6th International Conference on

Engineering Sciences

3-4 February 2023- Ankara, Turkey

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BOOK OF ABSTRACTS

6th International Conference on

Engineering Sciences

Ankara-Turkey

Welcome

It is a great pleasure for me to welcome you on behalf of the Organizing Committee, Ankara Yildirim Beyazit University, and the ICES to the 5th International Conference on Engineering Sciences (ICES 2023). This year the ICES conference takes place at the Ankara Yildirim Beyazit University. I believe that you find interesting the conference program, including, plenary talks, invited and contributed parallel sessions as well as social events. I hope that the conference can be the opportunity to meet colleagues, friends and establish new contacts for future research for all participants. I would like to express my personal thanks to all members of the Scientific and Organizing Committees for their work in preparation for the conference program.

Organizing Committee

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Conference Publications

batteries

Scopus | Clarivate Web of Science

Batteries is an international, peer-reviewed, open access journal of battery technology and materials published monthly online by MDPI.

smart cities

Scopus

Smart Cities is an international, scientific, peer-reviewed, open access journal on the science and technology of smart cities, published bimonthly online by MDPI.

Cleaner Engineering and Technology is an international, transdisciplinary companion journal to Journal of Cleaner Production that aims at preventing the production of waste, while increasing efficiencies in the uses of energy, water, resources, and human capital.

Scopus

Energy Engineering is a bi-monthly peer-reviewed publication. The journal invites researchers, engineers, scientists, technologists, planners, and policy makers to present their original research results and findings on all important energy topics.

Scopus

International Journal of Heat and Technology (IJHT) is an international, scholarly and peer-reviewed journal dedicated to providing scientists, engineers and technicians with the latest developments on heat transfer, fluid dynamics and thermodynamics, as well as their industrial applications.

Scopus | Clarivate Web of Science

International Journal of Sustainable Development and Planning (IJSDP) is an interdisciplinary journal covering the subjects of environmental design and planning, environmental management, spatial planning, environmental planning, environmental management and sustainable development in an integrated way as well as in accordance with the principles of sustainability.

Scopus

sustainability

Scopus | Clarivate Web of Science

Sustainability is an international, cross-disciplinary, scholarly, peer-reviewed and open access journal of environmental, cultural, economic, and social sustainability of human beings.

energies

Scopus | Clarivate Web of Science

Energies is a peer-reviewed, open access journal of related scientific research, technology development, engineering, and the studies in policy and management and is published semimonthly online by MDPI.
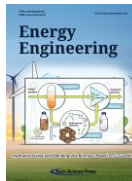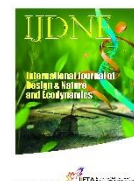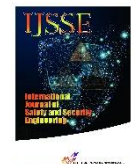
Cogent Engineering, An open access journal Publishes research on all areas of engineering and technology including computer science, chemical, mechanical, biomedical, civil and environmental engineering.

Scopus | Clarivate Web of Science

International Journal of Design & Nature and Ecodynamics (IJDNE) acts as a channel of communication for researchers from around the world working on a variety of studies involving nature and its significance to modern scientific thought and design.
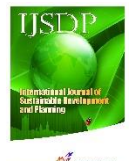
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International Journal of Safety and Security Engineering (IJSSE) aims to provide a forum for the publication of papers on the most recent developments in the theoretical and practical aspects of these important fields.

Scopus

Journal of New Materials for Electrochemical Systems (JNMES) is intended for the publication of original work, both analytical and experimental, and of reviews and commercial aspects related to the field of New Materials for Electrochemical Systems.

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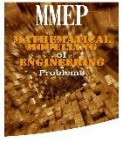
Mathematical Modelling of Engineering Problems (MMEP) is a top-rated international quarterly reporting the latest mathematical models and computer methods for scientific and engineering problems.

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Water and Environmental Sustainability (WES) is an open access quarterly Publication as a non-commercial publication. The title welcomes original, review, novel and high-impact contributions from the related Environmental science and Water issues.

DOAJ
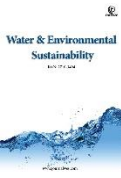
Researcher: Social Sciences Studies" (RSSS), which started its publication life in 2013, continues its publication life under the name of "Researcher" as of August 2020 within Ankara Bilim University.

Journal of Optimization and Decision Making (JODM) issued by Ankara Yıldırım Beyazıt University (AYBU) is an open access international peer-reviewed online academic journal published in English and Turkish in all fields of industrial engineering.

Anthropogenic Pollution Journal (Anthropog. pollut) - ISSN 2588-4646 is a peer-reviewed journal intended to publish original research papers in all main branches of environmental pollution research.

Scopus®

Journal of Smart Systems and Stable Energy (SSSE) is an international double-blind peer reviewed quarterly publication which publish high quality papers on all aspects of Energy and Sustainability.

DOAJ

Al-Rafidain Engineering Journal (AREJ) is a global, scientific and open access journal. The first issue of Al-Rafidain Engineering Journal (AREJ) was published in 1993 by the college of engineering – University of Mosul.

DOAJ

Journal of Turkish Operations Management (JTOM) issued by Ankara Yıldırım Beyazıt University (AYBU) is an international peer-reviewed online academic Papers.

Conference Statistics

457 scholars from **25** different countries are submitted their research to the 6th International Conference on Engineering Sciences. There are **375** abstracts have been accepted. Among all participants from different engineering sciences, academicians and professional researcher collaborate in their works. Also, three keynotes' talks are provided in special sessions.
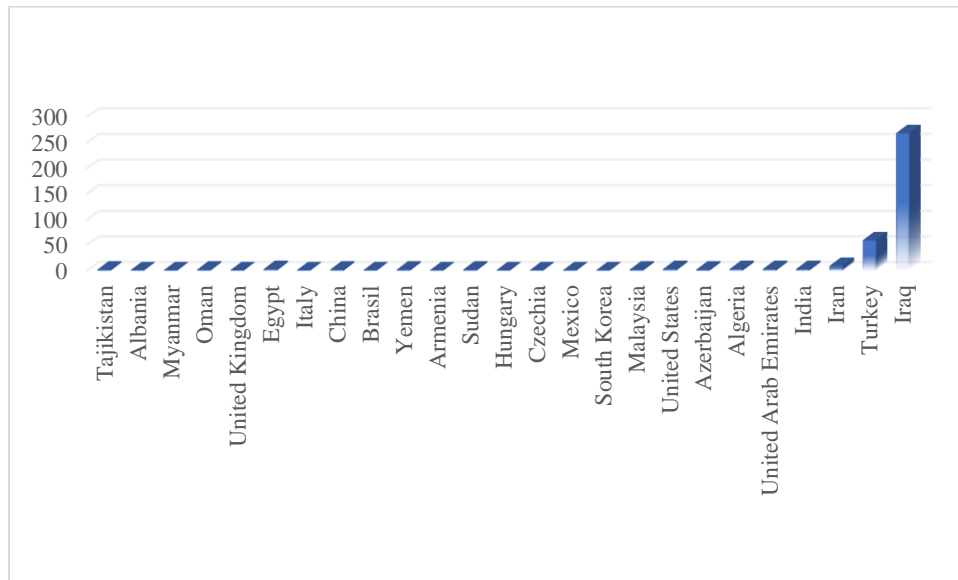
Usability analysis of mHealth application of e-Pulse in Turkey during the pandemic

Çiğdem Sıcakyüz[1], Yavuz Selim Özdemir[1] and Ayse Özdemir[2]
1. Department of Industrial Engineering, Ankara Science University, 06200 Ankara, Turkey
2. Department of Electrical - Electronics Engineering, Ankara Science University, 06200 Ankara, Turkey

Abstract: There have been many changes in the processes in the health sector due to technological developments in recent years. In order to increase the satisfaction of patients, especially many steps in the pre-and post-hospital processes of patients have been digitized with the help of mobile health applications. This study aims to investigate the usability of the "e-Pulse" mobile health application, officially used in Turkey during the COVID-19 period. The variables measuring usability were determined as performance and efficiency, usability, ease of use, content and availability, non-interruption, capacity, and the intention of using the application, and they were analyzed. The opinions of 71 users about the mobile health application were obtained through a questionnaire. Multiple regression analysis and Analytical Hierarchy Process were used as the analysis method. As a result of the analysis, several differences were found between the two methods. The difference between the technically experienced decision makers and the opinions of the end users of the application regarding the application will be used to improve the mobile health application and related services.
Keywords: e-Pulse, mHealth, usability, COVID-19, AHP, multiple regression analysis

Harmonics elimination of seven phase uncontrolled rectifiers driving dc motor

Myasar Salim Alattar, Firas Ahmed Aldarzy
Mechatronics Engineering Department, College of Engineering, University of Mosul, Mosul, Iraq

Abstracts: A multi-phase circuit played a great role in power and power; electronic system. traditional three-phase system was the first form, now a day electrical system witnessed a development and growth in number of phases to be more than three used with induction machine, power transmission system, renewable energy circuit etc. this work deals with building a new seven phase circuit derived from three conventional to drive dc motor. In this type of drives introducing low value of harmonics with output signal like dc form, however a noise generating in ac side of rectifier circuit needs to eliminate. The second goal of this work aimed to build a suitable passive filter connected in input side of rectifier to eliminate harmonics to get lower total harmonic distortion (THD)
Key wards: Power electronics, multi-phase, seven phase uncontrolled rectifiers, filters, harmonics, THD

An Evalution Model Proposal for Green Cities based on SWARA

Ezgi Aktas Potur[1], Ahmet Aktas[2], Mehmet Kabak[1]
1. Gazi University, Department of Industrial Engineering
2. University of Turkish Aeronautical Association, Department of Industrial Engineering

Abstract: The increase in energy consumption and carbon emissions due to rapid urbanization in the world has created concerns about sustainability. "Green Cities" have come into prominence to create a sustainable environment and reasonable ecological areas, with the cities growing increasingly and scarce resources starting to run out. Green cities are defined as cities that use renewable energy resources, adopt economically and environmentally friendly production, and consumption methods, and take care of the welfare and health of the society. In addition, it is expected that green cities will play an important role in the development of clean energy resources and reducing the impacts of climate change. There are plenty of criteria for evaluation of green cities, including aspects related to human, nature, the economy, and society. Therefore, it is important to use a multi-criteria decision-making (MCDM) method to determine the importance degree of these criteria. The main aim of this study is to propose a MCDM framework based on Step-wise Weight Assessment Ratio Analysis (SWARA) method to determine criteria weights for evaluation green cities. Obtained results from the study can be used by researchers and policy makers working on the development of operational, tactical and strategic decisions in green cities. It is thought that revealing the key criteria that support the development of green cities will contribute to increasing the quality of life in cities.
Keywords: Green Cities, Sustainability, Multi-Criteria Decision-Making, SWARA.

A Bi-objective Programming Approach to Intuitionistic Fuzzy Assignment Problem

Nurdan Kara[1], Hale Gonce Köcken[2] and Hande Günay Akdemir[3]
1. National Defence University, 34334, İstanbul, Turkey.
2. Department of Mathematical Engineering, Yildiz Technical University, 34220, Istanbul, Turkey.
3. Department of Mathematics, Giresun University, 28200, Giresun, Turkey.

Abstract: The assignment problem deals with allocating a certain number of jobs to workers in such a way that the total cost is minimized. Since the cost coefficients may not always be exact values, it is necessary to tackle the uncertainty of the parameters. A common way to handle imprecision is to use fuzzy numbers and fuzzy programming. Based on expert opinions, these parameters are generally constructed as fuzzy numbers. Moreover, the use of intuitionistic fuzzy numbers may be required to have more flexible modeling in case of experts' hesitation. The main purpose of this paper is to investigate the solution to the assignment problem having triangular intuitionistic cost coefficients and crisp decision variables. The single-objective intuitionistic problem is transformed into a bi-objective crisp problem to minimize the expected value and the fuzziness of the intuitionistic objective. Finally, the bi-objective problem is solved by the Zimmermann approach. To explain the proposed methodology, illustrative examples are provided.
Keywords: Assignment Problem, Intuitionistic Fuzzy Sets, Ranking Function, Multi-objective programming.

A Method for Solving Fully Fuzzy Linear Fractional Transportation Problem using Ranking Functions

Nurdan Kara
National Defence University, 34334, İstanbul, Turkey

Abstract: The fractional transportation problem, whose objective is to optimize the ratio between two cost and profit functions, etc., is widespread in real life. However, all parameters cannot always have exact values because of different causes such as weather conditions, road conditions, traffic conditions, etc. Thus, it can encounter uncertainty in the values of supply, demand, and transportation costs. A common way to handle imprecision is to utilize fuzzy numbers and fuzzy programming. The aim of this paper is to solve the fully fuzzy linear fractional transportation problem by having a triangular fuzzy number for all the parameters. This problem is converted into a three-component linear problem using Charnes Cooper's transformation. Then, the bi-objective crisp problem is obtained by applying ranking functions. Also, the problem is solved by constructing linear membership functions for each objective and using fuzzy programming. Finally, a numerical example is given to illustrate the proposed method.

Layer-based Synthetic Surface Model Generation

Yasemin Kılıç and Fatih Nar

Department of Computer Engineering, Ankara Yildirim Beyazit University, Ankara / Turkey

Abstract: Digital Surface Model (DSM) is a 2D-height representation of the elevations for a real-world scene where each pixel contains a height value. Such DSMs can be generated using photogrammetry techniques, LiDAR, or Synthetic Aperture Radar (SAR) interferometry. If satellite-based sensors are used, then resolution is generally not very high where airborne-based sensors can lead to high-resolution DSMs. DSMs can be very useful for various applications such as visualization and simulation of real-world scenes or even for computer games. They can also be used for various machine learning tasks such as image classification or object detection, i.e., using deep learning-based models. However, for all these tasks, existing data can be limited. Therefore, we propose a synthetic DSM generation model. We model the DSM generation problem as a combination of Digital Terrain Model (DTM), road-layer, man-made objects layer, and vegetation objects layer. For a given DTM, layers can be initialized randomly or with known shapes then our algorithm will converge to a plausible world-scene as a synthetic DSM. We combine learning and optimization approaches so that given DTM can generate various plausible high-resolution DSMs.
Keywords: Digital surface model, elevation model, generation, man-made objects, natural objects

Duty Cycle Optimization for Sliding Mode Control of Switch Inductor Quasi Z-Source Inverters

Ö. Özkara, A. Karaarslan
Ankara Yıldırım Beyazıt University, Ankara,Turkey

Abstract: The quasi-Z-source inverters (qZSI) are mostly used in many power applications because of their advantages such as high boost capability. To improve these advantages switch inductor quasi-Z Source inverters (SL-qZSI) have been developed. Based on the that topology many control approaches are proposed and in litrature sliding mode control (SMC) is seen leading control model for SL-qZSI. Even that method achieves for control ideal resutls, since the system includes nonlinear elements, the performance cannot reach intended outputs. So as to improve of working capacity of SL-qZSI, duty cycle should be optimized depends on SMC. In this study, after the duty cycle value is determined via SMC, it optimized with using Continuous Time Least Square Method (CT-LSM). This method has a statistical optimization approach as a cost function to converge the parameters of system in frequency ranges recursively. Therefore, the determined duty cycle is estimated via CT-LSM then SMC performance on SL-qZSI is increased. The outputs of the proposed model have been analyzed and explained in terms of simulation studies that are obtained by using Matlab/Simulink program.
Keywords: Switch inductor quasi Z source inverters, sliding mode control, continuous time least square method

A Comparison Study between Feed Forward and Recurrent Neural Network for Faults Classification in a Robot Arm System

Muhamad Azhar Abdilatef Alobaidy, Saad Zaghlul Al-khayyt,
Mechatronics Engineering Department, College of Engineering, University of Mosul, Mosul, Iraq

Abstract: Artificial neural network is one of the most intelligent and technical methods used in many field nowadays. The artificial neural network has been successfully applied to many hundreds of applications including fault diagnosis of the non-linear dynamic systems. The increase of using this type of technology is due to its accurate and high quality results. The fault detection or diagnosis field especially for robotics systems has become one of those fields depending on ANN. The mostly used process for the purpose of separation and classification is the artificial neural network (ANN). The multi- layer perceptron (MLP) with one hidden layer is used according to their accurate results obtained. Another type of neural network is the recurrent neural network which is more complex. The neurons of this type of network save the outputs of the processing nodes in order to feed them to the model again. In this paper, two types of NN are used, the MLP-NN, and also the Elman recurrent neural network (ERNN). These two type of NN are applied for different faulty and healthy signals of robot arm simulation, for the purpose of classification. The given results shown that the MLP-NN, is better in classification than the ERNN when applied for the same set of data. The MLP-NN given 100% classification accuracy as aresult.
keywords: Fault, Robot Arm, ERNN, MLP-NN, Detection, Classification

Synthesis of g-C_3N_4 nanocrystals and study the photocatalytic removal of Diclofenac from polluted water

Zahra Naderi Sani, Habib Mehrizadeh*
Department of Applied Chemistry, Faculty of Chemistry, Urmia University, Urmia, Iran

Abstract: Herein, graphitic carbon nitride (g-C_3N_4) nanoparticles were synthesized by thermal decomposition of treated melamine with acetic acid and were characterized by X-ray diffraction (XRD) and Field emmision scannin microscopy (FE-SEM). The prepared nanocrystals were used to photocatalytic removal of diclofenac as a pharmaceutical pollutant. The crystal structure of the nanoparticles was confirmed by XRD and the average crystalline size of the modified and unmodified g-C_3N_4, was calculated about 9 and 10 nm, respectively. The FE-SEM images showed that the synthesized particles were in the nanoscale with lowe aggregation. The prepared g-C_3N_4 nanoparticles exhibited a remarkable photocatalytic activity towards the removal of diclofenac. The effect of diclofenac concentration, radical scavengers, radical enhancers, andlight intensity were investigated on the photocatalytic removal efficiency of diclofenac. Based on the results, the initial concentration of 40 mg/L diclofenac and 1.5 g/L of photocatalyst under the optimum condition improved the removal efficiency up to 80.3% within 90 min of irradiation time.
Keywords: Advanced oxidation processes (AOPs); Nano-photocatalysis; Wastewater treatment; Diclofenac, Graphite.

Kinetic modeling of photocatalytic removal of Acid Blue92 in the presence of visible light by modified $ZnFe_2O_4$ nanoparticles with Cr^{3+}

Pouya Abedi, Habib Mehrizadeh
Department of Applied Chemistry, Faculty of Chemistry, Urmia University, Urmia, Iran

Abstract: In this study $ZnFe_2O_4$ nanoparticles were successfully synthesized by using the sol-gel auto combustion method and modified by Cr^{3+}. The synthesized $ZnFe_2O_4$ and $ZnFe_{2-X}Cr_XO_4$ were characterized by X-ray diffraction (XRD), and scanning electron microscopy (SEM). XRD pattern of prepared nanocrystals showed that $ZnFe_2O_4$ spinel formed in cubic structure and the mean crystallite size was 25 nm. FE-SEM image showed that prepared particles were in the nanoscale with low aggregation and porous structure. Photocatalytic activity of modified nanocatalysts were evaluated in removal of Acid Blue92 (AB92) solutions under visible light irradiation. The kinetics of photocatalytic processes were investigated by the Langmuir-Hinslowwood(L-H) model. The results showed that the photocatalytic removal of AB92 could be described by the modified (L-H) model. The kinetic model that developed besed on the kinetic data, was in good agreement with experimental data.
Keywords: Advanced oxidation processes, Spinel, Nanotechnology, Waste water treatment, Kinetics modeling

Study the bioremediation of chromium (VI) by proteus strain isolated from tannery wastewater

Roomina Sarshar[1], Habib Mehrizadeh[1*], Nima Sheykh Baygloo[2]

1. Department of Applied Chemistry, Faculty of Chemistry, Urmia University, Urmia, Iran
2. Department of Biology, Faculty of Sciences, University of Urmia, Urmia, Iran

Abstract: In this research, Chromium (Cr^{6+}) as an environmental risk was eliminated from aqueous solutions through bioremediation by a microorganism isolated from tannery industrial effluents. An indigenous bacterium *proteus* was isolated from locally tannery industrial effluent. The purified bacterium was characterized by PCR and Phylogeny analysis and was indicated. The isolated bacterium was used to remove Cr^{6+} from the aqueous solution. Effective parameters in the bioremediation of Cr^{6+}, such as initial concentration of Cr^{6+} and the presence of anion and cation were investigated. The results show that Cr^{6+} solution can be successfully removed by indigenous bacteria that isolated from tannery industrial effluent and the operational parameters effected on the removal efficiency. The maximum bio removal of Cr^{6+} was obtained about 85% at 8 hours for 10 ppm of Cr solution at the pH=6.6, 35 °C in the presence of 30 ml of isolated bacterium medium.
Keyword: Biological treatment; Heavy metals; Bacteria; Industrial effluent; Waste water

Bioremediation of lead from aqueous solutions by isolated bacteria from the effluent of the battery industry

Zhaleh Pirkharati[1], Habib Mehrizadeh[*1], Nima Sheykh Baygloo[2]

1. Department of Applied Chemistry, Faculty of Chemistry, Urmia University, Urmia, Iran
2. Department of Biology, Faculty of Sciences, University of Urmia, Urmia, Iran

Abstract: In the present study, a lead-removing bacterium was isolated and purified from the wastewater of battery industry. The molecular identification of bacterial strain was done by DNA extraction, PCR with primers designed for 16S rRNA gene, and sequencing. Sequence analysis using BLAST was shown that the isolated strain belongs to the *Pseudomonas* genus. The minimum inhibitory concentration of lead-removing *Pseudomonas* strain was measured by MIC method in 100-200-400-500 and 1000 ppm of lead concentrations, which was determined to be 500 ppm. The isolated bacterium was used to removal of Pb^{2+} from polluted water. The effect of different parameters that effected on the biological removal of Pb^{2+} by isolated bacterium including pH, concentration of bacteria and lead, and environmental temperature was investigated. The results showed that all studied parameters were effected on the bioremoval efficiency of Pb^{2+} by isolated bacterium and, the highest biological removal percentage of lead were obtained about 80.45% in the 20 ppm concentration of lead in the presence of 5 ml inoculum volume bacterium with pH pf 6 at the temperature of 25 °C.
Keywords: Heavy metal; Bioremoval; Pseudomonas sp.; Industrial effluent; Wastewater treatment

Design and Implementation Wireless Sensors Network for Monitoring Applications Using Arduino

Salah Abdulghani Alabady[1] and Sara Raed[2]
1. Computer Engineering Department, University of Mosul, Iraq
2. Technical Computer Engineering Department,Al-Hadba University College, Iraq

Abstract: Timely detection of building fires is essential to incident prevention or to reduce the negative impact on human health. This paper presents a Wireless Sensor Networks (WSN) system for temperature monitoring in a building. In general, sensor nodes in WSN are small, run-on batteries with very limited power resources; it is important to explore power management approaches to enhance network lifetime. The main aim of this system is to save energy costs and reduce power depletion. Through deploying many sensors, they collect information about the temperature and send it to the sink. The proposed method is based on multi-hop communication to decrease the transmission energy consumption and increase the monitoring coverage area. Furthermore, we computed the energy usage of the proposed system using Arduino and real sensor networks deployed indoors in the building. The results showed that the proposed system reduced the amount of energy consumed and increased the network's lifetime.
Keywords: Multi-hop routing, WSN, IoT, Monitoring applications, Energy-aware approach

Review of SCADA/ PLC System for Industrial Automation

Rafid Ahmed Khalil[1] and Falah Hasan Dakheel[2]
1. Mechatronics Eng. Dept., Mosul university, Iraq
2. Electrical and Computer Engineering, Altinbaş university, Turkey

Abstract: In any Industrial Automation there many devices connected together. In order to make them working suitably Programmable Logic controllers (PLC) are used. PLCs are industry-based computers that are used to monitor inputs and control the output based on the logic state of the input. Sometimes the system is placed in remote sites and in order to control the functions of such systems. This is known as Supervisory Control and Data Acquisition System (SCADA). SCADA/PLC is a system that enables to control, monitor and coordinates devices and components in real time from a remote location with the acquisition of data for analysis and planning from one central location.
Keywords: Automation industry, SCADA/PLC, HMI.

Toward building a sustainable environment using shading systems: A literature review

Mohammed Fatah Alsafar and Basman Mahmood Hasan Alhafidh
Department of computer, College of Engineering, University of Mosul.

Abstract: Energy saving using smart homes is of paramount importance to reduce heating and cooling energy consumption, and promote a sustainable environment. Awnings and blinds have exhibited their effectiveness to reduce heating gain in summer and cooling loss in winter, respectively. Awnings are more effective to reduce heat gain in summer than blinds, while the opposite is true in winter. Several approaches were presented by researchers to remotely control flat curtains and blinds as a step toward building sustainable environments in different scenarios. In this paper, we will review a number of studies related to the smart shading system and present the techniques used by researchers and developers around the world as a starting point for authors to assure optimization in the shading system. The literature studies the most significant natural factors of surrounding inside smart homes. As well as, it shows how far researchers have come in this field in order to get benefit from these studies for further development after carrying out a number of analytical operations and according to the application use.
Keywords: Energy Saving, Shading System, Blinds, IoT, Smart Home, Sustainability.

Campus Sustainable Development in Architecture Students' Projects- The Case of University of Mosul

Faris A. Matloob, Khalid j. Aldeen Ismail and Ahmad Y. Tohala
Department of architecture engineering, University of Mosul, Iraq.

Abstract: As centers of development and innovation, campuses need to be sustainable environments. Therefore, creating sustainable campuses has become an urgent goal for most countries. This is because the fact that achieving a sustainable campus would lead to improving a university community life socially, environmentally and economically. This would, in turn, conducive to a greater deal of innovation and success. Accordingly, this study deals with highlighting the academic role in adopting sustainable urban design characteristics. It concentrates on how architecture students' projects can consider the role of physical character in achieving sustainability of university campus. So, the study is aimed at exploring sustainability indicators in the academic projects of final stage- architecture

students. The main campus of University of Mosul was chosen as a case study for this research. To achieve its goal, the study adopts graphic analysis as a research method. Findings showed that key characteristics of urban sustainability have applied effectively as solutions for some design problems on the studied campus.

Influence of Magnetically Treated Irrigation Water on the Growth and Productivity of Tomato
(Rama F1 Italy)

**Ahmed A. M. Al-Ogaidi[1], Anmar Abdulaziz Altalib[1], Wisam Mahmood Ali[2] and
Bushra Khaled Majeed Albazzaz[2]**
1. Dams and Water Resources Engineering Department, College of Engineering, University of Mosul, 41002, Mosul, Iraq
2. Nineveh Agriculture Directorate, Mosul, Iraq

Abstract: Techniques of water magnetization have become one of the most popular treatments for enhancing the agricultural sector. The impacts of constant magnetic field treatment of irrigation water on Tomato (Rama F1) growth and yield were examined by conducting field experiments. The magnetic treatments comprised T1 treatment, which was irrigated with plain water, while the second T2 and third T3 treatments were irrigated with magnetized water of 50 mT (Millitesla) and 100 mT, respectively. The experiments were conducted in silty loam soil using completely randomized blocks of four replications (five plants in each replication). The results revealed that the performance of the treatments related to vegetative mass, number of flowers, and the average mass of one plant can be ranked as T3>T2>T1. Furthermore, no flower tip infection was observed in treatments T2 and T3, but in treatment T1 it was observed. In the plant set stage, the performance of the treatments regarding this trait was T1>T2>T3 which led to reduce the plant yield for magnetic treatments. Therefore, it is recommended to stop the magnetic irrigation during flowering stage only due to its sensitivity to magnetic treatment.
Keywords: constant magnetic field; magnetized water; tomato; plant yield; growth parameters

Accelerating K-Means Clustering with Parallel Implementations for Hand Written Digits Using Multicore CPU

Hasan F. Allayla and Zahraa T. Almokhtar
Computer Engineering Department Mosul University, Mosul, Iraq

Abstract: Data clustering has been implemented in the widespread applications, such as pattern classification, image segmentation, document retrieval and data mining. Clustering a large-scale data set has become difficult due to the increasing volumes of data sets produced by advanced technology. Many attempts have been made to build parallel clustering algorithms to tackle the issue. We present a parallel k-means clustering approach for handwritten digits by using a multicore CPU and a relatively straightforward technique for parallel programming. The experimental results show that the proposed technique scales well and processes large amounts of data efficiently on commodity hardware. Our clustering implementation uses digit pictures as input datasets, with a total of 60000 samples. Although using a relatively large data set, we obtain good results with speeds ranging from 12.5 to 36.4.

New Technologies Used to Detect Air Pollution and Prevent Asthma Attacks: Review

Saif Saad Fakhrulddin[1], Vaibhav D. Bhatt[2], and Sadik Kamel Gharghan[3]
1. Department of Biomedical Engineering, College of Dentistry, University of Mosul, Mosul, Iraq
2. Department of Biomedical Engineering, School of Applied Sciences and Technology, Gujarat Technological University, Ahmedabad, India

3. Department of Medical Instrumentation Techniques Engineering, Electrical Engineering Technical College, Middle Technical University, Baghdad, Iraq

Abstract: Asthma is an inflammatory disease that affects the lungs' airways. Breathing becomes difficult, and some physical activities become difficult, if not impossible. There are many technologies used for asthma monitoring and inhaler administration. This study presents a review of recent studies related to devices, sensors, and algorithms that can be monitored and control asthma patients. In addition, a comprehensive evaluation of the previous literature was conducted to identify anticipated instructional needs with technologies available for recommended resources to satisfy asthma management. Meanwhile, this work presents the related works that are interested in the relation between air pollution with asthma attacks and inhaler devices with self-management. This study appears that electronic sensors to monitor a patient's breathing system, self-management through inhaler adherence at precise times, and doctor control via telemetry technology can all help to reduce and prevent asthma attacks. Several technologies were studied and proven to be useful in improving patient technique as well as overall asthma results.
Keywords: air pollution, asthma, inhaler adherence, smartTracker, smartTurbo

Similarity as a relationship between inside and outside in Architecture (The Architect Richard Meier)

Shaymaa Kh. Abdulqader and Asma H. AL-Dabbagh
Department of Architectural Engineering / College of Engineering / University of Mosul

Abstract: The relationship between inside and outside is the first relationship in architecture and one of the most important relationships in its history, as the human being and since the beginning of creation, intends to carve out a part of exterior space to form an interior space of his own. So he creates what is known as (inside and outside), which may be the first terminology resulting from the establishment of the building, The architect aims constantly to create a relationship between the interior space and the exterior space, by manipulating the exterior mass, the interior space, and the common boundaries between them, and forming them in a way that leads to the creation of a relationship between the interior and the exterior spaces, creating a relationship of similarity or difference between the form of the exterior mass and the form of the interior mass of the interior space. The current research tries to study the phenomenon of "Similarity" as one of the characteristics of the relationship between inside and outside to describe specialty of the architect (Richard Meier) regarding this topic. In order to achieve the research objectives, the practical study choose three single residential houses and measuring the similarity variables in selected samples. The findings showed that there was a compatibility in the works of architect Meier in some geometrical properties, and difference in others, regarding the subject of the relationship between inside and outside. Moreover, approved that the less formal similarity between inside and outside the greater interaction between the whole house and its surrounding environment.

An Intelligent Method to Adapt the Distance Relay in Power System Fault Detection with Electric Vehicles Presence

Wisam Mohamed najem, Shaker M.Khudher and Omar Sh. Alyozbaky
Department of Electrical Engineering, Faculty of Engineering, University of Mosul, Iraq

Abstract: In this research paper, the effect of electric vehicles integration on performance of distance relay in the distribution system was studied. The number of electric vehicles integrated into the distribution system has been increased, and its effect on distance protection has been demonstrated using the MATLAB / Simulink software. The results showed that

integrating these vehicles led to poor performance, due to the occurrence of over-reach in distance protection and the difficulty of fault location. To obtain distance protection that could be adapted to the condition of the system, smart adaptive distance protection was proposed based on artificial intelligence. Artificial neural networks were used to detect the faults and to issue a trip signal with an accuracy of 99.9%. Meanwhile, fuzzy logic was used to locate the fault with an error rate of 0.00036 when 50 electric vehicles were added. Thus, smart distance protection was obtained that was able to adapt its characteristics to the number of added vehicles and to detect and locate a fault with high accuracy.

Keywords: Electric Vehicles, ANN, Distance relay, Smart System, Power System, Faults Detection

Rainwater harvesting of some catchment areas by small dam construction at Mosul City/ Iraq

Shatha Hazim AL-Zakar and Mays Ibrahim AL-Seeedy
University of Mosul, Iraq

Abstract: Surface and ground water are scanty in semi-arid and arid regions. Consequently, efforts are being made in these areas to collect and preserve rainwater as much as possible. In arid and semi-arid areas where rainfall pattern is irregular, much of these are lost as surface runoff, and as a result, there is a deficiency of water which results to risk for human beings. Under such conditions, water collection is a surrogate and is very important. Water harvesting is the collection of rainwater and runoff using different types of storage structures such as small dams, mainly for humans, irrigation and cattle consumption. Four sites of special hydrological and geomorphologic characteristics have been chosen and pointed in the drainage map of the studied areas (Talkif, Zummar, Alshoor, and Wadi-Almur) for the construction of storage structures on the main channel to impound and harvested rain and runoff water, forming surface storage reservoir and a model of the dam has been designed based on (Global Mapper program and Watershed Modeling System program,WMS). The geometrical dimension of each reservoir and bulk volume of water stored behind the dams of the four sites had been measured and calculated. The total volume of storage water behind the dams of the four sites could reach 75*106 m3. Several heights of the dam were selected in each basin and the submerged areas for each height were determined in order to determine the optimal height of the dam in each basin, which were (14.32,7.545,10.33 and 43.16 m) respectively.

Key words: Rain water harvesting, storage structures, reservoir, surface runoff, drainage system.

Design a fuzzy distance relay taking into consideration the impact of using UPFC

Ahmed Nasser B. Alsammak[1] and Hiba Nadhim A Al-Kaoaz[2]
1. PhD in Electrical Engineering, Assistant Professor, Electrical Engineering Department, College of Engineering, University of Mosul
2. Lecturer assistant, Electrical Engineering Department, College of Engineering, University of Mosul

Abstract: The increasing penetration of flexible AC transmission system devices within existing conventional power system grids has necessitated a relook into protective relaying schemes for ensuring grid security and integrity. Distance relay is one of the essential elements used in the protection of transmission lines, but it suffers from some obstacles in the detection of faults due to the presence of factors that affect the characteristics of their work such as: fault resistance (Rf), power flow and presence of Flexible Alternating Current Transmission System (FACTS) such as unified power flow controller (UPFC) which causes the insufficiency of the performance of the relay. In this paper, a new design of a fuzzy distance relay considers the impact of using UPFC in a sample power system, which will model in Matlab-Simulink.

Keywords: UPFC, Distance Relay, Fuzzy Logic, Power Flow, FACTs, Matlab-Simulink

The Recognition of Iris and Pupil Using a Low-Complexity Algorithm for Biometric Authentication

Nada I. Najim[1] and Dwlat Mustafa Sulaiman[2]
1. University of Mosul, College of Engineering, Mosul, 41002 IRAQ
2. Technical Informatics College, Duhok polytechnic University, Dohuk

Abstract: Any biometric system's objective is to identify people based on a certain trait that the people being examined possess. One of the most trustworthy and accurate biometric identification methods now in use is iris recognition. Since patented algorithms are used by the majority of commercial iris recognition solutions, open-source developers are forced to create and employ alternative algorithms. In this contribution, utilizing a greyscale image as the input data, we suggest two simple algorithms for identifying and separating the pupil and the iris. Since the suggested algorithms don't make use of complicated operations or image transforms, they can be easily implemented in any device. Additionally, we demonstrate a performance comparison with an implementation of our suggested methods and other algorithms.

Keywords: Human eye, Iris detection, Pupil detection, Biometric Authentication, Low-Complexity Algorithm.

Performance of recycled brick as coarse aggregate to produce self-compacted concrete

Baraa J. M. AL-Eliwi[1], Oday A. Salih[1], Ahmed A. Mohammed Ali[1] and Mohammed Awaf[2]
1. Department of Civil Engineering, College of Engineering, University of Mosul, 41001 Mosul, Iraq
2. Ministry of Youth and Sports

Abstract: Various recycling methods for construction and demolition wastes (CDW) have been developed recently. Recycled coarse aggregate (RA) from waste concrete or brick is the alternative to natural coarse aggregate (NA) to produce recycled aggregate concrete (RCA). Self-compacting concrete (SCC) can be poured under its weight with little or no vibration and without segregation or bleeding. SCC facilitates and ensures proper filling and good structural performance of restricted areas and heavily reinforced structural members. In this study, different levels of the replacement ratios of the recycled bricks with natural coarse aggregate were used to investigate the fresh and hardened properties of the self-compacted recycled concrete aggregate (SCRCA). The study investigates the behavior of SCRCA produced with recycled brick as coarse aggregate with different replacement ratios (0%, 10%, 20%, 30%, and 40%) of natural coarse aggregate. The required tests, such as concrete compressive strength and flexure strength of SCRCA, were carried out in addition to the properties of SCC were performed to slump flow property, V-funnel flow test, and L-box test was also measured.

Distribution Models for Trips in Tikrit City

Aodai Abdul-Allah Ismail, Mohammad Ahmad Humoody, and Abdul-Rahman Adnan Ibrahem
University of Tikrit, College of Engineering, Iraq

Abstract: It is important to conduct a study of urban transportation planning for our cities to extract trips models of the zonal household if the goal is the process of reaching a sustainable road network. This research is devoted to finding a special model for trips distribution in the city of Tikrit/Iraq. This city is characterized by its distinctive population and low intensity. The city was divided into 15 residential zones that generate trips based on the data collected for trips from the trip generation model, which was offset by several attempts depending on the trips production instead of the attraction. The trip distribution was carried out using the gravity model method. The city map is used to extract the vehicle friction factor. It was done on the GIS system for the specific zones centers that were carried out by previous operations on the same system. The process of finding mutual

trips between the city's fifteen zones was achieved by several attempts and by making corrections on the values and results. The final step is to extract the ultimate matrix for the O-D trip distribution matrix between the city's zones on the road network. Thus, the application of subsequent models of mode choice and traffic assignment of the road network in Tikrit city can be accomplished.

Keywords: Trip Distribution Model, gravity model, Urban Transportation planning, (O-D) matrix, Balancing.

Rainwater harvesting of some catchment areas by small dam construction at Mosul City/ Iraq

Shatha Hazim AL-Zakar and Mays Ibrahim AL-Seeedy
University of Mosul- Iraq

Abstract: Surface and ground water are scanty in semi-arid and arid regions. Consequently, efforts are being made in these areas to collect and preserve rainwater as much as possible. In arid and semi-arid areas where rainfall pattern is irregular, much of these are lost as surface runoff, and as a result, there is a deficiency of water which results to risk for human beings. Under such conditions, water collection is a surrogate and is very important. Water harvesting is the collection of rainwater and runoff using different types of storage structures such as small dams, mainly for humans, irrigation and cattle consumption. Four sites of special hydrological and geomorphologic characteristics have been chosen and pointed in the drainage map of the studied areas (Talkif, Zummar, Alshoor, and Wadi-Almur) for the construction of storage structures on the main channel to impound and harvested rain and runoff water, forming surface storage reservoir and a model of the dam has been designed based on (Global Mapper program and Watershed Modeling System program,WMS). The geometrical dimension of each reservoir and bulk volume of water stored behind the dams of the four sites had been measured and calculated. The total volume of storage water behind the dams of the four sites could reach 75*106 m3. Several heights of the dam were selected in each basin and the submerged areas for each height were determined in order to determine the optimal height of the dam in each basin, which were(14.32, 7.545, 10.33 and 43.16 m) respectively.

Key words: Rain water harvesting, storage structures, reservoir, surface runoff, drainage system.

The effects of masonry infill walls on the seismic performance of reinforced concrete structures under the effect of far-field earthquakes

Vafa Morsali, Frhad Azizi, Navid Ghaderpoor Iranshah
Department of Civil Engineering, Saghez Branch, Islamic Azad University, Saghez, Iran

Abstract :Due to the complexity of earthquakes, most seismic codes do not consider many factors that may influence the response of structures, or they mention guidelines in general. There are a number of examples of infill walls affecting the behavior of structures, particularly in far-field earthquakes. To account for the effects of infill walls, the Iranian Code of Practice for Seismic Resistant Design of Buildings only reduces the period of the structure. As a result, filler walls in the plane of structural frames result in significant changes in the properties they possess; therefore, the resistance, stiffness, ductility, distribution of internal forces, and other characteristics of such a frame with an empty frame differ greatly, both in elastic and inelastic areas. Different researchers have proved this difference through their theoretical and experimental research. Therefore, in the design of frames with infill walls, their effects cannot be ignored and need to be considered somehow in seismic analysis, design, and evaluation. Using 7 far-field earthquakes, a nonlinear time history analysis was performed on reinforced concrete frames with and without masonry infill walls. The plastic hinges were analyzed and the maximum relative displacements between the stories were determined. According to the

results, the presence of infill walls reduces the number of plastic hinges as well as the maximum relative displacement between the stories.

Keywords: time history analysis, infill wall, plastic hing, far-field earthquake

Towards a Wearable Embedded System for real time feedback in health and sports applications based on Bluetooth Wireless Sensor

Mohammad T. Mohammad Rabee M. Hagem, Omar Kanaan Taha and Hamed Abd Ul Aziz
Lecturer, College of Engineering, University of Mosul, Iraq

Abstract: Real time feedback for sports and health applications is important for monitoring athletes to improve their performance and for patient and elderly people to save their lives. This paper presents a system based on Bluetooth wireless sensor to give real time feedback. This system is an example of IoT technology. Experiments are conducted in air and in water to examine the signal strength with distance in both medium. The results showed that this system is feasible in air for long distances and in water with and without turbidity for short distances.

Keywords: Bluetooth; Duo; Embedded system; Wireless Sensors

Accurate Brain Tumor Detection and Classification Model based on MRI Images Using Deep Learning Technology

Bashra Kadhim Oleiwi, Layla H. Abood
Department of Control and Systems Engineering, University of Technology-Iraq, Baghdad, Iraq

Abstract: Brain tumor is most difficult, serious and aggressive disease in children and adults which can be considered the second leading cause of death globally, so early detection of cancer can prevent death. In order to obtain an accurate diagnosis avoiding surgery, it is important to develop an efficient brain tumor detection and classification model based on MRI images using deep learning technology. The basic aim of this study is to build a new Convolutional Neural Network (CNN) that would detect and classify the types of brain tumors based on Kaggle dataset named brain tumors classification Magnetic Resonance Imaging (MRI) which contains three tumor types and no tumor type. The main objective of this study: firstly, dataset collection, secondly, images pre-processing and then followed by exploration the different design options for CNN-based brain tumor recognition like types of optimizers, number of layers, stride size, receptive field, kernel size and padding. The performance of proposed of CNN network was evaluated and the accuracy of the testing model was 100% for testing dataset. The proposed CNN architecture has successfully applied and ability to recognize the brain tumors with high efficiency.

Comparison of the performance of reinforced concrete structural systems with flat slab roof systems

Vafa Morsali[1*], Ata Karampoor[1], Somaye Malmir[2]
1. Department of Civil Engineering, Saghez Branch, Islamic Azad University, Saghez, Iran
2. Department of Physics, Payame Noor University, P.O, Box 19395-3697, Tehran, Iran

Abstract: To control the rigidity and stability of the structure, it is important to know and understand the types of suitable structural systems and analyze their strengths and weaknesses. However, taking into account the project conditions such as the height of the structure, lateral loads that govern the structure, available technologies and materials, and the type of use of the building, is of paramount importance in choosing the type of structural system. In this study, the main objective was to consider the number of 32 analytical models using three types of structural roofs commonly used in Iran, namely one-way slab using hollow blocks, slab-beam and flat slab in three types of structural systems: intermediate reinforced concrete moment-resisting frame, intermediate dual frame-wall system, reinforced concrete dual system and shear wall systems, which

have been analyzed by using the time history analysis method, the most natural method of analysis and compatible with the behavior of structures during an earthquake, with the use of ETABS software and valid regulations. In conclusion, the results of the analysis indicate that flat slab roofs are the safest and best roofs among all types of structural systems, and engineers can implement engineering structures that are structurally safe, as well as economical, with the appropriate choice.

Keywords: time history analysis, flat slab roofs, structural roofs, lateral structural systems

Design Wireless Infrastructure in Term of Communication Network for Water Directorate Applications in Mosul City

Firas S. Alsharbaty, Fawaz Y. Abdullah, and Muhammed T. Yaseen
Electrical Engineering Department, Engineering college, Mosul University, Mosul, Iraq

Abstract: Water scarcity, and drought in addition to population growth accompanying climate change are dangerous factors with serious consequences related to potable water file unless appropriate action is taken urgently to deal with these issues, especially with large populations in the major cities as well as the suburban areas. This work presents a wide area network for efficient management of the freshwater quantity in the major cities. Hence, it adopts Mosul city as a typical case that contains about 100 residential districts require 100 sites of water monitoring in the different locations in the city where each site owns three different types of water sensors (water flow, water level, and pressure) in addition to the video surveillance application. The different sites send the data to the control center of water for control and monitoring. The suggested communication network addresses the requirements of the water section applications in term monitoring at the real time. Further, this work exploits WiMAX system as a communication network infrastructure to handle the advantages of the resilience, low-cost maintenance, expansion, and respected system capacity. The suggested network offered an excellent behavior in terms of latency (maximum latency is less than 57 msec) and data traffic of the adopted applications.

Keywords: Real time monitoring, Water section, WiMAX, Wireless network,

Global and local robot navigation combination for mobile robot obstacle avoidance

Zead Mohammed Yosif[1], Basil Shukr Mahmood[2] and Saad Z. Alkhayat[1]
1. Mechatronics Engineering Department, Collage of Engineering, University of Mosul
2. Computer Engineering Department, Collage of Engineering, University of Mosul

Abstract: Nowadays, robots can be seen in different areas of life. Where we can see it in industrial, agricultural and health applications. Mobile robots can perform some tasks that are too risky for a human to perform. Currently, most of the work is focused on the implementation of artificial intelligence and other algorithms that depend on the behaviour of nature. In this paper, an important issue in the mobile robot was addressed, which is to drive the robot until reach the destination. A combination between global and local mobile robot navigation have been proposed to address the challenge of dynamic obstacle avoidance. A-star is a well-known heuristic path planning algorithm used to find an initial path between start and destination point. An Adaptive Neuro-Fuzzy Inference System (ANFIS) proposed for dynamic obstacle avoidance. The ANFIS makes a decision as a reaction of a mobile robot to prevent the collision. There are three inputs to the ANFIS (relative velocity, distance, and angle) between mobile robot and obstacle. The outputs of the Adaptive Neuro-Fuzzy Inference System are the velocity and steering angle of the mobile robot. The simulation results for the tested cases show the capability of the proposed controller for avoiding static and dynamic obstacles in a fully known environment. The Adaptive Neuro-Fuzzy Inference System enhances the performance of

the proposed controller resulting in the reduction of path length, processing time, and a number of iterations.

Risk Assessment Model of Construction Buildings in Iraq by Fuzzy Logic Application (Case Study Baghdad -Al Rusafah)

Rana Jabbar Kasid Jalhoom and Ahmed Mohammed Raoof Mahjoob
Building and Construction Engineering Management, Civil Engineering Department, University of Technology, Baghdad-Iraq

Abstract: Numerous unknowns make it challenging for businesses of all sizes to accomplish their aims. "Risk" refers to the impact those unknowns have on an organization's goals. Risks are more likely to occur in the construction industry because of the uniqueness, complexity, and volume of tasks involved in any construction project. Risk management is essential in the construction sector because of the constant struggles and lawsuits that arise from risk. Due to the high cost of completing projects in the construction industry, all available resources must be used effectively. While making judgments, construction projects often deal with inaccurate data; fuzzy set theory can accommodate this. Fuzzy set theory's success in explaining thinking has led to its use in the risk management industry. A questionnaire was developed and distributed to stakeholders who are working in construction sectors in Baghdad City (AL Rusafa sector) during 2017-2020, to analyze the likelihood and impact of 66 potential risks during building projects. This study details the methodical procedure for assessing risk and using MATLAB's Fuzzy Logic Toolbox to make sense of all the reported risk factors.

Keywords: Risk, Fuzzy Set Theory, Fuzzy Logic, Management Goals, MATLAB.

Design Characteristics of Post-Coronavirus Architecture: Prevention in Architecture

Shaymaa Kh. Abdulqader1[&2*], Leng P. Chung[2]
1. Department of Architectural Engineering, College of Engineering, University of Mosul, IRAQ,
2. Faculty of Built Environment and Surveying, Universiti Teknologi Malaysi, UTM Skudai, Johor, MALAYSIA

Abstract: Architecture stands as a witness to the succession of eras and times, a mirror of society, and an indicator of the social, cultural, environmental, political and economic situation of each era, affected by several environmental, economic, social and other systems. These systems usually put their clear imprints on the thought and philosophy of architectural design in the world. Today, the Covid-19 pandemic was one of these systems that greatly affected the thought of both architectural and urban design. As it put the architect in front of several questions, will the standards for the spaces of the interior spaces in the buildings change? Will this change at the level of city planning as well? Should the spaces be reorganized to be occupied by new events and activities? How should architecture be dealt with as a refuge from the various epidemics that the world may be exposed to? And many other questions that had to be searched for and categorized to become a method for architects, planners and urbanists in their future work. Design / Methodology / Approach: The research paper relied on the descriptive analytical approach of the previous literature to discuss solutions for architecture and urban design in the face of the Corona virus in particular and the epidemics that the world may witness in the future in general. Results: Evidence from previous literature helped in developing a curriculum for architects, urban designers and planners to serve as a guiding principle in creating architecture for the post-Corona era, that accepts the changes that occurred in public and private life, with the aim of achieving better results for the prevention of epidemics or a better response to them. Originality / Value: The main contribution of this work lies in collecting the design characteristics of the architecture of

the post-Corona era to be an approach for all architects, urban designers or planners towards better architecture all over the world.
Keywords: Architectural Design; Urban Design; Planning.

FPGA-SoC based object tracking algorithms: A Literature Review

Marwan Abdulkhaleq Al-yoonus and Saad Ahmed Al_kazzaz
Electrical engineering Dept. Mechatronics engineering Dept. University of Mosul, Iraq University of Mosul, Iraq

Abstract: Systems for object detection and tracking are becoming increasingly important in practical applications today. Many research and developments groups are interested in improving the performance such systems, and numerous methods have been developed and proposed. Additionally, computer vision is constantly developing and implemented on reconfigurable and embedded systems. The purpose of this study is to present the past and recent researches works in the field of visual tracking systems that used FPGA and FPGA-SoC platforms. The study includes a brief description of several popular algorithms related to the main characteristics and in which field is preferred. Resource utilization was also considered in this study to present the most and the least resources used to implement different algorithms. The study found that flip-flops (FF) and lookup tables (LUT) are usually used, while BRAM, DSP, and multipliers had the lowest percentage utilization. Due to the recent development in the production of advanced processing systems, there is an increase focusing on employing FPGA-SoC platforms in visual surveillance systems. The reason behind that is their ability to implement complex processing using both hardware and software co-design to gain high performance in less design time compared with using only FPGA based platforms.
Keywords: Background subtraction; detection algorithm; frame rate; tracking algorithm; FPGA resources.

Power Density Enhancement of Three-Phase Rectifier

Salwan Samir Sabry and Ahmed Nasser B Alsammak
University of Mosul, Al-Majmoaa Street, 41002 Mosul, Iraq

Abstract: This paper introduces an isolated three-phase six-pulse rectifier using a solid-state transformer. The line frequency utility grid voltage is modulated by an AC-AC converter. The AC-AC converter exists two parts. The first is the rectifier converter, and the second is the inverter converter. Then after, a six-pulse three-phase diode rectifier is powered by the medium frequency transformer. The main idea of this study is to improve the power density of an isolated three-phase six-pulse rectifier using a medium-frequency solid-state transformer. Generally, the future goal of a power electronics converter is to achieve an efficient converter with higher power density. Having high power density implies less weight, volume/size for power electronics converters. The study shows that the grid line current has the same frequency contents as a regular six-pulse diode rectifier. In other words, the presented concept results in smaller weight and size while maintaining the same input current quality as a regular six-pulse rectifier. High power density power electronics converter would be extremely valuable for applications such as electric vehicle railways and data centers. Multiple core materials for the medium frequency transformer were considered in this study in terms of performance and cost. The proposed approach is reliable and easy to use. The solid-state transformer contributes to isolation and improves the overall converter's power density. High power density is realized without difficulty instead of using a bulky line frequency transformer. Simulation results for the 10kW converter were verified using MATLAB Simulink.
Keywords: Isolated three-phase six-pulse rectifier, Higher frequency solid state transformer

Exergy analysis of photovoltaic solar system using fixed, single – axis and dual – axes tracking systems under climatic condition of North Iraq

Omar Mohammed Ali1, Veen Sagvan Qader, Renas Hassan Saaeed
Mechanical University Zakho, Collage of Engineering, University of Zakho, Zakho, Iraq

Abstract: The current study includes the exergy analysis for the experimental investigation of the PV solar system using fixed, single axis and dual axes tracking systems to investigate the tracking systems on the exergy quantities and efficiency. The Experimental tests have been measured for a 5th September day in 2022 under climatic condition of the Zakho city/north of Iraq. The findings displayed that the tracking systems have significant influence on the exergy performance. The electrical and thermal exergy output increase with the use of the tracking systems, while the exergy losses for single and dual axes tracking systems decreases when compared with the fixed solar plane. The percentage increase in the electrical exergy efficiency for PV solar panels using dual – axes and single – axis tracking systems as compared with those of fixed solar panel between 2 – 50%.

Theoretical Behavior Investigation on Cold formed Steel.

Abdullah Ahmed Saadoon and Suhaib Yahiya Qasim
Mosul University, College of Engineering.

Abstract: Along this paper a study shows the behavior of a cold formed beam-column assembly's behavior while the beam free end is carrying a vertical load, the configuration of the system together consisted of 3mm steel plates forming the body of the beam and the column while it's 6mm for the gusset plate connected together using 16mm steel bolts following the (Eurocode 3 BS EN 1993-1-8). The system was experimentally investigated by Nadya et al.2018. And this study carried on the investigation further more by creating a numerical model using finite element method using ANSYS APDL to compute major forces affecting the connection; it's worthy to note that a load distributor plate was used at the load application area to avoid any unwanted local failure. Modelling any system contains bolts can be achieved by multiple ways related to finite element while the most precise way is to model the bolts as they are in reality, solid bolt modeling was used to simulate the real connection of the experimental steel system using (Solid185) for the bolts and element (Shell181) for the other components. The study provides insight into the behavior and failure modes of the assembly. The model result for the load difference percentage value at failure of the finite element model to the experimental model is 9.7% and it's 0.7% for the difference in deflection value at failure also. After verifying the model results and comparing the failure pattern a modification to the main characters of the system is induced to extend the capacity of each character effect and for that a full finite element analysis is conducted on (10) new samples each one of them gave different numbers and curves as when decreasing the flange thickness to 2mm and keeping all the characters the same, the failure load dropped by (66.93%) and a minimized deflection in about (6%) of the standard characters while increasing the flange thickness to (4.5mm) the analysis revealed that the failure load was (239%) higher than the normal state with less deflection in about (3.5%) and so on the complete set of modifications showed an extended understanding of the behavior.

Evolution of the design characteristics of prayer halls in contemporary Turkish mosques

Alaa Abdulkareem Suleiman and Ahmed Abdulwahid Dhannoon
Architectural Engineering Department, College of Engineering, University of Mosul, IRAQ

Abstract: Contemporary Turkish mosques were chosen in the study because they represent a development of a basic and important pattern in mosque architecture, and the prayer hall was chosen as an interior space characterized by design characteristics rich in its interior elements, and because Turkish mosques witnessed important design developments due to many influences that gave them new features and characteristics that

appeared in contemporary Turkish mosques. Previous studies on this topic were initially reviewed to determine the research problem, which is determined with (a lack of knowledge related to the development of the interior design characteristics of the prayer hall in contemporary Turkish mosques). Thus, the aim of the research was (to reach sufficient knowledge of the development in the design characteristics of the prayer hall in contemporary Turkish mosques), and to achieve the goal of the research, a theoretical framework was built for the design vocabulary Characteristics of the prayer hall, using previous studies, and then this framework was applied in a practical statistical study on a group of samples of contemporary Turkish mosques aimed at identifying the most important developments in the design characteristics of prayer halls for contemporary Turkish mosques.

Keywords: Turkish mosques, prayer halls Design, The interior spaces of mosques, Elements of the prayer hall

Improving Power Quality with UPQC: A Review

Ahmed Yahyia Qasim[1,2], Fadhil R. Tahir[1] and Ahmed Nasser B. Alsammak[3]
1. Electrical Engineering Department, Collage of Engineering, University of Basrah, Basrah, Iraq
2. Ministry of Industry and Minerals, SDI, Mosul, Iraq
3. Electrical Engineering Department, Collage of Engineering, University of Mosul, Mosul, Iraq

Abstract: This study reviews the literature on enhancing power quality (PQ) using the unified power quality conditioner (UPQC). With the growing use of non-linear and electronically switched devices in distribution lines and industries, PQ issues have become essential. Distribution Flexible AC Transmission (DFACTs) is a novel idea developed to enhance the performance of the distribution network. One of the DFACTs is unified power quality conditioner, which can improve PQ problems, such as voltage sag/ swell, single-phase fault, three-phase fault, voltage flicker, compensation of current and voltage harmonics, compensating for the load's reactive power, unbalanced load, etc. It is possible to build the UPQC in to protect sensitive loads that are located inside the distribution system and to prevent any distortion from coming from the load side. This paper thoroughly discusses the various configurations of UPQC systems for single and three phases. The UPQC is categorized based on factors such as voltage sag compensation, supply system, converter topology, and system configuration. According to its function, topology, and application, many researchers have given the UPQC several various names, like Multi-converter UPQC (UPQC-M), Interlined UPQC (UPQC-I), Distributed Generator UPQC (UPQC-DG), right shunt (UPQC-R), etc. This study is meant to provide a detailed overview of the many possible UPQC system formations.

Determination of suitable sites of water harvesting dams in the northeastern of Nineveh province

Saleh Mohammed Saleh Zakaria, Yousif H. AlAqeeli,
Ali A. Abdulmawjood and Omar M. A Mahmood Agha
University of Mosul, Engineering Collage, Dams and Water Resources

Abstract: The increasing of water demand resulting of population growth, climate change, and the water policies of countries of Iraq led to the needing to specify other sources of water in the arid and semi-arid areas of Iraq. The aim of this study is to harvest the rainwater that produced by the catchment area of seasonal Al-Khawser river. The Easter side of Mosul city is divided by the stream flow of this river then combined to Tigris river inside of Mosul city. Three sites of rainwater harvesting dams (RWH) were chosen in the catchment of this river. The storage volumes of RWH reservoirs were estimated using Watershed Modeling System (WMS) based on Soil Conservation Services – Curve Number (SCS-CN) method. The elevation-Area-Storage curves of those RWH reservoirs were identified with live storage, dead storage, flood storage, and outlet capacities (sluice gate, bottom out let and spillway). The results of the study

showed that sufficient quantities of surface runoff water are available in the Al-Khawser Basin, which can be stored in those three reservoirs 3.17, 3.3, and 1.82 MCM.

The Impact of Asphalt and Coarse Aggregate in Longitudinal Asphalt Surface Pavement Depression

Duaa Aqeel Ali, Abdulhaq Hadi Abedali Alhaddad
Department of highway and transportation Engineering, College of Engineering, Mustansiriyah University, Baghdad, Iraq

Abstract: Reducing the Permanent deformation of flexible pavement when subjected to traffic load, is one of the most noticeable pavement problems worldwide. It is a significant safety concern to transportation agencies because it affects the handling of vehicles. Many studies found that 55 to 80% of rutting appeared in the surface course pavement. Because this layer contains 90-95% aggregates by weight, understanding the characteristics of the aggregate component is critical. The main reason that caused Permanent deformation in the surface course is related to the gradation of aggregate. This study aims to investigate the effect of different percentages of aggregate gradient and the asphalt ratio and test by using a simulated manufactured wheel track device to evaluate asphalt mixes' rutting resistance. The experimental test was carried out on asphalt specimens' mixture using three sizes of aggregates at maximum sizes of 19 mm with three representative asphalt ratios calculated through several experiments carried out at 4.9%, 5% and 5.1%. The experimental test result showed that with the decrease in asphalt ratio, the rutting of asphalt concrete decreased.

Numerical and experimental analysis of Flow through a various configurations of inner dimpled tube heat exchanger

Mousa Aqeel Ali, Saad Najeeb Shehab
Department of mechanical Engineering, College of Engineering, Mustansiriyah University, Baghdad, Iraq.

Analysis of Flow through a various configurations of inner dimpled tube heat exchanger are investigated experimentally and numerically at different Reynolds numbers. In this study, numerical analysis has performed on two types of dimpled tubes (Inlined and staggered dimpled arrays) with an angle of 60º and 90º at pitch of X/d=8 and a 6 mm diameter. The study also discusses experimentally dimpled tubes with a specified configuration manufactured at a staggered arrangement pitch ratio X/d=8, with an angle of 60 at 6 mm diameter. In order to compare the results of the experiments, tests with plain tubes and tubes with dimples are also conducted. The thermal performance factor TPF also is presented. According to Nusselt number comparative testing results, dimples tube with staggered array improved heat transfer between 7.55 and 11.2 times the smooth tube. The numerical analysis demonstrated close results in terms of nusselt number compared with the corresponding results from experimental tests. The percentage difference between the numerical and the experimental results ranges from7.5- 10.6% higher for numerical. The numerical results demonstrate that staggered arrays of dimpled tubes improve the Nusselt number by around 50% over a lined array. The Nusselt number increases as angle distribution of dimple decreases. The angle distribution of 60º gives larger Nusselt number compared with tube that has 90º The TPF results varied from (1.67 to 5.22) for tubes with line arrangement while (4.91 to 8.633) for dimple tubes with a staggered arrangement to a range of Reynolds numbers (5000-20,000).

Mechanical Properties of Recycled Coarse Aggregate Self Compacting Concrete at Different Curing Conditions

Nadiya Sadeek Al Saffar[1] and Salwa Mubarak Abdulla[2]
1. College of Engineering, University of Mosul, Iraq
2. College of Engineering, University of Mosul, Iraq.

Abstract: The study describes an experiment that looked at the effects of several curing techniques on the mechanical properties of self-compacting concrete (SCC) that used recycled aggregate instead of natural coarse

aggregate. The specimens were cured for 7, 14, and 28 days using two distinct curing methods (normal 20 °C water and air cure). For each concrete property, an average of three specimens were used (splitting strength, compressive strength, and flexure strength). Natural coarse aggregate replacement ratios were 0 %, 30 %, 60 %, and 100 %. The influence of using RCA upon the behaviour of SCC in the fresh and hardened states i.e., Slump test, L-Box test, and V-Funnel test, compressive, flexural, and splitting tensile Strength is investigated. The results showed that regardless of the age of the concrete, all concretes cured in water gave the greatest values, followed by those cured in air. The results indicate that as the recycled aggregate replacement ratios increase, the strength of SCC decreases. The scc with sufficient compressive strength is obtained using a replacement ratio 30% of recycled aggregates. according to the current investigation.

Keywords: Compressive strength, Flexural strength, recycled coarse aggregates (RCA), Splitting tensile strength, Self-compacting concrete (SCC).

A new bidding strategy based on renewable energy sources and energy storage system

Hasan Hosseinzadeh
Department of Mathematics, Ardabil Branch, Islamic Azad University, Ardabil, Iran

Abstract: In this work, a new model has been developed to examine and present a bidding method and a suitable strategy for large consumers. In this paper, the sources of energy supplies are: wind micro turbines, energy storage systems, renewable energy sources (wind turbine and solar system) and bilateral contracts. The method used in this study is a hybrid robust-stochastic method in which the load uncertainty, temperature and wind speed, the amount of solar radiation and the cost of purchasing energy are considered in the proposed model. Generally, two robust optimization and stochastic methods have been used for uncertainty modeling that load uncertainty is modeled with the first method and other uncertainties modeled with the second method. Also, two types of weibull and normal distribution are utilized, that the first distribution is used to create wind speed scenarios and second distribution to create solar radiation, temperature and electricity market prices scenarios. Bidding and offering curves have been obtained via a mixed-integer linear programming model and this model has a significant effect on uncertainty in the demand of the large consumers. By examining the results, it is seen that the price of energy buying by large consumers is $ 40,060, while this amount increases to $ 50.560 in the presence of load uncertainty.

Keywords: Bidding and offering strategies, Large consumer, Uncertainty, Hybrid robust-stochastic approach, Bilateral contracts, Photovoltaic system and wind turbine

New mixture wind turbine and battery storage system for price offering by considering the uncertainties

Hasan Hosseinzadeh
Department of Mathematics, Ardabil Branch, Islamic Azad University, Ardabil, Iran

Abstract: In the last century, use of green energy and especially wind energy has increased dramatically because of rising fuel costs and reducing fossil fuels. In this study, with the aim of exploiting all the produced wind energy, the battery storage system (BSS) is combined with wind turbine (WT). In the suggested system, the required energy of the storage system is provided through a wind turbine or an upper network. In times interval if the cost of buying energy is expensive, needed energy can be purchased by BSS with the promotional price based on the price of the energy market. The wind turbine output power is used in two sections: Directly injected into the network or charged storage systems. A stochastic method has been used in order to simulate uncertainty and wind speed. Two types of distribution, including normal distribution and weibull distribution have

been used to model market prices and wind speeds, respectively. A mixed-integer linear programming method is used to obtain the optimal bidding/offering curves for each hour in order to bid/offer for purchasing/selling power from/to upstream grid. Finally, achieved results from the simulation are investigated and concluded.

Studies and Activities Carried out for Individuals with Down Syndrome in Miscellaneous Industries

Deniz Efendioğlu
Ankara Yıldırım Beyazıt University, Industrial Engineering Department

Abstract: Individuals with Down syndrome do not appear as a group of people that is at the forefront of the workforce in our daily lives. In this context, based on the compilation study intended to do, what kind of research have been done in Turkey and in the world have been examined. In a place, where diversity should be considered as a richness, it was desired to make an examination about their own development and how they could contribute to the societies they live in in the most optimal way, and the answer to this question was tried to be sought.

Floating Solar Power Plants: A Case Study Floating Pv Site Selection by Using Mcdm Methods

Ahmet Süha Hancıoğlu, Babek Erdebilli, İbrahim Yılmaz
Engineering faculty of natural sciences, industrial engineering, Ankara Yildirim Beyazit Universitesi

Abstract: The 21st century has seen a rise in the importance of energy as a global issue. Achieving sustainable, zero-emission energy production and an emission-free society, which has been a long-term aim for many industrialized countries, requires the development and application of renewable energy sources. Photovoltaic energy is now recognized as one of the renewable energy sources with the biggest potential, and as solar cell efficiency rises and costs fall, it is challenging hydropower, an established renewable energy source. Although the concept of a floating solar power plant is a relatively new one in the literature, the distinct advantages it offers make it stand out. It operates more effectively than land-based solar panels and contributes to resource conservation by lessening the evaporation of water, one of our most essential requirements. Other issues include land zoning and the effectiveness of solar panels used on the property. The purpose of this study is to use MCDM Methods to identify the ideal installation locations for floating solar power plants. Energy efficiency depends heavily on choosing the most precise site for floating solar power plants.

Key Words: Solar Power Plant, Photovoltaic Technology, Multi Criteria Decision-Making (MCDM), Renewable Energy, Sustainability

A Brief Review on Ear Recognition Technique

Mariam Mahmoud Mohammed[1], Abdul Monem S. Rahma[2], Ayad Al-Adhami[1]
1. Computer Science Department, University of Technology, Baghdad, Iraq
2. Computer Science Department, Al-Maarif University College, Baghdad, Iraq

Abstract: In the field of biometrics, ear recognition is a relatively new technique. Fingerprint, iris, retina, palm, and facial recognition are some of the most widely utilized biometric identifiers in today's criminal investigations and high-security facilities. This is primarily because the ear pattern can offer detailed and reliable information to distinguish and identify individuals. With the development of technology nowadays, people are paying greater attention to biometric recognition. For passive person identification, the human ear is the ideal source of information. Since the ear is visible, its photos are simple to capture, and its structure does not vary significantly over

time, it appears to be a suitable candidate for a solution. This paper looks at open problems and gives study ideas to give the reader a place to start thinking about possible research topics for the future. This paper explores available difficulties and offers study possibilities to provide the reader with a starting point for potential future research topics.

Keywords: Image processing, Biometric, Ear recognition, Identification

Geno-Fuzzy path planning algorithm for Assistive Robot in a complex environment

Aws Hazim Saber Anaz[1], Omar A Ibrahim[2], Ghazwan Alwan[3]
1. Mechatronics Engineering department/ Engineering Collage, University of Mosul, Mosul, Iraq
2. Department of Electrical Engineering, Tikrit University, Tikrit, Saladin, Iraq
3. Department of Mechanical Engineering, Tikrit University, Tikrit, Saladin, Iraq

Abstract: The path planning algorithm is the central part of most of Assistive robots. The algorithm should be designed based on; fixed obstacles, furniture and building style and dynamic obstacles, humans, and pets. Assistive robots face a challenging, complex environment mixed with all kinds of obstacles during the daily working activity. Besides, to select the optimum path to maximize the service area per hour. These challenges motivate the work toward an efficient path planning algorithm that can handle the complex environment. The process of the algorithm uses a designed genetic algorithm to find the best path to maximize the service area per hour. This genetic algorithm is then combined with a dynamic obstacle detection fuzzy system. This system depends on fuzzy membership zones. If the detected one is dynamic or static according to the detected obstacle's speed, direction, and size. Then the Geno-Fuzzy path planning algorithm was implemented in an assistive robot and tested with an actual environment.

Clustering Based Investigation in Fuzzy Rules Learning

Aws Hazim Saber Anaz[1], Omar A Ibrahim[2], Moein Enayati[3], Nasibeh Zanjirani Farahani[3]
1. Mechatronics Engineering department/ Engineering Collage, University of Mosul, Mosul, Iraq
2. Department of Electrical Engineering, Tikrit University, Tikrit, Saladin, Iraq
3. Center for the Science of Health Care Delivery, Mayo Clinic, Rochester, MN 55902, USA

Abstract: This paper implements and experiments on generating a fuzzy inference system based on examples. Membership functions have been generated by splitting the ranges in two ways. The first one is based on FCM, which puts the membership 'functions' peaks on the cluster centers, and the second approach divides the range into equal-spaced membership functions. , s, membership functions have been generated separately for each feature and with different amounts of overlaps for both cases. For each sample, the antecedent is generated based on the degree of the sample's membership in every dimension, and the class label is the rule consequence. A degree will be assigned to each rule based on the max membership of the point to the membership functions to resolve conflicts among the generated rules. The approach's result shows superior performance for many famous datasets.

Utilizing UPQC-based PAC-SRF Techniques to Mitigation Power Quality Issues Under Non-Linear and Unbalanced Loads

Ahmed Yahyia Qasim[1,2], Fadhil R. Tahir[1] and Ahmed Nasser B. Alsammak[3]
1. Electrical Engineering Department, Collage of Engineering, University of Basrah, Basrah, Iraq
2. Ministry of Industry and Minerals, SDI, Mosul, Iraq
3. Electrical Engineering Department, Collage of Engineering, University of Mosul, Mosul, Iraq

Abstract: Power quality (PQ) has become an important issue because of the increased usage of power electronic devices. The Unified Power Quality Conditioner (UPQC) is discussed in this paper as a means of load balancing, voltage regulation, harmonics mitigation (voltage and current), sag and swell mitigation, and load-reactive power demand compensation in a three-phase, three-wire distribution system for various combinations of non-linear and unbalance loads. A unified power quality controller combines a series Active Power Filter (APF) with a shunt Active Power Filter (APF) to deal with most power quality problems. Synchronous Reference Frame (SRF) theory is used to control the shunt (APF) of the UPQC, and the power angle control (PAC) technique is used to control the series (APF) of the UPQC. The PAC approach distributes the reactive power loads between the series and shunt APFs in order to maximize their efficiency. With the proposed UPQC system, power quality at the common coupling (PCC) point in power distribution networks can be improved under non-linear and unbalanced loads. The simulation results demonstrate that UPQC lowers the impact of supply voltage variations and harmonic currents on the power line under various loads, where the Total Harmonic Distortion (THD) of load voltages and source currents produced are less than 5%.

The heritage identity within the architecture of the old city of Mosul

Sana Nabeel Najib and Ahmed Abdulwahid Thanon
Department of Architecture, College of Engineering, University of Mosul, Iraq

Abstract: The city of Mosul is considered one of the important Arab cities, due to the richness of its history and its human, cultural and architectural heritage, and the traditional building in the old city represents the tangible and intangible part of this history, which expresses the local heritage identity. Identity is one of the most important links in societies and expresses a wide range of concepts and thoughts. And Architectural identity is the uniqueness and architectural distinction of a community, which comes from the factors surrounding this community such as political, economic, environmental, social, and cultural factors. During the past couple of years, the old city of Mosul witnessed a lot of construction operations in relation to the last unfortune events that happened in the city. These reconstruction processes required knowledge of the architectural characteristics of the heritage identity of the city's architecture and its buildings, this research came to determine the most important architectural characteristics of the heritage identity of the old Mosul city buildings', and within the various functional models such as residential, commercial, and religious buildings, using the help of previous studies, and then classifying them in a special table, to enable architects in the reconstruction process to build buildings characterized by this heritage identity

Keywords: heritage, local identity, traditional building characteristics.

Residual shear strength of clay soil containing different sand ratios

Ayman W. Aldabag[1], Abdulnasser Y. Alshuwaykhi[2] and Mohammed D. Abdulnafaa[1]
1. University of Mosul, College of Engineering, Department of Environmental, Iraq
2. University of Mosul, College of Engineering, Department of Civil, Iraq

Abstract: The research aims to study the residual shear strength of clay soils to which different percentages (5,10,15,20) of sand are added, which have a major role in determining the stability of steep slopes on those soils. The residual shear strength was compared with the shear strength, calculated from the direct shear test, and the unconfined compression strength test. The swelling of clay soil was ranged from medium to high, and the engineering characteristics similar to all clay soils found in most of

the sloped areas and hills in the city of Mosul. The study showed a decrease in the plasticity index with an increase in the percentage of sand, and the study also showed a rise in shear coefficients (C & Ø) in the residual shear test with an increase in the percentage of sand up to a certain limit (15% sand), which is the same percentage that gave values for (C&Ø) in the direct shear test.

Keywords: Residual shear strength, clay soil, sand

Investing the Effect of Moisture on Post Installed Reinforcing Bars Fixed by Chemical Adhesives using Pull-Out Test

Zahraa S. Salim, Oday Asal Salih and Suhaib Yahya Kasim Al-Darzi
Department of Civil Engineering, College of Engineering, University of Mosul, Mosul, Iraq

Abstract: The research study looked at how moisture in the holes affected the adhesive material's bonding strength during post-installed reinforcing (PIR) and compared the results to the bond strength of dry concrete holes. The experiment was carried out using concrete blocks having compressive strengths of 23, 27, 40, and 46 MPa and dimensions of (L = 200 cm, W = 200 cm, H = 40 cm). During the casting process, each concrete block was separated into two sections by placing a wooden piece with dimensions of (L = 200 cm, W = 40 cm). One installed rebar in dry holes, while the other installed rebar in damp holes. The reinforcing steel was put in four different diameters for varying embedment lengths, including (12, 16, 20, and 25 mm). The study focused on the behavior of post-installed bars during the pull-out test, as well as the impact of humidity on the failure load and failure mode. The findings revealed that as the embedment length rose, the difference in pull-out load between dry and wet conditions decreased. The maximum failure load was reduced by 17% in the wet condition compared to its value in the dry condition, while the lowest failure load was reduced by 38% in the wet condition compared to its value in the dry condition. The most common failure mechanisms in wet concrete were: concrete cone failure, bonding material failure, or a combination of bonding material and concrete cone failure. In dry concrete, the cone height and diameter were bigger than in wet concrete. This is due to the fact that the dry bond strength is stronger than the wet bond strength, allowing for a larger amount of concrete to be taken out.

Keywords: Post-installed Reinforcing Bars, Adhesive Anchors in Concrete, fastening systems, bond behavior, pull-out test.

Soil Resistivity Effect on the Separation Distance of Grounding System

Riyadh Z. Sabry, Wael H. Hamdon and Thaker Tahseen
Department of Electrical Engineering / Faculty of Engineering, Mosul, Iraq

Abstract: The lightning strike on the tall structures might cause arcing through the soil to the underground structure (power cable, water and oil pipeline). The arcing zone is primarily a function of the magnitude lightning current and the soil resistivity value. There is different value of safe separation distance by using several empirical equations to calculate. This paper presents a comparative study of the different empirical equations for the safe separation distance. Sunde, JW-Manna and JW-Oettle gives approximately same distance however, Mousa-Oettle and Mousa-Manna equations give unrealistic values. On the other hand, JW-Mousa and Mousa give the distance until (28) m. Critical breakdown electrical field calculation by using Manna and Oettle empirical equation gives similar value, at the same conductivity.

Total harmonic distortion reduction and power quality improvement for LED luminaire loads based on DC/DC power factor correction circuits

Yasir M.Y. Ameen, Wael H. Hamdon and Riyadh Z. Sabry
Department of Electrical Engineering, University of Mosul

Abstract: Residential and commercial lighting loads cause line pollution as a result of the increase in the total harmonic distortion of these loads and the significant reduction in their power factor as a result of their use of power electronic shutdown circuits. This paper aims to use DC/DC inverter circuits to improve power factor and reduce total harmonic distortion (THD), which generally has a positive impact on power quality. The paper presents the idea of addressing this problem for a group of combined LED luminaires by preparing power lines sufficient to drive multiple luminaires to reduce the economic cost of the power factor correction circuits used. PI and hysteresis band controls are used to shape the input supply current with sinusoidal forms. The simulation results obtained with MATLAB/Simulink showed a power factor correction from 0.6 to more than 0.95 lagging.

Biometric recognition based on hand-palm print

Muhamad Azhar Abdilatef Alobaidy[1], Zead Mohammed Yosif[1] and Ahmed Mamoon AL-Kababchi[2]
1. Mechatronics Engineering Department University of Mosul - College of Engineering, Mosul, 41002, Iraq
2. Computer Engineering Department University of Mosul - College of Engineering, Mosul, 41002, Iraq

Abstract: Biometric engineering is one of the most important and modern fields that affect human life directly. It can be considered as a new technology relatively, that is used for identity verification and/or the identification of persons depending on their physiological features, which include the morphological, biological, and characteristics of their behaviors. Many types of biometric recognitions are used depending on features of eyes, faces, hands (palm and/or fingerprints), voice, and many others. All the works before were focused on persons' detection only but nor on their ages. In this paper, a new idea and method (mechanism) is used. Palm print features' recognition algorithm depending on Convolutional Neural Network (CNN) is presented for recognizing individuals (persons recognition in different ages' classes). Palm print technique is depended for different ages' classes. The dataset is selected firstly for many known persons with different ages, for each person many palm image items are trained and tested using deep learning techniques. As mentioned, the CNN method is used for the training purpose, which means the recognition must be done depending on the CNN deep learning algorithm. The FAR and GAR factors are used to measure the performances of the recognition. The given results show that the selection of the palm instead of other features types makes the recognition easier. Also, the algorithm used which includes using the CNN to complete the work has competitive performance, the algorithm succeeded to separate between the features according to the persons' ages.

Keywords: Biometric, Palm, CNN, Deep Learning, Age.

Modernity discourse in mosque architecture: a comparative study between past icons and present experiences (An applied study of three contemporary mosques in the Sultanate of Oman)

Samaan Majeed Yas[1] and Luai Ali AL-Jubori[2]
1. lecturer, Architecture Department, University of Diyala, Iraq
2. Lecturer, Architecture Department, University of Nizwa, Oman

Abstract: Since modernity appeared it raises Wide controversy about its meaning, is it related to a specific thought? For a certain period or is it a revolutionary term describing every creative act Lead to cognitive disruption with prevailing traditions, trying to build a new paradigm? ... the research adopts the second approach Attempting to explain the act of modernity, which we believe has been practiced in the field of mosque architecture, which represents the fertile field for creative practices in the discourse of Islamic architecture, research tries to prove that it used a modernist discourse Using an approach opposed to imitation and copying ,using a new language that focuses on breaching The context , manipulate

with shape grammar at the level of detail or planning to reach the maximum levels of innovation, the research investigates these methods by studying some examples of mosques that were considered icons of their era in the history of Islamic architecture. The general research problem can be summarized: the lack of a clear vision of how to reveal the modernist discourse in the architecture of Islamic mosques, in the past and present. the research problem can be summarized: the absence of a conceptual framework that summarizes vocabulary and mechanisms that enable exploring modernist models in mosque architecture, past and present, and isolating them from models that depend on imitation and copying. the research objective: Building a conceptual framework on Modernity discourse in mosque architecture that enables investigation and measurement of the phenomenon and enables Measuring and evaluating the degree of innovation in contemporary models of mosque architecture to be isolated from traditional models in a way that stimulates the designer's imagination for creativity and innovation and achieves Continuity with modernist models of the icons of classical Islamic architecture. Research hypothesis: The research assumes that the discourse of modernity is a critical act that exists wherever creativity is found, far from being linked to a specific place and time, and there are design rules for modernity that Can be explored, measured and reactivate it, to produce modern creative models disconnected from the prevailing traditions in mosque architecture at every time and place. Research methodology: The research adopts a comparative investigative approach through which it studies creative models by selecting them from the classical and contemporary Islamic mosque architecture icons, and trying to extract a conceptual framework for the mechanisms and strategies of the modernist architectural design for those icons and experiments, and then applying the vocabulary of the extracted framework to three architectural experiences of contemporary mosques in the Sultanate of Oman, The research reached Realization of the principles of architectural modernity (previously explored) in these models, whether at the level of detail or planning.

Mechanical Properties of Green Concrete as Compared with Conventional Concrete: A Literature Review

Nadiya Sadeek Al Saffar

College of Engineering, University of Mosul, Mosul, Iraq

Abstract: Green Concrete is a substance that is good for the environment. Concrete is the most commonly utilized building material out of all the materials used in the construction of buildings. For the creation of concrete, billions of tons of naturally occurring resources are mined, leaving a significant environmental impact. Some of the resources used to make green concrete, a sustainable construction, are marble sludge powder, quarry rocks, crushed concrete, and fly ashes, silica fumes, blast furnace, slag, etc. The workability of green concrete has been demonstrated to be lesser than that of conventional concrete. This could be due to recycled aggregates absorbing moisture. In the case of green concrete, a little loss in compressive and tensile strength has been observed. Green concrete had a significant loss in tensile strength when compared to regular concrete. This could be due to the fact that green concrete has less aggregate binding.
Keywords: Green Concrete, Fly Ash, Glass Powder, Recycle concrete, Silica Fume.

Different Control Method Approaches to a Bidirectional Single-phase Single-stage Isolated AC-DC Converter with PFC

S. Gündoğmuş, A. Karaarslan

Ankara Yıldırım Beyazıt University, Ankara, Turkey

Abstract: In this study, the Propotional-Resonant (PR) and Propotional-Integral (PI) control methods are implemented to bidirectional single phase single stage isolated AC-DC Converter. The control methods are one of the most important methods required for a system to meet the desired conditions. Controllers used in power electronics are varied according to the structure of the system. There are two main methods in controllers:

open loop and closed loop. The closed loop controllers are generally used for the system to work properly such as Fuzzy, PI, PID, PR, ... etc. methods. The PR control method is one of the most popular controllers used for grid-connected inverters to regulate the current injected into the grid and rejects harmonic disturbances. The PR control method has a high gain around the resonant frequency and therefore can eliminate the steady state error when following or rejecting a high frequency signals. The PR and PI control methods that are used in this study are verified and compared on Matlab Simulink program.
Keywords: AC-DC Converter, PI Controller, PR Controller, PFC, Closed Loop Control, THD

Estimation of The Different Aspects of Water Demand for Selected Regions in The Lower Reach of Euphrates River

Dheyaa H. Dagher[1*], Imad H. Obead[2]

1. Ministry of the Water Recourses, Baghdad, Iraq
2. Ministry of the Higher education and Scientific Research Department of Civil Engineering, College of Engineering, University of Babylon, Hillah, Iraq

Abstract: This research aimed to estimate and analyse the water demand for the Muthanna and Thi-Qar provinces in Iraq's lower Euphrates River Basin. WEAP, CROPWAT model, and statistical forecasting methods were used to estimate agricultural, municipal, and industrial water demand. The results showed that the municipal demand for Muthanna reaches a maximum of 211.4 MCM in 2059 and a minimum of 98 MCM in 2022, while the demand for Thi-Qar is higher at 377.2 MCM and a minimum demand of 174.8 MCM in the same year. This difference is due to the larger population of Muthanna compared to Thi-Qar. The agricultural water demand for the two provinces also exhibits a significant difference, with Muthanna experiencing a maximum demand of 1579 MCM in 2059 and a minimum water demand of 1443.4 MCM in 2022, compared to a maximum water demand of 347.8 MCM and a minimum water demand of 317 MCM for Thi-Qar over the same period. This difference is due to the larger irrigated area in Muthanna compared to Thi-Qar. The findings from the comparison between the different methods suggest that demand can be accurately forecasted and planned in the future. The research highlights the need for effective water resource management in the face of the challenges posed by climate change, population growth, and industrialization in the lower reach of the Euphrates River.

Attitudes of Teaching Members at Samarra University Towards E-Learning

Abdul Munem Hasan Ahmed Ali[1] and Bashir Mohammed Abdel Rahman Saeed[2]

1. University of Samarra, Faculty of Education, Iraq.
2. University of Gezira, Faculty of Education, Sudan.

Abstract: The importance of the current research: An investigation of the attitudes of faculty members at Samarra University towards the use of e-learning, Clarify the role of e-learning in the educational process and benefit from it in educational institutions, the results of this research help inform specialists about the reality of the attitudes of the teaching staff towards e-learning in universities and educational institutions. The aim of this research is to identify the attitudes of the faculty members at the University of Samarra towards e-learning, and to achieve this goal, a scale of attitude towards e-learning was prepared, and the scale may consist of (20) items, and the scale was applied to all faculty members at the University of Samarra. And after the researcher applied the scale (the trend towards e-learning) to the ample of the research (300) male and female teachers, and after he analyzed their answers by entering them within the statistical analysis program (SPSS), the statistical treatments of the sample answers showed that their arithmetic average reached (48.6533) with a standard deviation of (6.94844), and with a hypothetical mean equal to (22.5), it was discovered that the calculated t-value for the sample members' response was (5.850), which is higher than the tabular t-value at

the level of significance, after using the t-test for one sample (0.05). According to the degree of freedom (df) (299), which equals 1,960, there are statistically significant differences between the sample mean and the hypothetical average, favoring the hypothetical average. This suggests that the participants in the research sample have negative views toward e-learning.

Keywords: directions, e-learning.

Mechanical Properties of Concrete Using Different Types of Recycled Plastic as an Aggregate Replacement

Mohammed H. Shukur, Kaythar A. Ibrahim, Suhaib Yahya Al-Darzi and Oday Asal Salih
Environmental Engineering Dept., College of Engineering/ University of Mosul/Iraq

Abstract: The current study looked into the feasibility of employing two distinct forms of recycled plastic trash as aggregate in concrete. Sixty-three standard cylinders were tested to determine the effects of adding varying percentages of recycled polyethylene terephthalate (PET) and recycled Polyethylene Pipes (PEP) on the mechanical qualities of concrete. The modulus of the rapture of concrete with 5% plastic replacements was evaluated using 18 standard flexural beams. Slump and density measurements of freshly mixed concrete were documented. Compressive strength, tensile strength, flexural strength, and modulus of elasticity are some of the hardened concrete parameters that were looked into. The data demonstrate that whereas replacing aggregate with PEP materials results in poor workability, PET materials produce good workability. With PET and PEP materials, concrete density was reduced by around 8-10%. The compressive strength of concrete modified with PET and PEP was lower than that of unmodified concrete. Compressive strength decreases as PET content increases. Compared to concrete made with PEP, concrete made with PET has a lower compressive strength. Compressive strength decreases non-linearly as more PEP materials are added, with the best results shown at 10% PEP replacement. Among the various percentages of PET replacement, 5% gives the greatest compressive strength. Tensile strength was highest in the PET group and lowest in the PEP group, lagging behind the control group. The modulus of rupture was lower in the PET and PEP groups compared to the control group because of the modest differences in behavior observed during flexural tests.

Keywords: Recycled plastic, Sustainable concrete, green concrete, concrete properties.

Demand based dynamic pricing for electrical vehiclecharging stations: maximization of profit model

Ilkin Garayev, Kerimhan Öztürk, Ömer Faruk Sarihan and Babek Erdebilli
Department of Industrial Engineering, Ankara Yıldırım Beyazıt University, Ankara, Turkey

Abstract: While factors like the world's rapidly declining oil reserves and the rising costs of gasoline-powered vehicles have sped up the development of electric vehicles, they have also begun to catch the attention of car owners. As a result, the global market for hybrid vehicles has seen a rapid increase in its share. Of course, the advantages offered by electric vehicles, which are being considered by businesses and nations, are their greatest advantage. Electric vehicles have smaller environmental footprints because they perform better in the fight against global warming, which poses a threat to both our nation and the rest of the world. On the other hand, quieter electric vehicles contribute to the user's comfortable journey. Additionally, electric vehicles cost less to maintain and repair and actively contribute to smart grid regulation. In addition to the benefits that electric vehicles have for the environment and human comfort, a developing or foreign-dependent nation like Turkey will benefit from this situation financially. Studies on electrical vehicle charging stations should be conducted in light of the expanding trend in this area in order for our nation to become a leader

in this field and to increase the appeal of just using electric vehicles. Since it has been discovered through research that the biggest barriers to the adoption of electric cars are related to their charging stations.

Comparison of PI and Fuzzy Controller on a PFC Operational Bridgeless SEPIC Converter for EV Charger

A. Uğurluoğlu A. Karaarslan
Ankara Yıldırım Beyazıt University, Ankara, Turkey

Abstract: The application purpose of control systems is to get a steady state and rated output from the controlled system. The control systems divided into two topics, which are open loop control (OLC) and close loop control (CLC). The CLC uses a feedback from output to keep the output at a desired level and react if any unwanted changes occur. Hence, the CLC is more robust way to control. The Electric vehicle (EV) battery charger devices also use controller system to convert an AC Voltage input to a steady state DC voltage output and provide a Power Factor Correction (PFC) for eliminating the harmonics in the input current to make it pure sine. As described in the IEC 61000-3-2 standard, the total harmonic distortion (THD) must be less than 5%. In this study, the PI and Fuzzy control methods are implemented to a Bridgeless (BL) SEPIC converter and simulated. According to the simulation results, the capabilities of the controllers are compared with each other. The simulatons of the control methods are implemented and compared using MATLAB Simulink program.

Keywords: BL SEPIC, PFC, THD, Fuzzy, PI

Effect of engineering properties of soft clay soil stabilized with limestone, Eggshells powder and Eggshells Ash

Shaimaa M. Abdulrahman, Ahmed S.A. Al-Gharbawi, Ammar A. Al-Sultan
Civil Engineering Department/ University of Technology-Iraq

Abstract: Soft clay, a problem that is widespread in southern Iraq and has a low bearing capacity, is there. This study investigates some of the mechanical properties of soft clay soil after adding the environmental waste material, egg shells. This study compares eggshell ash (ESA), eggshell powder (ESP), and limestone (L), which can be used as a stabilizer for soft clay while preserving natural limestone from consumption. ESP can be used as a replacement for limestone due to some similarities in chemical composition between it and limestone components. Soft clay from southern Iraq is used for this study and mixed with different percentages of ESA (2% - 6%), ESP (4% - 20%), and L (4% - 24%) by dry weight of soil. Lab tests such as specific gravity, Atterberg limits, compaction, and triaxial tests were used to evaluate the amendment samples and compare them with the reference one. The experimental results indicated that ESA increased the qualities of consistency, strength, and plasticity. It was found that the activity of the natural soil (0%) decreased from 0.60 to 0.20 at 6% of ESA, while the activity dropped to 0.23 at 20% of ESP and 0.25 at 30% of L. Thus, it can be concluded that ESA was an effective stabilizer for improving the mechanical properties of soft soil samples.

Keywords: Soft clay, eggshell, stabilizer, environmental waste, Atterberg limits, compaction.

The capability of Mosul university campus design to satisfy health standards

Khawola F. Mahmoud[1], Mehmet Inceoğlu[2] and Talaat Ibrahim Alaane[1]
1. College of Engineering, Architecture Department, Mosul University, Mosul, Iraq
2. Eskisehir Technical University, Department of Architecture, Eskisehir, Turkey

Abstract: Universities are one of the most important facilities countries all over the world due to their educative, social and cultural importance which

can only be achieved in a healthy architectural environment where all design, environmental and aesthetic values must be provided. Since the campus of the University of Mosul is currently undergoing constructional developments, it is in fact a random process and is lacking enough health-related studies. Therefore, an evaluative study is presented to investigate the application of health standards in the design and construction process of the University of Mosul through analysis, and consequently, putting forwards suggestions and recommendations that will help improve the health aspect of the University of Mosul. The current research begins with a study of the health aspects of cities in general and academic cities in particular. Then, the study moves on to study and analyze the elements, which must be provided to create a healthy environment; as well as investigating, and evaluating the health aspect in the University of Mosul. Finally, a set of solutions and suggestions concerning some design, climate and aesthetic problems are put forward in order to create a healthy environment that hopefully will lead to progress development in Iraq.

Face-palm print recognition system based on 2d circular wavelet filter and contourlet transformation

Zahraa Talal Abed and Ahmed M. Alkababji
university of mosul, computer engieering

Abstract: The study proposes a multimodal biometric design which combines face and palm print recognition modules. To extract the features from face data set, we proposed a novel circular wavelet filter depends on HAAR filters and used the contourlet transformation to extract the feature from palm print data sets. The multimodal biometric design is merging the different features extracted from different type of unimodal biometric system UBS by using Canonical Correlation Analysis CCA. The data set are 800 images for face palm print belong to 40 person each person has 10 images for face and 10 images for palm print both taken in different sessions. The proposed system shows higher recognition rates compared with the existing approaches, reaching to 100% in data set one and 99.39 % in data set two.
Keywords: face recognition, palm print recognition, multimodal biometric system, 2 D circular wavelet filter and contourlet transformation.

Effect of Biomass Sludge on Swelling Behavior of Expansive Soils

Ammar A. Al-Sultan[1], Omar H. F. Al-Emami[1], Abdullah I. Ibrahim[2] and Saad F. A. Al-Wakel[1]

1. Civil Engineering Department, University of Technology- Iraq
2. Department of Environmental Engineering, University of Mosul, Iraq

Abstract. Numerous materials have been proposed and developed in recent years to improve the swelling features of expansive soil under moisture conditions while minimizing economic costs and environmental impact. This research deals with the improvement of expansive properties of clay soils by chemical treatment using biomass sludge as a product from the last operating stages of wastewater treatment plants was used to stabilize the expansive soil. Experimental tests are carried out on treated expansive soils with sludge to enhance the swelling characteristics of the expansive soil. In these experiments, three different percentages of the treated biomass sludge by dry weight of soil (3%, 5%, 7%) were added to the expansive soil to evaluate the efficiency of using the treated material. The results of the present investigation show that the use of sludge efficiently improves the swelling characteristics. Furthermore, the optimum percentage of the treated biomass sludge was 7%, which reduced the swelling pressure by around 36% in compression with untreated soil.
Keywords: biomass, sludge, expansive soil, swelling.

The Invasion of Commercial Use of Residential Streets and Its Impact on The Cohesion of The Urban Fabric (The left side of Mosul city as an example)

Hussein Salman Abdullah, Talaat Ibrahim Alaane and khawola F. Mahmoud
College of Engineering, Architecture Department, Mosul University, Mosul, Iraq

Abstract: One of the most important problems that the cities of Iraq in general and the city of Mosul in particular suffer from is the unstudied changes that occurred and are occurring on the urban fabric and the residential neighborhood as a result of the invade of commercial shops on these areas, which led to the creation of social problems that affected the social behavior of the residential neighborhood. This research aims to A study of the impact of the random development of commercial buildings on the cohesion of the social fabric of the residential neighborhood. In order to achieve the goal, the Muthanna area was chosen on the left side, and the study of the impact of the development of Al-Muthanna commercial street on the social fabric of the residential area. The research relied on the descriptive analysis of the area and the study of change sites, and a questionnaire was also adopted for the residents.

Using Hybrid Generating Systems to Enhance Transient Stability: A Review

Hiba Nadhim A Al-Kaoaz and Ahmed Nasser B. Alsammak
University of Mosul

Abstract: In recent years, power demand has increased substantially, while power generation and transmission expansion have been severely limited due to limited resources and environmental restrictions. Consequently, some transmission lines are heavily loaded, and the system stability becomes a power transfer-limiting factor. Hence The impact on the transient stability of power systems is rising as the penetration level of renewable energy with sporadic natures rises rapidly on the grid. However, the effect of different renewable energy sources (wind, solar) and their combination on system transient stability varies even with the same penetration level. This paper comprehensively reviews the most modern research and the developments in the power system transient stability studies, which added a hybrid generation system to resolving transient stability issues. The purpose of this literature review is to encourage interest in more research and to give references for educational progress on recently published publications on improving power system transient stability.
Keywords: Hybrid Generating Systems, Transient Stability, Wind Energy, PV System.

An Intelligent Optimum and Scalar Control for an Induction Motor

Hasan Adnan Mohammed and Ahmed Nasser B. Alsammak
University of Mosul / College of Engineering
Electrical Engineering / Power and Machines

Abstract: Recently, the three-phase induction motor has been widespread usage in drives and industrial applications due to their advantages represented by robustness, simplicity of construction, controllability of speed, and high efficiency. Four strategies are used to control the speed of the induction motor: varying the input supply voltage, changing the supply frequency, changing both input voltage and input frequency in the same ratio, and changing the number of stator poles. The induction motor suffers from the accuracy of controlling the speed when it operates at different loads; this problem attracts the attention of many researchers to work in this field. This paper presents an improved hybrid control strategy represented by the Scalar Control (SC) method to control the frequency in addition to an Adaptive Neuro-Fuzzy Inference System (ANFIS) to increase speed accuracy and then improve the performance of the motor.

The model is carried out by MATLAB/SIMULINK package, and the Simulink results verified study showed the efficiency of the proposed scheme.

Keywords: Induction Motor (IM), Variable Frequency Derive (VFD), Scalar Control (SC), Adaptive Neuro-Fuzzy Inference System (ANFIS).

Risk-based Analysis of the Hydrological Uncertainties for Flood Management Strategies

Majid Khayatnezhad and Hasti Keynoos
Young Researchers and Elite club, Ardabil Branch, Islamic Azad University, Ardabil, Iran

Abstract: Designing a hydraulic structure with high capacity can impose additional costs on the project. Therefore, the importance of accurate design and proper selection of design parameters, optimal determination of flood return period and proper capacity of the flow channel are some of the topics that should been considered. Risk-based flow hydrograph estimation allows designers to take into account the uncertainties of the decision process and increase the level of reliability of hydraulic structures. In this research, hydrological uncertainties have been formulated based on probabilities to estimate the hydrograph of the dam reservoir output. To achieve this goal, time series data of maximum annual instantaneous flow for a period of 45 years were collected and analyzed. To achieve this goal, the genetic algorithm optimization method was used to calculate the best response and optimum return period. The results showed that the 40-year return period is a suitable option due to the hydrological uncertainty. Flow routing showed that the peak of the output hydrograph in the reservoir with a volume of more than 45 million cubic meters (MCM) will create a difference of about 13 m^3/s.

Keywords: Genetic algorithm, Hydrologic uncertainty, Hydrograph, Risk-based analysis

Univariate Distribution Estimator for Predicting the Groundwater Level Fluctuations

Majid Khayatnezhad and Hasti Keynoos
Young Researchers and Elite club, Ardabil Branch, Islamic Azad University, Ardabil, Iran

Abstract: Today, with the growth of population and consequently the increasing human need for water resources, lack of rainfall and surface currents in arid and semi-arid regions of the world, the exploitation of groundwater resources has increased and caused many problems in these non-renewable resources. Therefore, it is necessary to study and predict the status of groundwater resources. In this regard, several approaches and methods such as modeling have been used. In this research, an attempt was made to investigate changes in water level using a hydrological model and numerical simulation of groundwater. Univariate frequency distribution functions and MODFLOW simulation model were used to create an operating system. Hydrological events including rainfall and drought were considered to evaluate the return periods and prediction of rate and time of the individual phenomena. The results showed that the 50-year return period is the best scenario for groundwater abstraction for agriculture. Groundwater balancing, artificial recharge and exploitation control are other ways of managing the water level. Rainfall was the main component of the decision system in the summer season and the depth of precipitation was evaluated as critical factor.

Keywords: Sampling method, Univariate analysis, Groundwater simulation, Water exploitation

Parametric Study and Performance Analysis of Microstrip Antenna Array for Beamforming Systems

Bilal A. Al-Azzawi[1], Y. E. Mohammed Ali[2]
1. Electrical Department, College of Engineering, University of Mosul, Mosul 41002, Iraq

2. Department of Computer and Communications Engineering, College of Engineering, Nawroz University, Duhok, Iraq

Abstract: Recent years have witnessed an unprecedented increase in the demand for wireless data. This growth in
demand has led to congestion in frequency spectrum and a noticeable development in communications technologies. One of the most important of these technologies is the use of millimeter waves in fifth generation communications systems. Since millimeter waves suffer from high path losses, beamforming technology It became necessary to get rid of this problem as well as increase the data rate and reduce the interference. These technologies require an antenna with certain characteristics to work properly. The patch antenna is one of the best antennas used in modern communication systems and recently, many models have been designed from it. Many design parameters affect the characteristics and performance of the antenna, so studying the effect of these parameters on the antenna characteristics is very important. In this work, the effect of different feeding methods on antenna performance will be studied, also the effects of substrate types, thickness, and their physical properties on performance will be studied, as more than one material will be used for the purpose of the study. The study will be carried out using the CST Studio Suite.

Keywords: Beamforming, Patch Antenna, 5G

Design steps for an LCC-LCC based DWPT charging system for electric vehicles

Mohammed T. Ismael[1], Yasir M.Y. Ameen[1] and Kalid K. Mohammed[2]
1. Department of Electrical Engineering, Collage of Engineering, University of Mosul, Mosul 41002, Iraq,
2. Nineveh University, Mosul 41002, Iraq

Abstract. Using dynamic wireless power transfer technology (DWPT) to charge EV battery while driving is one of the proposed strategies to reduce costs and increase the adoption of electric vehicles (EV) worldwide. However, an efficient charging system depends on the correct design of the DWPT components. On the other hand, the design of these components depends on the compensation configuration of the DWPT system and many other factors. Therefore, this research work presents a step-by-step design procedure to develop a DWPT charging system based on the LCC-LCC compensation network for EV applications. The design of the transmit and receive pads is done with the software Ansoft Maxwell. The performance of the developed LCC-LCC based DWPT system is verified using MATLAB/Simulink program. The DWPT system is designed to transmit Class I power level , i.e. Po = 3.7 kW, and a charging gap of Z1 = 150 mm, i.e. Level 2 for EV charger standards. The simulation results of the developed system showed an efficiency of up to 98% and a high misalignment tolerance for the designed pads.

Preparation of multipurpose Grease by using micro-Gypsum

Noor K. Rasheed[1] and Ismail I. Marhoon[2]
1. Petroleum Research Center /Directorate of Materials Research, Ministry of Science and Technology, Bagdad, Iraq
2. Materials Engineering Department, College of Engineering, Mustansiriyah University, Baghdad, Iraq

Abstract: In this research a multi- purpose grease has been prepared by the addition of equal proportion of gypsum as thickener (3,5,10,15,20)% after treatment the gypsum (washing, filtering, drying, cracking, sieving) to get the required softness and suitable grain size) in limited heating and mixing conditions with silicon oil with different viscosities (500,700,1000) as base oil after adding the additives (antioxidant, molybdenum disulphide, nano carbon) to get the properties of the multi-purpose greases, gypsum has been chosen because it is available in nature and inexpensive and the semi solid consistency to withstand the operating condition of the machinery (heat, pressure) and viscosity test was done on silicone oil and (AFM) test on

gypsum, its effect will be studied after doing special lets on the greases (oil-separation ,penetration) .

Key words: penetration- oil viscosity – oil separation greases- dropping point

Design and Implementation Wireless Sensors Network for Monitoring Applications Using Arduino

Salah Abdulghani Alabady[1*] and Sara Raed[2]
1. Computer Engineering Department, University of Mosul, Iraq
2. Technical Computer Engineering Department, Al-Hadba University College

Abstract: Timely detection of fires in buildings is essential to incident prevention or to reduce the negative impact on human health. As noticed from the literature, the direct communication between sensor nodes and the BS node consumes a high amount of limited energy resource. This paper presents a Wireless Sensor Networks (WSN) system for temperature monitoring in a building. In general, sensor nodes in WSN are small and run-on batteries, and have very limited power resources, it is important to explore power management approaches to enhance network lifetime. The main aim of the proposed system is to save energy costs and reduce power depletion. Through deploying many sensors, they collect information about the temperature and send it to the sink. The proposed method is based on multi-hop communication to decrease the transmission energy consumption and increase the monitoring coverage area. Furthermore, we computed the energy usage of the proposed system using Arduino and real sensor networks deployed indoors in the building. The results showed that the proposed system reduced the amount of energy consumed and increased the lifetime of the network.

Sustainability of Contemporary Architecture Through Duplication Transparency

Enas Salim Abdulahaad, Zainab Hussein Ra'ouf and Vian Abdulbaseer
University of Technology, Iraq

Abstract: The application of the concept of transparency caused many problems in architecture, especially modern architecture, which used massive glass structures to change the boundaries of solid architecture to transparent and invisible borders, declaring its revolutionary modernist thought. The most prominent of these problems were related to the aspects of environmental and economic sustainability to the extent that the glass architecture was called the architecture of thermal crime. Through the technological progress and the development of the glass industry, the current era has witnessed a shift to the concept of duplication transparency instead of the traditional transparency, that highlight the research problem as: " limited knowledge presentation about the sustainable dimensions of applying the concept of duplication transparency in contemporary architecture". The aim of the research was to clarify aspects of improvement in the glass material through contemporary technological techniques. To achieve the goal, the research adopted a methodology that adopted the following steps: Building a theoretical framework that presents sustainable environmental, economic and social indicators for the application of (semi-transparent) glass technology and its techniques represented by glass envelopes, then applying the framework's vocabulary to selected research samples to reach results and conclusions that confirmed the efficiency of glass envelopes in achieving sustainability. Contemporary architecture achieved the control of the permeability of light through new glasses & new transparency.

The performance of YOLO-v5 algorithm on data with poor imaging conditions

Mohammed Obaid Mustafa and Ayad Saadi Ahmed
University of Mosul, Electrical Engineering College, Mosul

Abstract: In the recent years, the importance of object detection has increased and gained a great interest from researchers in many fields and applications, many techniques and algorithms have emerged which developed this field and increased efficiency in addressing errors and solving problems that related to object discovery techniques. In this paper we study the use of YOLO-v5 algorithm to detect objects through dataset taken in unusual circumstances that affecting on the quality of the images, especially in the low lightings, dark nature or high exposure, where data were used for the purpose of training and evaluating the model, the obtained results showed the effectiveness of this algorithm in these circumstances with mAP(50)=64.8%. The dataset contained 2348 images including 12 categories with 10 different conditions and angles of capturing.

Keywords: YOLO, Object Detection, Night Vision, Pattern recognition.

Evaluation and Investigation of GPSR Routing Protocol Used by UAVs in Various Scenarios

Zahraa Tarik AlAli[1] and Salah Abdulghani Alabady[2]
1. College of Engineering, Mechatronics Engineering Department, University of Mosul, Mosul, Iraq
2. College of Engineering, Computer Engineering Department, University of Mosul, Mosul, Iraq

Abstract: Recently, unmanned aerial vehicles (UAVs) have been relied upon as one of the most successful and efficient technologies in many areas of life, such as surveillance, wireless transmission, disaster management, delivery, transportation, and even the military. UAV routing is often a critical issue and data transmission through these UAVs goes through many challenges depending on various factors, among several routing protocols, the greedy perimeter stateless routing (GPSR) protocol is one of the most successful geographic protocols for UAV routing. In this paper, an investigation and evaluation of the GPSR protocol that used for UAVs for different fields and factors are presented, The MATLAB test results demonstrate the effect of the network parameter values and the type of used field on routing success and delay in the network, and these numerous cases assist experts in this field in determining the suitable factor values for their specified used field.

Keywords: Unmanned aerial vehicle, GPSR protocol, propagation delay, geographical routing, connectivity, UAV network.

Numerical analysis of sheet piles subjected to seepage flow

Zainab Sadon Ali
Department of Geotechnical Engineering, University of kufa, Najaf, Iraq

Abstract: The effect of pore pressure dispersal of water on the extent and range of stability of the earth dam was studied, resulting in the transition from stable seepage conditions to unstable transient flow conditions, and the equations applied in calculating the hydro-hydraulic model are saturated. / Equations applied in unsaturated flow. The equations are useful for studying the water pressure differential in the pores. The infiltration process depends on time, and the functions of the water pressure in the pores are the volumetric water content in the soil and the hydraulic conductivity. Pupils give an easy and smooth transition of the model studied and the saturation state can be considered a special case of the equations that have been applied. The study showed that the pore pressure changed significantly in the case of leakage described as stable leakage before and after the rehabilitation of the Ahwaz dam for the case of rapid retreat, and the manually calculated values correspond to the values of the safety factors resulting from the use of the slope/w program.

Keywords: volumetric water content, factor of safety, hydraulic conductivity, unsteady state steady state, pore water pressure.

The role of urban connectivity in progressing new cities

Inaam Qassem Abdullah and Khansaa Ghazi Rasheed
Department of Architecture, University of Technology, Baghdad/ Iraq

Abstract: As a result of social, economic, environmental, and technological changes, the master plans of the existing Iraqi cities

expanded, and new cities were developed within the existing cities to meet the increasing needs of individuals for housing, work, learning, and entertainment, so the urban fabric changed and lost its connection with its surroundings and its existing center, the urban and the environmental areas deteriorated within city plan, buildings were formed with new formal characteristics and an unclear identity that embodied visual pollution, as it is difficult to see the master plan areas as a consistent urban unit; consequently, the research problem was identified by: the lack of a clear cognitive perception of the policies of upgrading the new urban environments within Iraqi cities, and activating the mechanisms of urban interconnection in them, as a strategy to renew and restore degraded places, and link the new areas with the old historical center spatially and temporally within a unified, coherent and sustainable master plan scheme. Starting from the principles of urban design and its objectives concerned with creating environments with interconnected places functionally, physically, socially and spatially with the surrounding areas and with all facilities, services, schools and shops as a policy to advance the new cities towards a sustainable perspective; The current research will focus on a description and analysis of a number of Arab and international experiences in the field of activating the mechanisms of interconnection between new and existing places as an important strategy in repairing, developing and sustaining degraded places, And then put forward a set of recommendations to upgrade the degraded neighborhoods in the new cities towards sustainable development, and to link the current city spaces with the new areas with heritage and cultural values that preserve the historical built environment and try to integrate it into a unified and coherent planning among its parts to be a basic criterion in formulating policies and methodologies for upgrading the new cities, including it's fits with the specificity and identity of the master plan within current and future studies.
Keywords: new cities, patterns of new cities, urban connectivity, upgrading policies, interconnection mechanisms.

DQ Model of PMSG with The Most Proficient Dynamic Analysis in Standalone Grid

Ammar Shamil Ghanim[1] and Ahmed Nasser B. Alsammak[2]
1. Lecturer assistant, Electrical Engineering Department, College of Engineering, University of Mosul
2. PhD in Electrical Engineering, Assistant Professor, Electrical Engineering Department, College of Engineering, University of Mosul

Abstract: The pico grid implements an essential solution to provide electrical power for isolated areas like villages and remote regions. Wind, tidal or hydropower, etc., maybe the energy source for these grids. The permanent magnet synchronous generator (PMSG) is one of the promising solutions for this application. In this study, a constant speed source, which emulates a pico-hydro turbine, is used as the prime mover to the generator. By using park transformation, the dynamic model can be built and employed in Matlab/Simulink to get a more detailed study of the system's response with different perturbations.
Keywords: PMSG, pico hydro, modelling, micro gid, dynamic model, Matlab

Smart Internet of Things system for monitoring storage environments

Nadia Mahmood Hussien, Yasmin Makki Mohialden and Nada Thanoon Ahmed
Computer Science Department, Collage of Science, Mustansiriyah University, Baghdad, Iraq

Abstract: Protection and monitoring of Covide-19 immunizations before they are delivered affect people, especially in areas without the appropriate means to ensure vaccines work. Vaccinations lose their effectiveness if taken beyond the country where they were made. It's advisable to employ the constraint while saving or relocating the item. This work proposes and builds a system that monitors the COVID-19 vaccine storage environment and alerts the centre in real time if the vaccination is no longer viable owing to a supply chain issue. This system's hardware component is an Arduino Uno microcontroller, an ESP, a magnetic sensor, a temperature sensor, a GSM SIM900, a GPS device, an LCD, and a buzzer. The temperature sensor is used to measure the Vaccine's temperature. A magnetic sensor is used to identify if a container is open or closed. An alarm will ring if the box is opened. The Global System for Mobile Communications (GSM) is the abbreviation. It sends and receives messages to inform the system of any potential problems. Satellites report GPS of the location of a faulty box. Telegram receives IoT messages transmitted via ESP Wi-Fi. If the storage temperature is too high, the system sends an SMS with the box's latitude and longitude. Google Maps display the location. By following specific directions, the telegraph bot acquires information about a system. The system is coded using Arduino IDE and C++.
Keywords: ribonucleic acid (RNA), global system for mobiles (GSM), a global positioning system (GPS), national marine electronics association (NEMA), liquid crystal displays (LCD), ESPRESSIF systems (ESP 32).

Performance Evaluation of Pattern Division Multiple Access (PDMA) in 5G

Sabaa khaled[1] and Farhad E. Mahmood[2]
1. University of Mosul / University Presidency
2. University of Mosul/ College if Engineering/Department of Electricity

Abstract: The primary objective of this paper is to evaluate NOMA techniques, specifically the Pattern Division Multiple Access (PDMA) technologies. PDMA has been compared to the orthogonal multiple access (OMA) techniques for different noise environment levels. Some factors that have been considered in the comparison are the achieved bit rate and transmitted power. The results show the superiority of PDMA technology by 2bps/Hz along the curve without being affected by the change in white noise, and the superiority in terms of BER over the value of BER in OMA by around 33%. In all of the comparisons made by the study, the simulation results revealed a striking advantage for PDMA technology over OMA technology. This helps us achieve high spectrum efficiency and grow the user base, which is what the world seeks to do to contribute to the advancement of communications in the fifth generation and future generations.

Floating photovoltaic plants and their impact: A review

Noor Mardan, Ahmed A. Abdullah Al-Karakchi
Northern Technical University, Mosul, Iraq

Abstract: Due to the scarcity of fossil fuels, solar power plants have recently attracted widespread attention for their positive results in producing electricity alongside other plants. Solar energy is a clean, ecologically friendly, and sustainable energy source that contributes to the reduction of CO2 emissions. This review provided a summary of floating photovoltaic panels and their components, as well as their environmental and economic impact and comparison to the earths system. Floating photovoltaic panels were discovered to be more efficient than standard ground systems, which has several advantages in terms of evaporation and water cleanliness.
Keywords: Renewable energy; Photovoltaic; Floating; Evaporation; Quality.

Effect of 3D-Printer Parameters for Hollow Vascular Network Design That Used in Concrete Healing Containing Recycled Materials and Sodium Silicate of Polylactic Acid (PLA)

Noor A. Hameed, Farhad M. Othman, Alaa A. Abdul-Hamead
Department of Materials Engineering / University of Technology

Abstract: In order to add self-healing qualities to concrete, this research concentrates on using fused deposition network to create unique forms of vascular networks that are appropriate for being filled with

healing agents. In particular, a network of pipes has been created via 3D printing as well as filled with multi-component inorganic sodium silicate liquid and one nano-powder (fly ash) made from recycled materials. To ascertain the mechanical response regarding various layer thicknesses (0.10, 0.20, 0.30, 0.40, and 0.50) mm with the other constant parameters of printed PLA specimens, these specimens were put through their tests with the use of a form of (ASTM D2240) for hardness, (ASTM D638-10) for tensile strength, ISO 62 for water absorption tests, and ASTM standard (D790-10) for three-point bending. In the range of 0.1 to 0.4, the strength rose as the layer thickness grew, yet at 0.5 mm, the opposite occurred, as was indicated for the upright oriented specimens. Greater gaps resulted from the layer thickness increase, which raised the porosity in the specimen's cross section. Anisotropic behavior can be seen in the 3D printed specimens as a result of layer-by-layer procedure. A layer of 0.4 mm was selected for such pipe network in order to transport the healing agent into concrete.

Keywords: Fused deposition modelling, Self-healing concrete, Polylactic acid (PLA), Layer thickness, Mechanical properties

Testing the Performance of Support Vector Regression and M5 Tree in Forecasting the Drought at Diyala Region, Iraq

Hawraa Mazin[1], Thamer Ahmed Mohammed[1], Saad Shawkat[2]
1. Department of water Resources Engineering, College of Engineering, University of Baghdad
2. Department of Civil Engineering, College of Engineering, University of Diyala

Abstract: Important factors in characterizing the drought are duration, severity and size of drought (severe, medium and so on). There are several climatic parameters through which drought can be modeled for varying periods of short periods. The most important parameter is the rainfall which can be used to determine the drought index and the standard precipitation index. The periods of 6 and 9 months were used to determine the agricultural drought while longer periods of 12 months up to 24 months were used to determine the hydrological drought. Recently, Diyala governorate, Iraq has been exposed to many drought periods. In this study, two artificial intelligence methods were used for prediction of the drought in the above region. The methods used were support vector regression (SVR) and M5Tree. In addition, the performance of these methods was tested using statistical induces such as correlation coefficient (R), the root mean square error (RMSE) and the mean absolute error (MAE). In conclusion, SVR and M5 Tree methods gave almost identical results for long-term data while the M5 Tree method gave better performance than the SVR for short period data.

Keywords: Machine Learning, SVR, M5 Tree, SPI, Diyala Governorate

Toward Improving BIM Acceptance in FM A Conceptual Model Integrating TTF and TAM: Data Analysing

Maryam Mohammed Khaleel[1] and Mustafa Abdullah Hilal[2]
1. M.Sc. Student, University of Baghdad, Civil Engineering Department
2. Lecturer, University of Baghdad, Civil Engineering Department

Abstract: The awareness of Building Information Modeling (BIM) in facilities management is still relatively concerning to many of researchers around the world and specifically in the Iraqi construction industry, despite the orientation of applying BIM technology in the design and construction of facility assets. Also, huge research on applying BIM technology in sustainable building were stated over the last few years. Hence, focuses on this shortage and try to investigate how the Iraqi construction industry can accept and perceive the actual usage of BIM technology in facilities management to make intensively motivation to the industries in order to reduce the challenges and barriers so that the Iraqi construction industry can adopt new innovations in their daily work. Therefore, depending on an extensive literature review, a conceptual model by applying the technology acceptance theories such as the Technology Acceptance Model (TAM) and Task Technology Fit (TTF) has been developed. The aim is to predict how the Iraqi construction industry can accept and perceive the actual usage of

BIM technology in facilities management. The internal variables of TAM and TTF theories were identified through the previous studies, regarding the impact of these variables on understanding the acceptance of new information technologies, and reference to the hypothesis that has been suggested by the author in the previous research, a questionnaire survey was designed and sent out among the Iraqi construction industry in the engineering specialization working in facilities management. This survey is needed to test the validity of the construct effect on the user acceptance to the new technology and innovation. A total of 208 completed questionnaires were retrieved. After collecting the data results are analyzed using a Structural Equation Modeling (SEM) approach, using SMART PLS4 Since this technique has been received with considerable interest among empirical researchers. Briefly, the model has conducted the following measurement (Descriptive Statistics using SPSS22, reliability and validity assessment, in addition to conducting discriminant validity by applying two methods (Fornell Larcker criterion and Heterotrait). Finding shows that the model is normally distributed according to the normality test that has been conducted, the output result ranged between (-0.039 to 1.327) for the skewness test, as for the result of Kutosis is in the range of (0.497 to 1.048), which is in the threshold limit of the method. Also, the output of the reliability test was very high it in between the range of 0.89 to 0.97, which is greater than 0.7 according to Cronbach's alpha value. So, the model structure is got high reliability. For discriminant validity, the square root of AVE is larger than the correlations among the latent variables according to the Fornell criterion, this result supports that the measurement model has discriminant validity. Finally, a bootstrapping procedure with 200 samples was used to estimate the statistical significance of the path coefficients in the research model. The results of the AMOS analyses based on the bootstrapping procedure indicated all paths are significant at $p < 0.0001$ except the path of PEOU not supported with the BI.

Performing Structural Equation Modeling in public transport through COVID-19 pandemic time: Baghdad case study

Ali Emad Jehad[1*], Noor J. Mahdi[1], Rania H. Shehab[1], A. I. Al-Hadidy[2]
1. Department of Civil Engineering, Al-Maarif University College, Ramadi, Iraq
2. Civil Engineering, University of Mosul

Abstract: Traveling via public transportation is a better option than driving a private car and should be encouraged to reduce congestion, pollution, and fuel costs. However, the COVID-19 pandemic bans full use of public transportation in order to limit infection spread. Using structural equation modeling, this study intends to identify travelers' attitudes and preferences for using public transportation during the COVID-19 epidemic (SEM). A questionnaire survey was created to analyze travelers' behavior, attitudes, perceived risk, and sense of responsibility when utilizing public transportation in Baghdad, Iraq. The 234 complete replies were analyzed using the Structural Equation Modeling technique. The survey findings and measurement equations supported the relationship between observable and latent variables. The SEM results demonstrated that travelers' Perceived (PER) and Responsibility (RES) are favorably connected to Attitudes (ATT), whereas Behavior (BEH) towards public transportation is adversely related to Attitudes (ATT) (ATT). To assess the confirmatory of measurement scale, confirmatory factor analysis (CFA) measurement was combined with nine Goodness-of-Fit measurements: Chi-square, Chi-square/df, RMR, GFI, AGFI, NFI, TLI, CFI, and RMSEA. When the model was tested, the majority of these measures revealed an appropriate threshold value. The AVE and C.R measurements for model reliability and validity also yielded acceptable results, indicating that all determinants of the SEM model have a substantial and positive causal link with variables.

Keywords: Structural equation model, Covid-19, Public transport, Questionnaire, Confirmatory factor analysis.

Effect Of Iraq clay mineral enforcement on the properties of epoxy spray coating for steel

Walaa Hussein Hamid and Mofeed. A.Jaleel
Department of Applied Science, University of Technology, Iraq, Baghdad

Abstract: coatings with polymeric composite materials are one of the most used methods in recent times among other methods, to provide a physical barrier that prevents the metal from direct contact with the environment, as well as for its cheapness and local availability; Examples of this are epoxy/clay composites because they have excellent chemical resistance, good electrical insulators, and high adhesion to the substrate. In this research, the preparation of polymeric composites reinforced with iraq clay minerals as an insulating coating for chemical corrosion and study the coating properties. The low carbon steel alloy was used as substrate coated with composite materials consisting of epoxy as a matrix material reinforced with mullite(M) and metakaolin (MK) clay particles in weight percentages (2,4,6,8,10wt%) by using paint spray method. Mechanical tests (micro-hardness, adhesion, wear rate) were performed Also chemical (chemical corrosion rate). The results showed that the micro-hardness of the coatings increases with increasing the reinforcement values wt% for each of the metakaolin and mullite particles, with a higher hardness value for mullite renforcement (160.38Mpa). The adhesion strength of epoxy coatings reinforced with metakaolin and mullite particles improved the adhesion strength compared to the pure coating, the highest as was obtaind at 4wt%for metakaoline and 4,6wt% for mullite respectivety . the reinforcement of epoxy coating with clay minerals particles improved the wear and corrosion resistance compared with pure epoxy coating.

Design of fuzzy Controller Using ant colony optimization for Cuk converter

Muhammed A Ibrahim[1], Mustafa Hussein Ibrahim[2], Salam Ibrahim khather[1]
1. University of Mosul
2. Ninevah University

Abstract: Direct voltage power converters have extensive use in the industry and power electronics area. The topology Cuk converter is considered as a proper choice in the battery management system of electric vehicle (EV) technology. This is due to low ripple output load voltage, continuous flow off input and Output current and High efficiency compared to buck-boost topology. This paper deals with analysis, modeling and control of Cuk converter circuit employing hybrid fuzzy logic based ant colony optimization (ACO). Transient response and steady state performance specifications are utilized as object function to attain fuzzy controller design. The proposed controller provides a good performance at load and reference voltage variation.
Keywords: Cuk converter, Fuzzy logic, Optimization.

The importance of live projects in architectural education and its role in developing professional practice among students

Merna Sabri and Mozahim Mohammed Mustafa
University of Mosel

Abstract: Many graduates in architecture departments are generally disadvantaged when it comes to their experience in professional practice, which various studies in this field have indicated. Therefore, there has been a reevaluation of the academic architectural education methods to address and resolve the existing defects. Among these methods is a method utilized by many architectural schools in the United Kingdom, United States, and others. This is represented by realistic projects based on actual context, as the goal of this method is to introduce larger engagement between academic institutions and professional practice. This study aims to evaluate this method through an experiment for a number of architectural students and to determine the extent to which students benefit, which can help overcome the difficulties they may face in the future. The study adopts a descriptive and analytical approach, where the experience of live projects was done in a manner similar to international experiments. The study sample includes a group of students in the fourth stage of the Department of Architecture in the College of Engineering - University of Mosul. The extent to which students possess work skills in an actual project was measured through the evaluation mechanism of the questionnaire and observation to collect the possible outcomes, conclusions, and recommendations in this field. The results of the experiment showed that most of the students agreed that the live projects provide a realistic learning experience that differs from the traditional design studio. Furthermore, the results also showed that the experience of the live projects developed many skills (such as negotiation, persuasion, working as a team, etc.) that they did not acquire through virtual projects in the design studio.

Evaluation of effects of silica sand on geotechnical properties of clayey soil in Sulaymaniyah city, Iraq

Asmaa Gheyath Salih[1], Ahmad Safuan A. Rashid[1], Nihad Bahaaldeen Salih[2]
1. School of Civil Engineering, University Teknologi Malaysia, Johor Bahru, Johor, Malaysia
2. Department of Water Resources Engineering, College of Engineering, University of Sulaimani, Sulaimaniyah, Northern Iraq

Abstract: The ground settlements induced by the construction loads on soft clay are considered problematic due to serious damages in the form of cracks and deformation of structural buildings. Accordingly, soil compaction and stabilization are considered effective methods to treat shallow soft clayey ground to support many engineering constructions. This paper investigates the potential use of silica sand as a soil stabilizer, for the stabilization of soft clay and the formulation of an optimal mix design of stabilized soil with silica sand. The objectives of this study are to stabilize the soft soil with silica sand to evaluate the effects of silica sand on the strength development of the stabilized clayey soil specimens. The suitability of stabilized soil was examined on the basis of unconfined compression, and direct shear, tests. A series of unconfined compressive strength (UCS) tests were performed for four sand doses (2.5%, 5%, 7.5 %, 10%) for different curing times of 0, 7, 14, and 28 days. Moreover, the chemical compositions of the used materials were determined using X-ray Fluorescence (XRF) test. SEM results revealed that the clay fabric modification was caused by the particle interaction and contact with the added silica sand resulting in bonding formations and hardening. It was found that the optimal mix design of the stabilized soil is 90% clay and 10% silica sand. It is further revealed that stabilization increases the unconfined compressive strength of the combinations by almost 4-fold. According to the outcomes of this study, it can be concluded that the optimum mix design using silica sand can be sustainably applied to stabilize the shallow clay without failure, which is a viable alternative to cement in geotechnical applications.
Keywords: Silica sand- Soil stabilization – Unconfined compression strength

Numerical Study on the effect of working conditions on the Performance of Parabolic Trough Collector at Al-Najaf city in Iraq

Hussein Ali Jabbar[1], Kareem J. Alwan[2], Dhafer Manea Hachim[1]
1. Engineering Technical College / Najaf, Al-Furat Al-Awsat Technical University ,31001, Najaf, Iraq
2. Najaf Technical Institute / Al-Furat Al-Awsat Technical University ,31001, Najaf, Iraq

Abstract: Solar energy is one of the renewable energy types. A solar collector is a device that converts solar energy into thermal energy for use in the production of electricity. The most common form of solar collector used in solar power plants is a parabolic trough collector (PTC). The study aims to use a numerical CFD model using COMSOL Multiphysics 5.5 software to investigate the effect of different working conditions on the thermal performance of a solar Parabolic Trough Collector at Al-Najaf city in Iraq. Three different working fluids, such as Water, THERMINOL VP-1, and SYLTHERM800, were used. The influence of input temperature was considered at a range of temperatures between $(323.15 – 423.15)$ K. In addition, various magnitudes of mass flowrate were selected between $(0.00926 - 0.0556)$ kg/s. The developed numerical model was validated

based on the literature's experimental results. The final results showed that water has a high maximum (average output temperature = 411.6 K, average thermal efficiency = 70.7%, average useful heat = 3560.1 W, and average heat loss = 199.2 W), while SYLTHERM800 has a maximum (average output temperature = 472.3K, average thermal efficiency = 65.0%, average useful heat = 3180 W, and average heat loss = 579.3 W). at mass flow rate 0.00926 kg/s, for 15 Jan 2018, also obtained the flowing results for high mass flow rate (0.0556 kg/s), water has a high maximum (average output temperature = 339.75 K, average thermal efficiency = 72.9%, average useful heat = 3689.3 W, and average heat loss = 70.0 W), while SYLTHERM800 has a maximum (average output temperature = 362.5K, average thermal efficiency = 73.0%, average useful heat = 3691.4 W, and average heat loss = 67.9 W). The percentage error of validation results with literature article research for output temperature, thermal efficiency, useful heat, and total heat losses were (0.337%, 5.34%, 5.02%, 5.2%) respectively.

Keywords: Thermal performance of Parabolic Trough Collector, Working fluid , heat transfer fluid , Numerical study.

Analysis and Assessment of Freeway Weaving Segments in Mosul City, Iraq

Mohammed Y. Taha and Nuha S. Mohammed

Civil Engineering Department/Engineering College, University of Mosul, Iraq

Abstract: Freeway weaving segments are a significant operational and design issue in the network of city highways requiring specific criteria for traffic problems solution, performance analysis, and design. In this work, the evolution of the processes provided in several editions of the Highway Capacity Manual (HCM) for the analysis and evaluation of freeway weaving sections was reviewed. The purpose of this study is to compare and assess the accuracy and effectiveness of weaving segment analysis methodologies offered in the last three current editions of HCM. The study area consists of three major weaving segments on the main urban freeway in Mosul City. Traffic data for this study was collected using video recordings. Two stages were created, with six weekdays of 12 hours of daily traffic operations videotaped at each location to cover a wide range of traffic flow characteristics. The Good Vision Software was used to assess if the HCM methodology can effectively predict the behavior of weaving sections. According to the study results, the comparison of estimated values from three methodologies with real values in terms of weaving and non-weaving speed and density calculations under normal daily traffic conditions shows the relative validity of the HCM 2000. The study revealed that traffic congestion and problems on the freeway section downstream of the weaving segment had a noticeable influence on non-weaving speed and density, as well as the level of service and weaving performance. As a result, the study recommended future research to incorporate this influence into the HCM methodology.

Keywords: Highway Capacity Manual, freeway weaving analysis, lane-changing rate, traffic density, traffic speed, Mosul, level of service

A Low Sidelobe Level Synthesis Through Linear Subarray Thinning

Ahmed Jameel Abdulqader[1], Jafar Ramadhan Mohammed[1], and Y. E. Mohammed Ali[2]

1. College of Electronics Engineering, Ninevah University, Mosul-41002, Iraq
2. College of Engineering, Dept. of Computer and Communications Engineering, Nawroz University, Duhok- 42001, Iraq

Abstract: in this paper, a low sidelobe level synthesis through linear subarray thinning is investigated. Firstly, two different styles are proposed to modify the array radiation pattern based on fully and partially subarrays. In the first style, all the elements in the original linear array are portioned into multiple nonuniform ascending repeated subarrays, while in the second style, only some of the elements positioned on the edges of the linear array are portioned into multiple nonuniform ascending repeated subarrays, and the others elements located close the center are left without portioned and modifying (i.e., the elements close the center are excited by

unity uniform weighting). Then, the thinning approach is added to these two styles for disposing of some of the subarrays in order to reduce the complexity significantly of the array system. The proposed subarray styles with thinning approach employ amplitude-only feeding (i.e., phases set to zero), as a result, the desired radiation pattern issues from excessive quantized peak sidelobe levels (PSLL). To solve this problem, the elements in the proposed subarrays are distributed ascendingly and repeatedly with boundary constraint cover included in the optimization process. Computer simulation results illustrate that PSLL, in the first style, can be reduced to more than −33 dB by disposing of 5 subarrays on each side, then the complexity percentage of 9%. While PSLL in the second style, was -30 dB by disposing of 4 subarrays from the sides, then the complexity percentage of only 7% for a total of 100 array elements, the number of individuals unoptimized central elements is equal to 26, the number of subarrays on both sides of the array S = 14, and the number of elements subarray are arranged as a nonuniform ascending repeated. Lastly, the basics of the proposed subarray thinning were extended and added to the two-dimensional arrays.

Keywords: Sidelobe; linear subarray; thinning approach; genetic algorithm.

Adaptive PID control for 8/6 switched reluctance motor drive based on BFO

Muhammed A Ibrahim[1,2] and Ahmed Nasser B. Alsammak[2]

1. Ninevah University
2. University of Mosul

Abstract: The switched reluctance motor has been increasing importance both at the scholar and industrial levels. Its most suitable characteristics are the non-use of rare earth materials and the low manufacture charge. But one of the disadvantages for SRMs is difficult to control its responses, as a result of their nonlinear magnetization characteristics. This paper achieves a control solution adaptive PID control-based bacteria foraging optimization (BFO). This method selects benefit of BFO to adjust the three factors of the PID controller. With the intended method, satisfying response of the rotor speed stable operation has been achieved by simulink validation.

Keywords: Switched reluctance motor (SRM) , Speed control , PID Controllers , Optimization.

Assessment the Damage of the Urban Fabric of the Old Mosul City Using Remote Sensing Techniques and GIS

Raed S, Ahmed[1] and Sabah H. Ali[2]

1. College of Engineering, Architectural Engineering Dept., University of Mosul
2. Remote Sensing Center, University of Mosul

Abstract: Preserving the urban fabric entails caring for a collection of heritage or historical buildings as well as the urban spaces between them. The city of Mosul is considered one of the most important old and ancient historical cities in Iraq and has a formula for Iraqi urban development and growth. The Arabs have inhabited it since the third century AD when it was built by them over a small fortress on the western shore of the Tigris River (the site of the old city today), which was completely destroyed by ISIS terrorist gangs during the period of its occupation of the city of Mosul (June 10, 2014-10 July 2017). In the current study, Remote sensing data, GIS, AutoCAD drawing model of the Mosul old map (1944) as well as the survey data implemented by the United Nations Settlements Program Humanity (Unhabitatiraq) of the city were used for the purpose of detecting the damage of the historical and archaeological buildings and estimating the percentage of damage and destruction that affected the historical and archaeological monuments of the old Mosul city and its original urban fabric by the terrorist organization ISIS and distinguishing them from the archaeological monuments that maintained their general structure and were not subject to change. It can play an important role in the decision-making management process in restoring, maintaining or rebuilding the

archaeological areas in the old city and preserving its authentic urban heritage.

Keyword: Old Mosul City, Historical buildings, GIS, AutoCad, DEM

Experimental Studies in Monitoring and Controlling the Operation of Steam Boilers in Steam Power Plants

Shoug R. Nooria, Hashim A. Husseinb and Ali H. Numanc
Electromechanical Engineering Department, University of Technology, Baghdad, Iraq.

Abstract: Steam power plants are among the common ones known as steam power plants, where steam boilers are the basis for steam generation. However, these stations suffer from many serious problems in the steam boilers, the most common of which is the problem of shrinkage and swelling, which is considered one of the mechanical problems that appear in the steam and water separation area in the upper cylinder boiler, which may lead to boilers malfunctioning and stopping the work of the station, so we need a procedure Immediate maintenance, which costs a lot of money due to the loss of time in addition to the cost of repair, so the study came to deal with the proposal to monitor the steam cylinder, the work of the steam boilers, and how to control them.

The use of Data Envelopment Analysis (DEA) in the healthcare with a focus on city hospitals

Seda Nur Vuran and Eda Eser
Industrial engineering department, Yıldırım Beyazıt University

Abstract: The current study focuses on healthcare and assesses the effectiveness of the Turkish healthcare system. Many countries, whose health system is known to be efficient in the current situation, faced significant difficulties in the emerging Covid-19 epidemic and could not demonstrate adequate performance. The main purpose of the research is to compare the efficiency results to be obtained with the Covid-19 performance of hospitals in different cities. In order to evaluate and contrast the point of one unit of hospitals while giving various weights to various sorts of data, DEA with MCDM hybrid techniques was utilized. The main advantage of this strategy is that it enables performance comparison and evaluation of the individual decision-making unit using qualitative and quantitative performance measurement criteria in order to perform the efficiency analysis of health services in the context of Turkey and to show the relevance of this approach in its evaluation. The study's findings consist of a list of rankings given to various departments within each identified hospital, providing information to decision-makers on the approaches to be taken to enhance hospital performance. A grading system applied to the various departments of each identified hospital informs decision-makers about the approaches that should be taken to enhance city hospitals' performance. The main benefit of this strategy is that it allows the performance of the individual decision-making unit to be evaluated and compared by using both qualitative and quantitative criteria in performance measurement in regards to performing the efficiency analysis of health services in the context of Turkey and to demonstrate the relevance of this approach in its evaluation.

Buckling Control of RC Column Member Using CFRP Composite: A review

Mand Kamal Askar[1*], Salim T Yousuf[2], Yaman S. S. Al-Kamaki[3], Lawend K. Askar[1]
1. Highway and Bridge Engineering, Duhok Polytechnic University.
2. College of Engineering, University of Nawroz
3. Civil Engineering Department, College of Engineering, University of Duhok (UoD).

Abstract: The immediate change in the shape of the structural element is buckling in structural engineering like the bowing of a column under compression or the wrinkling of a shear plate under shear. This study seeks to demonstrate buckling regulation using CFRP composite and to display the behavior changes in slender reinforced concrete (RC) columns. Fiber reinforced polymer (FRP) confinement affects the bending behavior of RC monotonous and cyclic axial compression bars in longitudinal steel reinforcing bars (rebars). There were several case studies examined the positive effects on buckling stability of columns of FRP. Several factors including strength, stiffness, ductility, and the capability to absorb the energy of deformation were all addressed.

Keywords: Buckling; RC columns, control buckling

Design consideration to improve the misalignment tolerance of the DWPT-based EV charging system

Mohammed T. Ismael[1], Yasir M.Y. Ameen[1] and Kalid K. Mohammed[2]
1. Department of Electrical Engineering, Collage of Engineering, University of Mosul, Mosul 41002, Iraq,
2. Nineveh University, Mosul 41002, Iraq

Abstract. Dynamic Wireless Power Transfer (DWPT) technology is one of the proposed solutions to make electric vehicles (EV) cheaper and more common worldwide by charging the EV battery while the vehicle is in motion. However, the continuous change in mutual inductance between the paired pads during EV movement adversely affects the efficiency of wireless power transmission. To solve this problem, DWPT pads must be able to withstand high levels of misalignment. Increasing the misalignment tolerance increases the distance between the transmission pads installed on the transmission paths, consequently increasing the length of those paths, reducing the number of pads, and making the system efficiency more stable. In this paper, some design concepts are highlighted to develop an LCC based DWPT charging system for EV applications that is as misalignment tolerant as possible. The DWPT system is designed to transmit a power of PO = 3.7 kW within a charging gap of Z1 = 150 mm. The design of transmitting and receiving pads is done with the software Ansoft Maxwell. The simulation results of the developed system showed an efficiency of up to 98% and an offset tolerance of more than 50% of the pad length.

Water Turbidity Removal Utilizing Various Materials as Filter Media

Zuhal Abdul Hadi Hamzah
University of Basrah, College of Engineering, Department of Civil Engineering, Basrah, Iraq

Abstract: The current study concentrated on determining the effectiveness of turbidity reduction utilizing a filtration unit treatment method in the city of Basrah. In order to conduct tests under various operating conditions and compare the effectiveness of various media filters in terms of turbidity removal and water head loss. Sand, plastic, coal, and palm fronds were employed as the media in the filtration unit, which was covered in the work. According to the findings, the turbidity levels were between 6.35 and 45.4 NTU. Some readings are low and are viewed as favorable outcomes of the filter unit's treatment. The removal rate of the filtration unit varied greatly depending on the material, ranging from 95.6% to 96.8% for plastic, to 75.5 to 86.3% for sand, to 86.3 to 95.1% for coal, and to 69.7 to 80.2% for palm fronds. Additionally, compared to other media, the head loss was lower in plastic media. So, (minimizing in head loss leads to extending the filter running time and decreasing the number of procedures for backwashing) (decreasing in head loss leads to increasing the filter running time and decreasing the number of processes for backwashing).

Keywords: Filtration, Water Treatment, Removal efficiency, Turbidity, Filter media.

Characteristics of Flow Over Cramp Weir

Khalil I. Othman[1], Mena A. Alsawaf[2] and Tahseen A. Gelmiran[3]
1. Assistant Professor, Dams and Water Resource Research Center
2. lecturer, Dams and Water Resource Dept

3. lecturer, College of Environmental Science and Technologies,
University of Mosul

Abstract: Weirs are one of important hydraulic structures used for controlling flow and measuring flow rates in rivers and waterways. Crump weir is a special form of broad crested weir that is used in hydraulic engineering. The advantages of the crump weir are simplicity of construct, suitable for many sizes of canals and rivers, stable overflow pattern, easy to pass floating debris. The purpose of this paper is to find out the effect of the modification on downstream slope of crump weir on discharge coefficient Cd and on flow properties over the weir under different flow conditions. A series of laboratory experiments was conducted in rectangular flume by using four Crump weir models with constant upstream slope and different downstream weir slopes. The results show that Cd of the weir increase with increase in the rate of flow and decrease with increase in downstream slopes. The characteristics of the hydraulic jump downstream of weir are affected greatly by the downstream slope of the weir. The results shows that a breaking of downstream slope of the crump weir will push the hydraulic jump toward the weir.

Visual Impaired Assistance System Network Based on Deep Learning

Omar Kanaan Taha
Mohammad T. Mohammad
Lecturer, College of Engineering, University of Mosul, Iraq

Abstract: According to World Health Organization records, there are more than 285 million people who are visually impaired. It is relatively simple for a normal human to deal with objects in the surrounding environment, but it is one of the major problems for visually impaired people. The current paper proposes a visual impaired assistance system to help visually impaired people by converting the visual world to audio commands. The system
has been developed using deep learning based on YOLOv3. twenty-two objects have been chosen to detect using a completely patient-centered approach. A label of the detected object is converted into an audio command using Text to Speech library. The trained model performance has been evaluated on a test dataset and real-time live video.

Effect of hollow region incorporation with the elliptical dipole nanoantenna on its plasmonic properties

Abdalem A. Rasheed[1] and Khalil H. Sayidmarie[2]
1. Dep. of Electrical Eng., College of Eng, Mosul university
2. Dept. of comm. Eng., College of Electronic Eng. Ninevah University

Abstract: The widening range of plasmonic nanoantenna applications necessitates flexible design strategies to adapt the nanoantenna qualities to particular needs. By changing the size and shape of the nanoantenna, the design work largely focuses on changing the plasmonic resonance wavelength or boosting the localized fields. By including a hollow elliptical portion in the parent (solid) nanoantenna, we provide in this work a design technique to increase the plasmonic resonance wavelength and concentrate the localized field in the gap zone of elliptical dipole nanoantenna EDNA. Another benefit of this hollow region is to regulate the properties of absorption and scattering of EDNA. Where the resulting hollow elliptical nanoantenna geometry, which produces different thicknesses t of EDNA, can enhance overall the dipole nanoantenna's absorption and diminish its scattering. The hollow and solid EDNA link to an equal quantity of applied radiation. In contrast to the hollow EDNA structure, which scatters just 43% of the linked power and absorbs the remaining 57% at thickness t=6 nm, the parent solid EDNA scatters 90% of coupled power and absorbs the power and absorbs the reseduing 10%. This represents the switch from a scatterer to an absorber case of nanoantenna. Additionally, the field enhancement in the gap region of HEDNA is more than three times greater than that of parent EDNA. The advantages of this suggested structure are easily applied to a variety of fields, such as biosensing, thermoplasmonics, solar cells, and photovoltaics.

Recent Advances in Water Treatment Membranes Based on Nanomaterials (Mini-Review)

Halla Yousef Farman[1], Riyadh Hasan Al-Anbari[2] and Adawiya J.Haider[3]
1. Ministry of Municipalities and Public Works, General Works and Maintenance Department,
Baghdad, Iraq.
2. Civil Engineering Department, University of Technology, 10066, Baghdad, Ira 3List all distinct

Abstract: Nanomaterials are the next generation of high-performance materials, and they have the potential to solve the world's water pollution problem. Membranes incorporating nanoparticles have higher mechanical strength and water permeability, which improves the efficiency of separation and minimizes fouling of the membrane. The objective of this review is to clarify the importance of nanotechnology in improving the properties of commercial membranes for treating turbid water, agricultural waste water or swimming pools.

Throretical study of pollutants emissions from industrial chimney

Hashim Al-zuwaini
Almaaqal University, College of Engineering, Department of Petroleum Engineering, Basra, 61003, Iraq

Abstract: Environmental damage caused by industrial emissions is estimated as a major factor by predicting the concentration zones of pollutants ejected into the atmosphere. The necessity of knowing the velocity field and the intensity of the turbulence with a great deal at the boundary layer of the atmosphere in the region of interest in order to solve the equation for the concentration of gaseous or particulate liquid waste. A Mathematical Model of two dimensions based on Fluid mechanics equations as well as a modified non-isotropic k-ε turbulence model, is used to calculate the flow and dispersion at the microscale of the atmospheric microscale. The finite volume method is adopted to implement an to model three dimensional computational code to the body by using coordinates corresponding to the model of the body. Finite volume method (FVM) is used solve the average of Naiver Stock equations in combination with the turbulent k- ε model to obtain the investigation results. The plume flow of the industrial chimney with different velocities, wind velocities and chimney height was calculated. SIMPLE schemes are used to solve model's equations. The simulation of multiple flow and dissipation the program FLUNT is applied by code to show the results of different parameters of plume and velocities at different height. The computational results clearly show that the numerical model correctly predicts the trajectory and concentration of the plume. Comparison with experimental results shows that the non-isotropic turbulence model has a better ability to predict plume dissipation than the standard k- ε model, in which the non-isotropic nature of turbulence is essential.

Dual internet links to provide safe transformation of analog tags between client and server in process automations

Mohammed Mahmood[1], Jassim Abdul-Jabbar[2]
1. University of Mosul, College of Engineering, Computer Department, Mosul, Iraq
2. Almaaqal University, College of Engineering, Control and Computer Department, Basra, Iraq

Abstract: In any industrial system there are critical parts which need to work perfectly to maintain minimum requirements of industrial processes and to ensure sustainability of productions. In this paper, a practical remote monitoring and control system was created using KEPServerEX. A dedicated public IP address has been used for allowing the Client to access the Server remotely through the Internet. The Open Platform Communications United Architecture (OPC UA) was used to transfer automation data such as flow rate, Liquid Level, pressure, temperature, motor speed control signal, etc. The local devices are connected to the

server via Ethernet cables. An innovative method has been introduced to realize dual link connections between the OPC UA Server and the remote OPC UA Client. A redundant Internet link has been used with the other link to achieve higher availability, reliability and security to the designed industrial system. The results showed the maximum time required to receive alarms inferring the state of the dual path at the client side (when using the 3G mobile data) is between 200 to 300 ms.

Design of a floating photovoltaic system on Mosul Dam Lake in Iraq by PVSYST

Noor Mardan, Ahmed A. Abdullah Al-Karakchi
Northern Technical University, Mosul, Iraq

Abstract: The low water level in Mosul Dam Lake caused a reduction in electrical power delivery and energy support for the grid. This paper provided analysis and design of a 32 MW floating photovoltaic system to be added to the grid. The analysis and design using the PVSYST program resulted in an 84 % performance ratio and total energy injected into the grid 57.178 GWH/YEAR, saving 1,490,633.3 tons of carbon dioxide. This analysis recommends the deployment of this type of system to assist the national energy network while also reducing water evaporation and consumption for other purposes.

Simulation Study for Changing some Roundabouts in Karbala government into signalized roundabout

Ali Fadhlallah Hussein
Civil Eng. dept. University of Kerbala Karbala, Iraq

Abstract This research aims to analyse and evaluate some of the main roundabouts in Karbala Governorate after they were converted to signalized roundabouts by simulation program PTV VISSIM. These roundabouts suffer from large traffic, which leads to a significant decrease in their level of service (LOS), especially at peak times, where it is observed that the traffic police intervene to direct the traffic and reduce congestion. Therefore, one of the proposals was to use the light signal to control the roundabout at peak times. The results were positive in the first roundabout, as the level of service (LOS) decreased from F to D, and the LOS of the other roundabout also decreased, though to a lesser extent, from F to E due to heavy traffic volumes at peak times and design errors in the roundabout.

Enhancement melting and solidification process of phase change material in a zigzag plate heat exchanger

Hussein Alawai Ibrahim Al-Saaidi[1] and Firas Abdulsattar[2]
1. Department of Refrigeration and Air Conditioning Engineering, Al-Turath University College,Baghdad, Iraq
2. Department of Mechanical Power Engineering, Refrigeration and Air Conditioning Technical Engineering, Dijlah University College, Baghdad, Iraq

bstract: Due to the low costs and remarkable energy savings, thermal energy storage with phase change materials (PCMs) is a reliable technology for filling the gap between energy supply and demand. This study numerically investigated the melting and solidification of paraffin wax in a zigzag plate-type heat exchanger latent heat thermal storage unit (LHSU) under the effect of different tilt angles of $0\circ$, $30\circ$, $45\circ$, $60\circ$ and $90\circ$. The effects of inlet flow rate, the average temperature of the heat transfer fluid (HTF) and zigzag angle orientation are thoroughly investigated and revealed. Two-dimensional numerical simulations of PCM melting in a zigzag configuration can accurately predict both the temporal evolution and the liquid fraction of the solid-liquid interface. The results reveal an important reduction in melting and solidification time by using the zigzag configuration, the reduction in the charging time by nearly 80.4%, 44.7%, and 16%, for horizontal, inclined, and vertical orientation when compared to the double-tube, respectively. The zigzag plate unit with a tilt angle of $0\circ$ horizontal reflects the best performance among other inclinations.

Numerical simulation of selected parameters affecting on the nugget zone temperature during friction stir welding

Anas Obeed Balod, Mohammed shaalan Abed Fathi, Qays Hazim Ismael
College of Engineering, University of Mosul, Mosul, Iraq

Abstract: Friction stir welding is considered a modern welding process due to high efficiency of welding parts with low cost compared with other welding joints. This process depended on friction between pin and welding parts and increased temperature, and the resulting welding between parts. In this research the effective parameters for the welding process were numerically modelled using finite element method software such as pin rotation, linear welding velocity, Friction coefficient. Also, different aluminium alloys were used in the welding process to show the effective parameters for welding temperature.

On the maximal monotonicity and nearest point Operators

Mustafa Dawood Alobadi and Zena Hussein Maibed
University of Baghdad, College of Education for Pure Science Ibn Al-Haithem

Abstract: The aim of this paper,is to introduce a new methods of approximation for solutions family of maximally monotone and prove convergence of the proposed method under suitable conditions.

Study and Analysis of an Intelligent Air Balloons Powered By Wind Turbine Generator: A Review and Challenges

Sarah Ghanim AL- Hussainy, Ali Abdul Rzzaq Altahir, Asseel AL-Gaheeshi
Department of Electric and Electronic, University of Kerbala

Abstract: This paper will present a review and some challenges related to study and analysis of an intelligent balloon powered by wind turbine generator. In some of coastal cities, the incidence of hurricanes is mainly caused by solid winds or earthquakes and volcanoes. They may occur on the seafloor, which cause the waves of water acceding the coastal cities quickly and destroying the urbanization state especially for cities and villages near the surface of sea. The proposed study will introduce an intelligent cylindrical balloon that automatically acts as a water repellent to absorb the sudden momentum of water hammers coming from the sea caused by a hurricane. The smart balloon could be controlled by one of expert systems with assistance of pressure sensor. Also, the proposed system consists of air pump driven by a DC motor powered by deep cycle rechargeable batteries. These batteries will be recharged by wind turbine generator located faraway from onshore by 100 m. In this project, variable speed control can be checked by studying the steady-state and dynamic models of the grid side system. An Intelligent balloon is issued for shores usually exposed to coastal hurricanes. Arrange several sequential balloons in such a matter to form a flexible wall repel hurricane. The mathematical model will simulate in a MATLAB environment R2022a. For the knowledge, the authors expect that this study is the first try in field of electrical and electronic engineering, which discuss the state of hurricanes with assistance of expert's systems and renewable sources.

Calibration of flow equations through the total opening of the regulator gate using CFD modelling

Hamid Ahmed Mahdi
College of the Engineering/University of Kerbala

Abstract: Studying the characteristics of the flow passing through irrigation regulators and the factors affecting them, for the case of flow at the total opening of the regulator gate, as well as the effect of The presence

of struts in the regulators on the flow, this research reviewed a simulation in the Flow 3D program and compared the results with the general and positional equations for calculating the discharge through water facilities that were reached in previous research. In lab water studies, three versions of irrigation regulators with a single aperture or with numerous apertures were utilized. Based on the findings of laboratory measurements, the coefficients and other components in the equations for estimating discharge were calculated, and links between these coefficients and the non-dimensional components impacting the flow calculated in the laboratory were drawn. This equation was tested using actual laboratory experiments and comparisons to the drain taken from the simulation in the flow 3D program to determine the discharge coefficient, approach charge coefficient, and the results of the calculated discharge. Because the program in this study depends on elements that can be obtained or calculated from measurements available in the field or in the records of the responsible departments, the data that must be available to run the program are distinguished by the possibility of their application in the field.

Bearing Capacity of Shallow Footing Resting on a Gypseous Soil Treated with Xanthan-Biopolymer

Lubab Ibrahim Zedan, Jawdat K. Abbas
University of Tikrit, Iraq

Abstract: Gypseous soils are abundant in Iraq; they constitute over 33% of the country's surface area. The structures that are founded on these soils could face significant damage due to the dissolving of gypsum when soaked in water. Today, there are an increasing number of biopolymer applications for environmentally friendly soil improvement and erosion prevention. For lower cost and human safety, biopolymers like xanthan have been commonly studied to improve strength. The objective of this study is to investigate the behavior of the shallow foundation that is resting on gypseous soils treated with xanthan. The study included forty-two tests to load the square footing (100mm x 100mm) resting on gypsous soil used with a relative density of 70%. The Xanthan was added to the soil in percentages of 1.5 , 3, 4.5, and 6% and the footing model was taken for Df = 0.5 ,1 , 1.5 B. Soil is mixed with xanthan for the first time and then water is added. The obtained results are: The best ratio of xanthan for improvement is 6% at Df/B = 0.5 for high gypsum content soil, causing ultimate capacity to increase considerably. It was also noticed that settlement increased with an increase in xanthan.

Enhancement the Performance of Photovoltaic Panels by Cooling the Back Surface with Water

Mohammed Salih Safar, Adnan M.A. Saffawi and Ahmed Fattah Ahmed
Department of Mechanical Engineering, College of Engineering, University of Mosul, Iraq

Abstract: The electrical performance of solar panels is greatly influenced by the operating temperature of silicon solar cells due to the properties of the crystalline silicon used in it, so the energy generated from these cells decreases with increasing temperature. To minimize this reduction in power generated, the solar panel was cooled by water, using rectangular channels placed on the backside of the solar panel. The water flow inside the channels is directly in touch with backside. The experimental results indicated that, cooling the panel with a flow rate of 3 liters/min decreased the panel temperature from 74 °C, to 43 °C. And the maximum improvement in power produced as a result of cooling is (19.6) %.

Automated Body Postures Assessment from Still Images Using Mediapipe

Mazin H. Aziz and Hamed A. Mahmood
University of Mosul, College of Engineering, Computer Engineering Department.

Abstract: Human poses assessment was an exciting research trend in the last decade. It was used in sports, Yoga, health care, and many other fields, to help people get better performance. Machine learning and artificial intelligence techniques are used for this purpose. This paper used Google Mediapipe as a part of a framework for automatic Human-body pose assessment. Google Mediapipe is based on a machine learning model to find the body joint landmarks' positions. The proposed framework is based on detecting reference image poses, finding pose landmarks, and extracting discriminative features for each pose. The reference image should be given by a teacher or should be taken from some reference data set. These same process stages are applied to each image taken for the learner. The last stage of the framework compares the extracted features for the learner pose image with that of the reference and specifies the inexact pose for each related human body part. The reference image was proposed to enable the system to be used for various applications. Google Mediapipe was proposed for landmarks detection via Python, which was also used for feature extraction, making comparisons, and giving assessment advice. The pose assessment is displayed as text messages that specify the deviation states from the reference pose and direct the learner to the correction manner. Public features were proposed for each main view, i.e., side view, front view, and others. Different application activities were adopted as a case study and gave promising results. This system could be very helpful for automatically self-pose assessment at home, or as an auxiliary tool for a certain learning program.

Enhancing compressive strength of particulate composite using additives

Ahmed N. Rashid[1], Ahmed S. Abdalaziz[1], Yasir. H. Ali[2] and Awad. H. Khedher[1]
1. University of Mosul, College of engineering, Mechanical engineering dept.
2. North technical university, Refrigeration and air conditioning dept.

Abstract: The major objective of this research is to enhance the particulate composite's compressive strength. This was done by combining a polymer base with a number of additives, including Iron particles, Al particles and sawdust particles in weight percentages of 5%, 10% and 15%wt to produce the required composite. The hand-molding technique was employed to create the compressive specimens. The results revealed that, depending on the density, type of additives used, and their weight percentage, as well as the characteristics of the dispersion of particles within the polymer, the compression strength increased in some cases of the study and decreased in others, but at varying rates. According to the previous factors, when the good mechanical properties combined with the high density and high addition ratio, an improvement in the compressive strength reached 23% in the case weight percent of 15% of iron particles. On the other hand, despite the poor mechanical properties and low density that occurred in the case of weight percent 10% of sawdust particles, the effect of the particles distribution inside the polymer was visible through an improvement 12% in the compressive strength.

New Hybrid Load Balancing Algorithm Based on Golden Eagle Optimizer and Throttled for a Cloud

Ola Hani Fathi and Turkan Ahmed Khaleel
Computer Engineering Department, College of Engineering, University of Mosul, Iraq

Abstract: Improving load balancing performance in a cloud computing environment is one of the biggest challenges facing a cloud environment, and it is still evolving. For this reason, a hybrid algorithm based on Golden Eagle Optimization (GEO) and the Throttled algorithm has been proposed. In this article, the hybrid load balancing algorithm was simulated and compared with other load balancing algorithms such as throttled, round robin, equally spread current execution, shortest job first, GEO, Ant-colony, and honeybee and compared with them using two scenarios of the

service broker, which are the closest data centre, optimize response time in cloud analyst simulator. It was concluded that the response time and process using the time of data centres hybrid is better than other algorithms. Overall response time in the case of the closest data centre, or for hybrid, throttled, round robin, equally spread current execution, shortest job first, GEO, Ant-colony, and the honeybee is, respectively: 2605.85ms, 15587.31ms, 29175.32ms, 29184.96ms, 29185.59ms, 29185.71ms, 32123.51ms and 34627.57ms, and the data centre processing time is 2480.74ms, 15319.63ms, 28803.43ms, 28810.98ms, 28811.48ms, 28811.50ms, 31856.94ms, and 34264.75ms. In the case optimize response time server broker, the response time centre for hybrid, throttled, round robin, equally spread current execution, shortest job first, GEO, Ant-colony, and the honeybee is respectively 2684.69ms, 8119.69ms, 14836.32ms, 14123.00ms, 15075.27ms, 14743.23ms, 17790.22ms and 25910.01. And the data centre processing is respectively 2489.88ms, 7650.20ms, 14306.38ms, 13583.33ms, 14540.82ms, 14211.10ms, 17303.06ms, and 25388.22ms. Finally, we conclude that the hybrid algorithm significantly decreased overall response time and data centre processing time compared to the rest of the algorithms.

Building A Keystroke Dynamic Recognition System Using An Improved Accelerated Method

Ula T. Salim[1], Sahar L. Qaddoori[2] and Noor M. Allayla[3]
1. Computer Engineering Department, Engineering Collage, Mosul University, Mosul, Iraq
2. Electronic Engineering Department, Electronics Engineering Collage, Ninevah University, Mosul, Iraq

Abstract: Keystroke is a printing recognition software feature that is used to support trusted security applications in the real world. Despite its simplicity, it needs an accurate and fast way to analyze the characters of the printing. In this research, the keyboard pressing dynamics was applied to deal with the problem of recognizing user information by suggesting an improved and accelerated method built using artificial intelligence and it has been implemented with the help of a graphics processor unit.

The effect of Planning standards to improve the thermal performance of housing with North fronts in Mosul

Obuai Taha AL-Wazzan and Ahmed Yousif Alomar
Department of Architecture, College of Engineering, University of Mosul

Abstract: The study aims at providing sustainable environmental solutions for single housing problems in Mosul and the northern region of Iraq, namely the bad thermal performance of housing with northern façade. Northern facades are the worst in winter as front façade is not insolated while side and rare insolation is prevented because of neighboring houses where perpendicular and reticulate planning is adopted. Mosul climate is different from middle and south parts of Iraq climates where the cold winter lasts for about five months. The Iraqi housing specifications applied in all the parts of Iraq have never give enough specificity to tackle this problem. The current study examines the locally adopted planning criteria and how planning criteria deal with this global phenomenon to draw up a theoretical frame for examining all the aspects of this phenomenon. The study sample consisting of the common and proposed single housing patterns is examined including connected, semi connected, separated and yard patterns. Twelve models, the more repeated, were selected simulation software (ecotect) is used to examine the impact of selected planning criteria on thermal performance. Results have shown that there is a possibility to improve thermal performance of northern houses and indicated large impact of controller for the rare joint between the northern and the southern house, controller of coverage and rebound of first floor to ground floor. Results also indicated the importance of creating spaces for insolation through using lateral and rare spatial neighboring relations among houses in improving thermal performance. Some patterns were shown to be better than others as related to thermal performance. A model

for heliosphere is proposed as a hypothetical housing condition for Mosul City.

Key words: Thermal performance, single housing, planning controls. ecotect program, Mosul

Coexistence of the opposites in Contemporary Architecture

Ghusoon Najm Abdulzahra and Abbes Ali Hamza
Architectural Engineering Department, University of Technology- Iraq

Abstract: Critical and rhetorical studies that dealt with the concept of opposites have always dealt with the language of architecture and its texts analytically and theorizing, as the texts multiplied, accumulated, changed their quality, and conflicted with each other, so some of them are differences and others have a crisis in their meaning, hence this study came to shed light on the employment of the concept of coexistence as a communicative mechanism that can formulate and read Contemporary architectural text, based on a system of (opposite) intellectual and formal perceptions, and combining them to create a multi-level, comprehensible architectural text, and conceptual and semantic systems governed by previous perceptions (collective memory), to preserve what is inherited and allow what is contemporary. The research concluded the importance of developing a conceptual or semantic model that facilitates the process of dialectical thinking, through a system of possibilities that produces a generalizable pattern at the level (text production, reading the produced text). The study adopted a qualitative approach based on the ontology of critical realism and the application of theoretical framework indicators on some projects. Elected down to the results and conclusions and then recommendations.

keywords: Architectural text, dialectics, opposites, coexistence, communicative

Spatial considerations for organizing plans within Norman Foster's architecture in contemporary architecture

Khadeja M.Ali Abdullah and Asma Hasan Taha Al-Dabbagh
Mosul University Mosul University

Abstract: The design characteristics of plans in contemporary architecture vary according to several considerations; Spatial, functional and technical, which stem from the designer's conceptual influences, which have undergone evolutionary and sometimes revolutionary changes since the industrial revolution until now, which led to the emergence of various architectural movements and trends. This paper focuses on spatial considerations, which include the characteristics of openness, layering, and shape of the plans. Within contemporary architecture, many architects organized plans according to different considerations mentioned above. By analyzing three cultural buildings designed by the architect Norman Foster implemented in the period between (2003-2021). And measuring the variables within previously stated characteristics. The research founded that Foster employs the openness and the shape of the plans more than others characteristics in organizing the plans of cultural buildings. The research came out with conclusions related to these findings. as well as the generalizations related to the architectural trend.

Keywords: spatial considerations, Norman Foster, openness, layering, trend

Hiding Encrypted Data In different Image types using spatial domain

Mohammed Idrees, Mustafa Ahmed and Farah Tareq Mohammed
University of Mosul/Iraq

Abstract: Development of Informatics fields and data transfer through internet increase every day. This development has emerged the need to protect this data by developing cryptographic algorithms and concealment technique in order to reach a higher level of protection. Based on this, this project develops based on using Least Significant Bit (LSB). Focusing on changing concealment sites in the less important cells between points, and also using a suggested algorithm to encrypt gray scale image data by adopting the positivist method of image point locations. The algorithm was

applied to more than one gray scale image and they hidden in more than color image. The algorithm approved and achieved good results after using metrics. The Peak Signal to Noise Ratio (PSNR), The Mean Squared Error (MSE) and the Normalization Correlation (NC) standard measure the accuracy of extract data.

A review study on weak soil stabilized with the addition of silica

Asmaa Gheyath Salih[1], Ahmad Safuan A. Rashid[1], Nihad Bahaaldeen Salih[2]

1. School of Civil Engineering, University Teknologi Malaysia, Johor Bahru, Johor, Malaysia
2. Department of Water Resources Engineering, College of Engineering, University of Sulaimani, Sulaimaniyah, Northern Iraq

Abstract: Using soil improvement/stabilization techniques, the engineering qualities of problematic soils can be changed to satisfy the design specifications. According to research in the literature, silica as an additive increased soil strength and contributed as a strength enhancer for soils that had been treated with cement, lime, and fiber. Additionally, silica helps in reducing the soil's hydraulic conductivity and compression index. On the basis of the previous literature, an analysis of the minimal strength enhancement with silica on various types of soils is also explored. After the research's encouraging findings, improvements in cost- and eco-efficient biogenic manufacturing techniques would make silica a competitive additive in the geotechnical engineering field. Therefore, the current research gives a demonstration of a comprehensive review of silica's physical characteristics, effects on curing processes and aging, behavior when combined with soil and other additive materials in terms of strength improvement, hydraulic conductivity, and compressibility, mechanism of reaction in various soil and additives, and a discussion of the gaps that need to be filled to implement this technology to field practices.
Keywords: Silica - Soil stabilization – Soil strength improvement.

On Analytical Convergence of Multi Iterative Procedure for Finite Family of Generalized Quasi Like Contractive

O MA Joodi and Z H Maibed
Department of Mathematics, Ibn Al-Haitham College of Education University of Baghdad, IRAQ

Abstract: In this paper, we will define a generalized quasi like contractive mapping in convex metric space and define new iterative schemes from the three-step type. In addition, the convergent, stability and rate of converge in convex metric space will be proved.
Keyword: fixed point, Contractive operator, convergent, stability, rate of convergence, convex metric space

The effect of activating spatial value in achieving attraction to neglected urban places

Sara kubbah
Department of Environmental Planning, Faculty of Physical Planning, University of Kufa, Najaf, Iraq

Abstract: The spatial value of urban places contributes to activating them and making them attractive points in the urban landscape of the city and gives a sense of spatial belonging, becoming essential points for social interaction and an attractive hub at the level of the region and the city. Capable of attraction and containment, and therefore the research focused on studying and clarifying how to activate the spatial energy of religious buildings, as it gives the highest value to the urban place, and to choose the study area for the urban place located between the shrines of Muslim bin Aqil and Maitham al-Tamar, peace be upon them both, because this area has a high historical and religious specificity, but it lacks energy The sensory and spatial conferred by the force of attraction resulting from its spatial value. The research aims to reveal the spatial values through the concept of feeling the energy of the place as a result of the presence of the material, visual and moral components in it. Through a hypothesis that states, the sense of the spatial value of religious buildings contributes to

activating the positive energy of the place and making it an active urban point within the urban fabric
Keywords: energy of place, spatial attraction, spatial value, religious buildings, activating urban space

Balance in multiple urban systems

Sara kubbah[1] and Wahda Hankawi[2]
1. Department of Environmental Planning, Faculty of Physical Planning, University of Kufa, Najaf, Iraq
2. Department of Architecture, University of Technology, Baghdad, Iraq

Abstract: The city consists of a group of urban systems that develop through different periods of time that together form the identity of cities that distinguishes them from others. Rather, they are within a specific logic that seeks to develop the city and establish urban formations capable of continuity and change, and since our local cities possessed a systematic pluralism that led to a significant change in the urban structure, therefore, it was necessary to know these models that form the urban context of the city, and how each model affects To change the identity of the cities in it, and from here came the idea of research in identifying mechanisms that address the state of dispersion in the systems and that can combine the multiple urban patterns in the city and reach a balanced urban structure that depends on partial solutions according to the specificity of the problems in the different parts of the city and then create a comprehensive vision for the city as a whole. Therefore, the research path will be linked to the development of the basic concepts and ideas of urban planning and their impact on the formulation of mechanisms to solve the problems of intellectual pluralism and imbalance. urban systems, and the research will depend on a basic hypothesis, which is "a balanced urban structure is achieved through mechanisms that deal with the state of systematic pluralism in the city." The goal of the research is to determine the appropriate mechanisms that can be followed to achieve a state of balance in the urban structure by combining systems cities and make them coexist with each other
Keywords urban systems, systemic multiplicity, urban dispersion, systemic balance, systemic identity

Multi-Frequency Low Power Low Density Parity Check Encoder Using Dynamic Voltage and Frequency Scaling Approach

Noora Nazar[1], Qusay Al-Doori[1] and Omar Alani[2]
1. University of Technology, Baghdad, Iraq
2. University of Salford Manchester, Salford, UK

Abstract: In terms of correction efficiency, Low Density Parity Check (LDPC) codes are widely regarded as one of the best error correction coding (ECC) methods. They have been utilized in numerous modern data transmission standards, where the codecs are frequently built within specialized integrated circuits (ICs). Nowadays, market-driven vital requirements and technological limitations to forced researchers to create new model methods and strategies to meet the power requirements for Complementary Metal-Oxide-Semiconductor CMOS circuits. Furthermore, power requirements for CMOS circuits with a wide frequency range are a critical issue for future communication generations that many researchers have overlooked. As a result, this paper focuses on a multi-frequency power reduction strategy for LDPC encoders, by using a well-known power reduction method known as Dynamic Voltage and Frequency Scaling (DVFS) which is one of the most powerful power reduction strategies in CMOS circuits. The suggested system employs a fuzzy logic controller combined with the DVFS to control and select the optimal voltage that reaches the encoder to reduce total power consumption. This combination achieves substantial power reduction with a wide frequency range while having no effect on LDPC efficiency, flexibility, or performance.
Keywords: low-density parity checks code (LDPC), forward error correction codes (FEC), power reduction in CMOS circuits, dynamic voltage and frequency scaling (DVFS), fuzzy logic controller.

On the Performance of Physical Layer Authentication via Realistic CSI Dataset

Eman Hani Enad and Sedki Younis
Computer & Information Engineering Department, Ninevah University, Mosul, Iraq

Abstract: In this research, the performance of physical layer authentication (PLA) statistical decision schemes via realistic channel state information (CSI) dataset is presented. The physical layer authentication adopts the channel features and statistical metrics to classify the received frame based on the signal distortion through the channel into two categories, legitimate or illegitimate. The statistical decision metrics of the physical layer authentication are investigated using the measured CSI dataset in several authentication scenarios formulated to detect the spoofing attack of the illegitimate entities. The authentication performance is evaluated in terms of the probability of detection, probability of false alarm and the area under the receiver operating characteristic curve. Simulation results based on the measured CSI available in the dataset demonstrated the superiority of channel attribute feature to detect the spoofing attack and achieving acceptable probability of false alarm hence increasing the potentiality of the physical layer authentication to substitute/assist the conventional authentication schemes.
Keywords: physical layer, authentication, wireless, channel state information, OFDM.

Analysis and simulation of a five-phase voltage source inverter based on SVPWM strategies

Marwan M.Alwan and Yasir M.Y. Ameen
Department of Electrical Engineering, University of Mosul, Mosul, Iraq

Abstract: Multiphase inverters have become more attractive to researchers after significant advances in power electronic devices that have become more reliable and less expensive. It has become possible to manufacture AC sources with more than three phases. There are many advantages of these drivers that differ from their three-phase counterparts, so multi-phase drivers are more appropriate and desirable, especially in modern electric machine applications. In this article, three-phase VSI and five-phase VSI based on SVPWM schemes have been studied by simulation study using Matlab/Sumlink software. For three-phase VSI, two SVPWM schemes are considered: seven-segment and five-segment schemes with resistive load and inductive load were studied. For five-phase VSI, two schemes are also considered: large SVPWM and medium SVPWM with resistive load and inductive load were studied. A comparative study was conducted to show the pros and cons for each system in terms of DC utilization factor and total harmonic distortion.

Modeling and simulation of a VSI-fed five-phase induction motor based on large and large-medium SVPWM strategies

Marwan M.Alwan and Yasir M.Y. Ameen
Department of Electrical Engineering, University of Mosul, Mosul, Iraq

Abstract: Recent research tends to use polyphase induction motors extensively in many different applications with more than three phases. This is due to its different advantages over the three-phase motor, such as B. Reducing the current for each phase of equal power, besides its high fault tolerance, small torque ripple, greater reliability and higher efficiency than the three-phase motor. This paper presents a modeling and simulation of a five-phase induction motor driven by a five-phase VSI and controlled by two techniques for SVPWM, the first technique is large SVPWM and the second technique is large-medium combination SVPWM. The performance of the engine was theoretically analyzed and compared to a simulation study performed with the Matlab/Simulink program and good agreement was obtained.

Smart System based on IoT for Movable Objects detection

Marwan M.Alwan[1] and Yasir M.Y. Ameen[2]
Department of Electrical Engineering, University of Mosul, Mosul, Iraq
Department of Electrical Engineering, College of Engineering, University of Mosul, Mosul, Iraq

Abstract: Recently, the detection of the movable objects has got a lot of attention for certain applications. The developments in the digital systems especially the IoT systems help improve the performance. Different techniques can be used to detect objects. The communication techniques used to transmit and receive data to detect and track them. The target object can be various things such as people, cars, etc. Hardware and programing are required to achieve object detection. The fast response and security are factors that should be considered carefully in this work. In addition to, The high resolution of object detection and distance. Various application can be utilizing this system for its potential, simplicity, and low cost.

Design and Implementation of Power Convertor Circuit toward Electric Vehicle Charging Applications

Fawaz Y. Abdullah, Mohammad Tariq Yaseen, and Firas S. Alsharbaty
Department of Electrical Engineering, College of Engineering, University of Mosul, Mosul, Iraq

Abstract: The grid-connected electric vehicle charging stations are being integrated into renewable energy for preserving the conventional energy resources as well as to ensure sustainable development of the society. In addition to the effortless charging, the sudden demand variations in the grid can be met by the renewable energy storage system in the charging stations. The main challenge in this concept is the unstable nature of renewable energy. As the energy storage system of charging station is directly connected to the renewable energy source like a solar panel, according to the variable and deficient input power condition, the converter should supply a regulated output at the required magnitude. If a conventional converter is used for this purpose, the charging efficiency will be poor for higher gain conditions.

A Novel Approach for Maximize the Efficiency of Wind Turbine by Adaptive Control of Pitch Angle

Zainab Jamal Mohammed Saad Enad Mohammed Mohammed Obaid Mustafa
University of Mosul / College of Engineering

Abstract: This paper proposes two different strategies for controlling the pitch angle of variable-speed wind turbines for a permanent magnet synchronous generator. the proposed strategies are Proportional Integral (PI) controller and Fractional-Proportional Integral (FPI) controller. The proposed system was represented in MATLAB-SIMULINK. The values of KP and KI are chosen for the control unit PI by traditional methods, while the Particle Swarm Optimization (PSO) algorithm selects the parameters of the FPI controller. The first method results show a somewhat satisfactory performance, but it lacks the accuracy and effectiveness necessary to keep the system stable. The results of the second method show high efficiency and accuracy in regulating the pitch angle, and thus the stability and high efficiency of the system.
Keywords: Wind Turbine (WT), Permanent Magnet Synchronous generator (PMSG), Pitch angle control, Particle Swarm Optimization (PSO), Fractional-Proportional Integral (FPI).

Performance Investigation of RIS Aided Localization with TDOA in the Near-Field

Abdulrahman Kh. Alhafid[1], Y. E. Mohammed Ali Nawroz[2] and Sedki Younis Ninevah[3]
1. University of Mosul, College of Engineering, Electrical Dept. Mosul, Iraq

2. College of Engineering, Computer and Communications Dept. Duhok, Iraq
3. University of Mosul, College of Electronics Engineering, Computer and Information Eng. Dept, Mosul, Iraq

Abstract: Reconfigurable intelligent surface (RIS) is considered as the enabling technology for the future wireless communication systems. The adoption of RIS to provide sufficient localization accuracy particularly in non-line-of-sight (NLOS) conditions has been considered in this paper. Given that the surface is sufficiently large and working in large frequency, the system will operate in the near-field region. The localization algorithm is formulated considering orthogonal frequency division multiplexing (OFDM) downlink signalling with single antenna anchor. The time difference of arrival (TDOA) radio measurements of the RIS tiles is used to estimate the position of the users. Through simulation investigation has been conducted on the reliability of the estimated time of arrival (TOA) for each RIS tile. Numerical results confirm the effectiveness of using TDOA-RIS algorithm to improve the localization accuracy given different strategies to choose the reliable measurement for the formulation of the estimation procedure.
Keywords: Wireless device localization, Reconfigurable intelligent surface (RIS), phase profile, time difference of arrival (TDOA), orthogonal frequency division multiplexing (OFDM), Near-Field propagation.

Investigating the impact of cavity charges on the surface electric field distribution of the GIS spacer

Ahmed D. Awad and Dawood N. Saleh
Department of Electrical Engineering Department of Electrical Engineering, University of Mosul University of Mosul, Mosul, Iraq.
Mosul, Iraq

Abstract: One of the important components that consist GIS system are spacers. The accumulation of charges on the surfaces of these insulators may increase the concentration of the electric field and cause electric flashover across the interface surfaces between the SF6 gas and the solid insulator. These insulators are not free from some manufacturing and operational defects that adversely affect their performance, and among these defects is the presence of air voids inside the solid insulator, which may be exposed to high electric fields that may lead to partial discharges within these voids. The result is the accumulation of charges on the inner surfaces of these voids. With 2D finite element method, this study investigates the impact of the charges that accumulated on the inner surfaces of the void on the distribution of the electric field on the inner and outer surface of the spacer, as their effect is investigated when they are in different places inside the insulator.
Keywords: GIS spacer, air void, partial discharge, surface flashover, electric field distribution.

The Impact of Mosul Hot Environmental Conditions on Monocrystalline Silicon Solar Cells

Omar Abdullah Ahmed[1], Adnan M.A. Saffawi[1], Khalid Khaleel Mohammed[2]
1. Department of Mechanical engineering, College of Engineering, University of Mosul.
2. Department of Electrical engineering, College of Engineering, University of Mosul.

Abstract: In this research, the impact of the hot season (summer) in Mosul city (Iraq) on the performance of silicon solar cells was investigated. In order to identify the absolute parameter required to overcome the efficiency loss caused by high climate temperatures in July and August month, the performance of silicon solar cells was evaluated and simulatively determined. Usually, the performance of photovoltaics is degraded with increasing temperature due to f the reduction of solar cells open-circuit voltage, which leads to a decrease in the overall efficiency of the solar cell.

The Proposed Evacuation Strategies in Smart Networks

Zubaida Alazawi
College of Engineering, Mustansiriayah University, Baghdad, Iraq

Abstract: The importance of disaster management systems cannot be underestimated today due to the many manmade and natural disasters especially in recent years. COVID 19 pandemic was the worst disaster among other disasters since 1920 which caused of 620,154,009 infected cases and around 6,540,178deaths. COVID 19 impact leaves other disaster circumstances less impact. However, still other natural and manmade disasters have their fingerprint on lives and economies. After months of heavy monsoon rain and flooding, satellite images of Pakistan revealed a third of the country below water. The natural disaster began in mid-June and has claimed over 1,000 lives, with the government reporting $10 billion in damage. The Transportation and telecommunications play a vital role in disaster response and management as it helps in preventing the loss of human life, economic cost and controlling the disruption situation. In previous works, we proposed and evaluated an Intelligent Emergency Response System for disasters of various scales with a focus on transportation systems. The system exploits the Information and Communication Technology (ICT) developments. In addition, we have developed a tool/model to evaluate the proposed Intelligent Disaster System within the transportation evacuation strategies performance. The Demand Strategy, Destination Strategy and Speed Strategy have been already evaluated independently, for traffic in urban networks. In this paper, we employed our emergency management system intelligently at various emergency statuses while using the Intelligent Transportation Systems (ITS). In other words, various substitute technologies including VANETs (Vehicular Ad hoc Networks) and mobile technologies are applied to propose and examine a set of evacuation strategies simultaneously including the Demand Strategy, Destination Strategy and Speed Strategy while using the proposed Intelligent Disaster Management System. Our most previous important objectives of our research will be examined and validated here as well as the effectiveness of our system is demonstrated through modelling the impact of a disaster on a real city transport environment and comparing it with the case where our disaster management system was in place. We report great benefits derived from the adoption of our proposed system together while applying the evacuation strategies in terms of improved and balanced traffic flow and smooth evacuation.
Keywords: Intelligent Disaster Management System Ad hoc Networks; Demand Strategy, Destination Strategy and Speed Strategy

Adequate compensation of DSTATCOM-based FGS for mitigating the impact of source disturbances in radial power systems

Ahmed Samir Alhattab, Nasser B. Alsammak and Hasan Adnan Mohammed
University of Mosul, College of Engineering, Electrical Engineering Department, Mosul-Iraq

Abstract: Electrical power systems are often exposed to disturbances due to various factors (internal and external). One of these disturbances is source voltage disturbance. The source voltage sags and swells, significantly affecting sensitive loads and the rest of the system's equipment, causing them to work less well or even break down. Because of this, the effects of these disturbances on the power system should be lessened. One of the most effective solutions is to employ modern power electronics technologies such as Distribution Static Synchronous Compensator (D-STATCOM). Conventional PI controllers are commonly used in D-STATCOM but are not adaptive to large disturbances, which can lead to significant performance degradation. Also, the tuning methods of their parameters are tedious and time consumed. In this work, a fuzzy gain scheduled (FGS) controller integrated with PI parameters was used to provide adaptive performance in a wide range of source voltage disturbances for a radial power system. The optimal parameters were found by the response optimizer tool. Simulation of the system operation was

carried out using MATLAB/Simulink software. The simulation results showed adaptive performance and superiority in response speed and overshoot value in the fuzzy control unit compared to the traditional PI units.

Keywords: D-STATCOM, sensitive load, FGS controller, response optimizer, voltage disturbance.

The effect of the magnetic field on the transmission of the optical signal in the optical fiber

Taha Abdulsalam Taha, Saad Ahmed Ayoob and Mohammad Tariq Yaseen
University of Mosul, College of Engineering, Department of Electrical Engineering, Communication

Abstract: Optical fibers are exposed along their path in some areas to alignment or intersection with electric power transmission lines. A magnetic field is generated around electric waves in the form of rings. The magnetic field affects the optical signal transmitted through the optical fiber through the Kerr and Faraday phenomena. A simulation circuit was designed using Optisystem7 for a fiber optic network. The magnetic field effect on the properties of the optical signal is studied in terms of Q-factor, bit error rate, and other parameters.

Keywords: Modeling, Magnetic field, Optical fiber, Kerr, Faraday phenomena, BER.

Pulse-Width Modulation Control of a New Multilevel Power Inverter with Reduction in Switch Numbers

Harith Al-Badrani and Zeyad H. Ismael
Electronic Engineering Department, College of Electronics Engineering, Ninevah University, Iraq

Abstract: The present study focuses on investigating a multilevel inverter, which is usually used for converting DC power to AC power. For this paper, the Level-Shifted Carrier Pulse Width Modulation topology is chosen as an optimal modulation method. This paper proposes a new technique for Pulse Width Modulation control for controlling a seven-level inverter. This new technique has many advantages over a commercial cascaded H-bridge multi-level inverter. Not only does it reduce the harmonic distortion, but it also reduces the size of the electronic circuit, the number of switches, and switching losses. Furthermore, it can be extended to any number of output voltage levels. A different type of inverter with variable frequencies is presented. The comparison shows that the Variable Frequency Phase Opposition Disposition VF-POD and Variable Frequency Alternate Phase Opposition Disposition VF-APOD give an optimal design with lower harmonic distortion.

Improve performance of Asphalt Mixture by Using Styrene–butadiene–styrene (SBS) Polymer

Zeina Osama Yahiya and Abdulbasit Abdul-Aziz Mahmoud
Building and Construction Engineering Technical College of Mosul, Northern Technical University Iraq

Abstract: The purpose of this research is to compare the mechanical properties of modified and unmodified asphalt binder in order to determine the effect of add up to Styrene Butadiene Styrene polymer SBS as a modifier on the mechanical properties of asphalt binder and hot asphalt mixtures (HMA). This research will be used to pave the highway's surface course in areas prone to rutting and cracking. While the second stage employs SBS, the first employs laboratory experiments with asphalt rather than SBS polymer. As an additive, asphalt contains apolymer. Experiments on asphalt binder show that adding SBS Polymer improves the material's mechanical and physical properties. The asphalt grade has dropped as a result of the penetration test. To investigate the evolution of chemical and rheological properties in asphalt binders, the dynamic shear remoter test (DSR) was used. The dynamic shear remoter test increases in modified asphalt compared to unmodified asphalt. The flash point, ductility, and viscosity all rise while solubility falls. The results of the hot mixture asphalt tests show that insert SBS polymer improves the mechanical and physical properties of modified hot mix asphalt. As a result, the Marshall stability of modified hot mix asphalt is improved across the board.

Keywords: Styrene, butadiene, styrene (SBS), performance, Modified

Effects of (SBS) Styrene-Butadiene-Styrene on Physical properties of Bitumen

Zeina Osama Yahiya and Abdulbasit Abdul-Aziz Mahmoud
Iraq's Northern Technical University, Mosul's Technical College for Building and Construction

Abstract: The presence of water in the asphalt structure causes early weakening, leads decline in asphalt sturdiness in light of the loss of connection between total and folio (stripping) and may cause loss of solidarity and strength in admixture. The most common technique to mitigate moisture damage is by using polymer additives mixed with asphalt binder. By using three percent of Styrene-Butadiene-Styrene (SBS) by the weight of asphalt and how much it affects the physical properties of bitumen, turns out it affects penetration (31,32), ductility (130,140) Cm, flash point (250,277) C°, soft point (68.5,69.5) C° and viscometer (1979,2128)Cst when we use two percent (3,3.5) of SBS by the weight of asphalt. We got the best physical properties of bitumen in penetration (33), ductility (150⁺) Cm and more, flash point (290⁺) C° and more, soft point (70)C° and viscometer (2279) Cst at 4%SBS by the weight of asphalt. So, we′ll get the best results at 4% SBS by the weight of asphalt, due to reduce rutting when high and low in temperature at accost is appropriate.

Comparative Study of Three-Phase and Seven-Phase Voltage Source Inverter Based on SVPWM Technique

Ali Hussain and Harith al-Badrani
Ninevah University, Collage of Electronics Engineering, Department of Electronic Engineering

Abstract: Due to the substantial developments in power electronic devices, researchers' interest in multiphase converters has increased. Three-phase drives are being overtaken by Multi-phase Inductive loads, which have several advantages and are becoming a potential competitor and viable solution for high-power electric drive applications. The comparative analysis of three-phase and seven-phase voltage source inverters controlled by SVPWM was presented. Different loads (resistive load and inductive load) were used for this study. The objective was to analyze the performance of the seven-phase inverter compared to the conventional three-phase voltage phase inverter in terms of common mode voltage and harmonic producing. For multiphase inductive load fed by voltage source inverters (VSIs), a suitable PWM control approach is required. The various power switching signals for conventional inverters are generated using the Space Vector Pulse with Modulation (SVPWM) technique. The output voltage of the inverters is supplied to various three-phase and seven-phase loads. Total Harmonic Distortion (THD) in the output voltage of inverters is an important performance metric. The quality of the applied voltage has a significant effect on resistive and inductive loads. The results related to the harmonic content in the output voltage waveform and the performance of the (3-φ and 7-φ) VSI-fed variants load. In order to illustrate and validate the theoretical ideas and the results obtained from the MATLAB/Simulink software, the simulation and its results are presented in this work.

The impact of smart interactive technologies in creating personal internal spaces: an analytical study of user preferences for interactive shape characteristics

Maryam N. Hameed and khawola F.Mahmoud
College of Engineering, Architecture Department, Mosul University, Mosul, Iraq

Abstract: Interior design is the art of designing and studying spaces according to the type of activity used, as it is a process of interaction between human, time, place and culture. The rapid development in the technological industry has added new dimensions to the design and the creation of new ideas, functional solutions and aesthetic elements. The presence of many interactive smart technologies that can contribute to the creation of internal spaces interacting with human requirements and functional and psychological needs in space and thus creating his own environment. Especially in small homes, where smart technologies, whether interactive or otherwise, are often added in the post-design and implementation stage, and often after the home and space are used. While interactive smart technologies can be within the design stage through analysis users' desires to use interactive smart technologies in homes. As well as what are the desirable physical characteristics to interact with users in creating their personal environments within the small specific spaces in homes. In this research, an attempt is made to find mechanisms that can help determine what are the formal characteristics of the interior spaces in homes that users want to interact with, and what are the formal characteristics that achieve their personal environments for them. This can be achieved through interactive smart technologies that contribute to creat interactive spaces with their requirements and needs.

The impact of employing advanced digital technologies on the formal, functional and aesthetic aspects of the facades of contemporary Iraqi architectural projects -Adapting modern building materials to enhance local Iraqi thought-

Ass. Prof. Nasma M.M. Thabit
Department of Architecture, College of Engineering, University of Mosul

Abstract: Many recent architectural studies have paid great attention to the concept of employing advanced digital technologies and its impact on architectural projects, as it is related to the design process and embodies the formation of the formal, functional and aesthetic aspects of the facades of architectural production, and studies indicate that there are many people who have started to rely on advanced digital technology systems and programs , including engineers, doctors, university professors...and others. The research dealt with the field of application of the concept in the field of architecture, and the forms of dealing with it in architecture varied according to the research orientation of each study, which confirmed the importance of the concept within the architectural field in general. Architectural models in general, and their impact on the formal, functional and aesthetic aspects of the facades of contemporary Iraqi projects in particular, due to their importance in understanding the facades of executed architectural models and the possibility of embodying facades of new architectural models. The research problem crystallized and defines its goal and approach by building a comprehensive theoretical framework that includes several main vocabulary that defines the concept of advanced digital technologies, first, then applying one or all of these main vocabulary, according to importance, on several facades of architectural products in contemporary Iraqi architecture as models, secondly, and then extracting employment effects The concept that derives its thought from concepts related to the architecture of Iraq and its applications, third. A distribution mechanism will also be adopted Passing by a questionnaire on a number of specialists and students in the field of architecture, taking into consideration the variation in gender, scientific level, age and years of experience, as well as the different areas of their residence, to reach more credible results, then discuss the results and determine the verification rates for aspects of these vocabulary in order to put forward conclusions and include future recommendations.
Keywords: advanced digital technologies, local thought, Iraq

Sustainable design solutions in the reconstruction of the Student Center of the University of Mosul

Obuai Taha AL-Wazzan
Department of Architecture, College of Engineering, University of Mosul

Abstract: The research sought to provide ideas and proposals for the reconstruction of the Student Center at the University of Mosul with sustainable design solutions that are available for implementation in the city of Mosul . Which should be reflected in the most important civilizational, cultural and educational landmark in the city of Mosul in particular and northern Iraq in general After the liberation of the city of Mosul in 2017, the Iraqi government, in cooperation with international organizations, worked to rebuild the city. This led to the emergence of a problem, which is the neglect of the development in architecture, especially the technology of sustainable architecture, (green building architecture) and that the reconstruction process did not give sufficient privacy to deal with this problem; However, the reconstruction process continued with the same previous design errors of these buildings (Such as construction work in the last century without any development) The research shows the importance of the University of Mosul to developing sustainable design solutions that can be implemented in Mosul in particular and northern Iraq in general.

The research sought to study the architectural design of the student center at the University of Mosul And the possibility of making environmental design changes to improve the thermal performance of the building at low economic costs by adopting the ecotect computer simulation program To study the impact of these design changes and compare them with the current architectural design. By calculating the cooling and heating load of the building in its normal condition (without treatment) and compare it with the cooling and heating loads of the building in the case of using the movable roof system for the courtyard and use of Turkish foam material for the external walls. And addition to using the dome to cover the courtyard of the student center to to reach results that improve the thermal performance of the building.
Key words: Mosul University, Student Center, Reconstruction, Sustainable Design, Computer Simulation

Assessment of Prestress Bridge Girders, Case study: New and Old Al-Rayhanna Bridges / Iraq

Mohammed Oweed Hussein and Akram S. Mahmoud
Civil Engineering Department, Engineering College, University of Anbar, Ramadi, Iraq

Abstract: Risks variation which related to reinforced concrete (RC) structure age, construction type, material deterioration, environment attack, high traffic volume, wars, a car accidents and inadequate capacity, a high percentage of the Iraq highway bridges system are deteriorating after checking and approved with acceptable standards (especially in Anbar province). This study demonstrates the assessment method of bridges can help transportation agencies make more quantitative and clear decisions for bridge repair by using concrete compressive strength detection as an indicator to fatigue life prediction. Using an ultrasonic pulse velocity test and a Schmidt hammer test, NDT was utilized to estimate the compressive strength of the concrete from testing the girders. The readings from each test were combined in a formula to provide an accurate estimation. The assessment method may be considered an accurate, transportation agencies can used to help by taking typical decisions on sustainability of their bridge systems, and consequently, leading to cost reducing and more efficient sustainability of their bridge systems. The bridge fatigue life prediction will be predicated using the simplest method.
Keywords: Bridge, bridge assessment, prestress girders, compressive strength, non-destructive concrete test NDT

Design characteristics that achieve the dimension of safety and security in the spaces of administrative buildings

Ghada Muhammad Tayeb Mustafa and Asma H. Al-Dabbagh
Department of Architecture/ College of Engineering/ University of Mosul

Abstract: The need for safety and security is one of the important human needs, as it comes in second place after the basic human needs according to Mauslow's hierarchy of human needs. To occupy an important space in

the architectural designer's thought, especially because the issue is related to the safety of lives and facilities. The importance of achieving the dimension of safety and security in the administrative buildings lies in the large number and diversity of its users, who are internal users (employees), external users (visitors), and the abundance and diversity of the furniture used in them due to the diversity of activities within the administrative building. which are located in city centers. The research adopted the theoretical descriptive approach, as it dealt with the most important risks to which users of administrative buildings are exposed, which are the risks of fire accidents, and the risks of other accidents such as falling, slipping, and others. The research reached the most important design characteristics that achieve the dimension of safety and security, and includes architectural design characteristics (characteristics of spaces and architectural details), and non-architectural design characteristics (technical and others).

Dominance in Monumental Buildings

Sura Mohammed Adil Khaleel Al Hayali and Asma Hasan Al Dabbagh
University Of Mosul, Architecture Engineering

Abstract: Monumental buildings were and still are the focus of attention as unique buildings distinguished by their attractiveness for their visual power, so they were the most famous until some counted them as icons and many researchers dealt with them from different points of view that varied between analyzing their general characteristics and the common laws that govern them, and between focusing on one of the characteristics or classifying it formally.. These studies focused on answering the main reason for being a monument. While the principle of dominance is one of the well-known design laws related to the characteristic of attraction, weighting, and superiority to one of the elements among the composition elements, in order to solve the confusing conflicts and compatibility of the design, and it has strategies and methods. The research assumes that there is a fundamental relationship between activating the principle of dominance in the design of these buildings and between their attractiveness and visual power. The research problem was summed up in the absence of a specialized study to detect the dominance strategies in these buildings, and thus the aim of the research is to reveal these strategies in order to know the most important and influential ones.

The role of roofing systems in reducing the cost of construction A comparative study between prefabricated and on-site cast roofs

Doaa Sameer Abdullah and Raed Salim Ahmed Al-Nuamman
Department of Architecture, University of Mosul, college of Engineering, Mosul, Iraq

Abstract: Roofs and floors are an important part of any building in terms of energy conservation, performance and cost. As it is known that the initial stage of construction, which is the stage of building the basic structure of the building, represents the equivalent of about 35-40% of the cost of the building, so it was necessary to study the construction systems that help reduce the cost of this stage, especially the ceilings and floors. Roofs and floors are considered one of the basic structural elements of buildings. The costs spent on these elements during the construction phase represent about 8-11% of the total cost of the project, so it has become necessary to resort to innovative solutions that rationalize these costs. The study aims to explore the least expensive system used in Roofs and floors of buildings by comparing A set of systems for the construction of concrete Roofs and floors common locally, this was done through the modeling of an existing case study according to the construction systems common locally (cast on site, prefabricated construction of various types) and thus limiting the costs achieved for Roofs and floors in order to explore the least expensive system.
Keywords: Roofing system, Construction costs, Affordable housing, Prefabricated system.

Suggested Algorithm to Select Modulation Scheme Depending on S/N Ratio for LTE-A to Improve BW Efficiency

Yehia R. Hamdy, Ahmed I. Alghannam
Electrical Engineering Department, College of Engineering, University of Mosul, Mosul, Iraq

Abstract: Although 5G cellular system is available today, it is not prevalent as 4G, a lot of cellular provides don't offer 5G or at least don't provides a full 5G coverage. Also majority of smartphones do not support 5G or only supports few bands offered by it, since its required different sets of antennas inside the smartphone. Long Term Evolution – Advanced (LTE-A) is the 4.5 generation of cellular technology. Its vast spread and all cellular providers and smartphones support it. The physical layer of LTE-A is based on Orthogonal Frequency Division Multiple Access (OFDMA) transmission. The cellular system is built to provide high throughput compared to predecessor older generations 3G and 2G. To achieve the aims of high throughput, the available Bandwidth (BW) must efficiently be used, thus high modulation technique must be implemented. Modulation techniques such as 16QAM, 64QAM or 256QAM can achieve efficient use of Bandwidth (BW) in LTE-A cellular system. However, drawback of implementing high modulation techniques in noisy LTE-A channel is increasing in Bit Error Rate (BER) which at some levels could not be solved at the receiver's end and the connection is lost. This paper suggests an algorithm for LTE-A cellular system to select modulation scheme for each connection between Base Station (BS) and Mobile Station (MS) depending on S/N ratio to increase the efficiency of available BW and achieve maximum throughput.

An analytical Model for Analysis of Steel-concrete Composite Beams under Monotonic and Repeated Loads

Ikhlas S. Sheet[1] and Bayar. J. Al-Sulafani[2]
1. Mosul Technical Institute, Northern Technical University, Iraq
2. College of engineering University of Mosul, Iraq

Abstract: This paper presents a numerical model for non-linear analyze steel-concrete composite beam subjected to monotonic and repeated loading with partial and full interaction. The model is constructed by a modified FORTRAN computer program. The nonlinear response of the steel and concrete component of the beam is based on the section discretization into fibers using the layered section approach with uniaxial hysteretic material models for the constituent materials. A derivation of the cyclic model for the concrete, reinforcing bar and profile steel has been adopted. The behavior of the shear connectors under repeated load has also been derived. Since the slip between the components of composite beams is considered as a basic factor in the analysis, a slip model is adopted to estimate its amount. The numerical model is validated using experimental results. The results indicate that the presented numerical model can provide an effective tool for analyzing steel-concrete composite beams.
Keywords: Nonlinear analysis; Composite beams; Repeated loads; Slip; Numerical model.

Design and Optimization of Novel Sphere Sandwich Structure for Energy Absorption Applications

Meethaq M. Abed
Polymers and Compsite Materials,Technical Institute of Karbalaa , Al-Furat Al-Awsat Technical University, 56001, Karbala, Iraq

Abstract: Sphere Sandwich Structures (SSS) are a novel structure which may have the potentials to provide the energy absorption as compared with monolithic specimen material. According to design of experiments method, fifteen specimens have been prepared by CNC-3axis machine with sphere end screw for carving wax plate.In this study, sphere diameter(D), distance between spheres(X) and skin thickness(K) have been investigated. The energy absorption has been calculated by area under the curve of load-deformation which achieved by compression test (quasi-static) on the designed samples. ANOVA statistical analysis was used to evaluate the effect of the geometrical factors on the energy absorption.The results show

that the sample 683 has the highest specific energy absorption with 3.57 J/g value, an improvement of 325% compared with the monolithic sample and 220% weight saving. The optimal value of this test is 2.97 J/g of the sample 682 (diameter = 6, distance between spheres = 8, skin thickness = 2 mm).

Most Appropriate Reuse Mechanisms for Historic Buildings (Mosul Old City as a Case Study)

Sorour Abdel Ghafoor and Emad Hani Ismaeel
Dept. of Architecture, Coll. of Engineering, University of Mosul

Abstract: The built heritage is affected by various types of causes and factors of damage that require decisive action interventions. Internationally, many experiments have been conducted effectively in the use of the adaptive reuse mechanism of heritage facilities. Building reuse fails in many cases due to inadequate selection of the new function of the building, which is made through inappropriate decisions, often resulting in an increased level of damage to the historic building. The study aims to present an innovative mechanism used for the purpose of prolonging the constructive period of historic constructions by assigning a "Most Appropriate Reuse" pattern in order to reduce the impact of one of the causes and destructive factors. The study suggests the use of the predictive method by "predictive analytics programs" applications and by employing the set of criteria required to make a decision to reuse the most appropriate building in question, or to choose the most suitable building for the required use.
Keywords: conservation, most appropriate reuse, decision-making, built heritage, Mosul old city.

Aerogel Usage to Decrease Electromagnetic Radiation Emission

Duru Turkdonmez
TED Ankara College

Abstract: This study investigates whether aerogels or aerogel composites can be a potential shield against electromagnetic radiation given their unique properties. Being porous and lightweight, aerogels have started being used in various fields today. Today's continually advancing world of technology comes with many dangers in addition to the advantages and innovations it provides. One of the greatest illustrations of this is the threat to human health posed by the side effects of technological developments. Many devices that we use frequently in our everyday lives emit electromagnetic radiation. The simplest examples of this include mobile phones, microwave ovens, and television sets. This study involved investigating the harm caused to the human body by electromagnetic radiation and the use of aerogels and aerogel composites as an alternative, sustainable, and innovative material to prevent this harm, and then performing an experiment. As electromagnetic waves cover a very broad spectrum, this study specifically focused on radio and microwave frequencies. Although the waves at these frequencies may appear harmless, they can cause serious problems in the long term. The experiment took readings by using amorphous silica (SiO_2) absorbed into injection-molded fiberglass matting and particulate amorphic silica (SiO_2), meaning an aerogel construct with pores measuring 10-40 nm. The samples' reflection and permeation rates in the 2-18 GHz range were measured with the free-space measurement device and the vector analyzer in the university laboratory. Aerogel by itself was found to be insufficient in this frequency range but quite sufficient when fortified with a good conductor. Aerogel has been found to provide sufficient reflection when tested at higher frequencies.
Keywords: Silica Aerogel, Electromagnetic Radiation, Radiation Protection, Shielding

Design of fractional order PID controller based on Genetic Algorithm Optimization for Vertical Take-off and Landing Platforms

Ali Mahmood, Mohammed Almaged and Abdulla I. Abdulla
Ninevah University, AL-majmoaa Street, Mosul 41002, Iraq

Abstract: This work shows the design procedure of a fractional order proportional–integral-derivative (FOPID) controller based on a genetic algorithm optimization approach to control the pitch angle of a vertical take-off and landing (VTOL) system. The VTOL system of unmanned aerial vehicles (UAVs) has been widely used in many fields because of their stable flight and simple requirements for the take-off and landing space. The VTOL system has been modeled first by taking the action of the torque of the rigid body and then finding the equations of the angular motions. Finally, the transfer function of the current to the position dynamics of the VTOL (pitch angle variable) has been found. The fractional order PID controller is considered a modified PID controller because it has fractional orders for the integral and derivative sections instead of being integers. This results in five variables in the controller that must be optimally chosen: Kp, Ki, Kd, μ and λ. So, the genetic algorithm (GA) will be used to find the optimal values for the controller parameters, while three different fitness functions will be used, including integral square error (ISE), integral time square error (ITSE), and mean square error (MSE). The performance of the controllers with the three-fitness function has been compared in terms of overshoot, rise time, settling time, and steady-state error, and the results show that the ISE gives better performance in terms of the transient and steady state response specifications.

A New Iterative Algorithms for Finite Family of Resolvent Operators

Mustafa Dawood Alobadi and Zena Hussein Maibed
University of Baghdad, College of Education for Pure Science Ibn Al-Haithem

Abstract: The aim of this article, is to introduce a new method to finding a common element of the set of fixed points of a K- strictly pseudo contraction mapping and the set of zeros of maximal monotone operator. Also, we studied the convergence of the proposed iterative method under suitable conditions.

Replacing Dynamic Shading in Architectural Facades with Shape Memory Alloys (Sma) As A New Approach in Shading Systems

Mona Mohamed Saleh
Assistant prof in the department of architecture, the higher institute of engineering- EL, Shorouk, Egypt

Abstract: In the recent period, the kinetic interfaces appeared was motivated by the ambition of designers to push the potential of the façade in improving the indoor environment and reduce energy consumption. Kinetic facades are dynamic and adaptable, acting as an outer building skin providing either insulation or solar shading, in response to climatic scenarios and user needs. Usually electrically driven and controlled, are composed of moving surfaces interacting physically with the environment. With the emergence of smart materials and their new properties, the architects decided to integrate these materials into the architecture to take advantage of their new properties on the buildings. Researchers have increasingly used memory alloys (SMA) in the architectural context as a smart material that responds to temperature changes in the external environment; it is an attempt to replace the mechanical control systems of shading also it is a smart approach to reduce electrical energy can be consumed in the cooling process of the building. As such alloys are smart material used to control the internal temperature of the building and is considered as a new approach to shading systems. This research sheds light on these shape-memory alloy materials (SMA) especially that used in the solar shading systems that enhances the energy performance of the building in the surrounding environment to create a new alternative shading system for the dynamic interfaces that saves the energy consumed in the movement of these interfaces system.

The beginnings of modern architecture in Iraq. Formal analytical study of the Republican Hospital building in Mosul.

Aseel Ibrahim Khalil AL-Habeeb
University of Mosul-Iraq

Abstract: Modern Iraqi architecture, whose emergence was associated with the establishment of the modern Iraqi state, began in the twenties of this century, and the Iraqi architecture of the thirty's decade considered a continuation of the new architectural ideas that arose and formed in the twenties. The design effort at that time was limited to two categories: the architecture of public buildings and the architecture of residential buildings. Both types enriched the architecture of the thirties with design masterpieces which represented symbols in that time, and the references of that era belonged, as is well known, to a school of thought based on the values and ideas of classical approaches, or rather the "neo-classical" common, at the time, in English .architectural discourse The research traced the beginnings of modern architecture in Iraq in the design of public buildings, and presented a formal analytical study of the building of the Republican Hospital in Mosul. The research assumed the presence of roots of classical architecture, which were common in the design of hospitals in the design of this building. Formal analysis confirmed the validity of the research hypothesis. Some conclusions were reached like using many of the formal elements used in English hospitals in the design building of the Republican Hospital in Mosul.

Cluster and Hierarchical based Algorithm for Routing Improvement in Large-scale Mobile Ad-hoc Networks

Kilan M. Hussein[1]**, Mohammed Hayman Salih Mohammed**[2]**, Abd A. Hussein**[3] **and Mohammed Ibrahim Al-mashhadani**[4]
1. Electronic and Computer Center, University of Diyala, Iraq
2. Department of Computer Engineering, Sapienza University of Roma, Italy
3. College of Engineering, University of Diyala, Iraq
4. Education College, Al Iraqi University, Iraq

Abstract: Large-scale mobile Ad-hoc networks do not have any fixed communications infrastructure. Due to the specific features of large-scale mobile Ad-hoc networks, there are numerous challenges in these networks. One of these challenges is the node limited energy origin. Therefore, methods should be adopted to reduce the nodes energy consumption. One of the ways to reduce energy consumption in Ad Hoc networks is to use different clustering methods. In these methods, the nodes are divided into distinct groups called clusters. Each cluster has a cluster head that collects data from its cluster members, and then, transfers them to another cluster. The cluster heads play an essential role in network management and control. In this paper, a clustering algorithm is presented using hierarchical routing for large-scale Ad-hoc networks. In the proposed method, first, using the Topsis algorithm, the cluster heads are selected based on the most important network metrics: hop count, overhead control, distance, energy consumption and link quality. Then, three steps are utilized to transfer data: between-cluster connection stage, intra-cluster connection stage and the route maintenance stage, where an effective and efficient method is used to maintain the route. Route maintenance is performed according to the routes validation. The hierarchical and cluster-based proposed approach which employs Topsis algorithm is an innovative method that has not yet been presented. The proposed HCRA method is evaluated with the NS-2 simulator and compared with the WBC method. The evaluation results validated the proposed method efficiency in terms of remained energy improvement in the nodes and increase of network lifetime.

The Effect of Modern Technologies of Energy Conservation on Forming High – Rise Buildings

Luma Mohammad Yahya
Department of Architecture Engineering, University of, Mosul, Mosul, Iraq

Abstract: The High – Rise buildings were a reflection of the huge technological development that the world witnessed in the field of constructing modern buildings and the accompanying environmental, formal and structural treatments. It is also considered a global language and a symbol for many cities of the developed world, but it is classified as one of the most energy-consuming buildings due to its reliance on mechanical devices in Air conditioning and lighting of the building within the operating stages of the building, and after the emergence of the problem of energy and its sources, the world turned to think seriously about finding appropriate alternatives to alleviate the problem, so the designers resorted to using methods to reduce energy consumption in buildings in general and high buildings in particular, and many modern trends appeared in architecture Which aims to reduce energy consumption by using multiple techniques, and from here the research aims to extract the modern technologies used to conserve energy in high buildings and their impact on the formation of the building. Analytical study of models of high-energy-saving buildings in varying proportions and deducing the extent of the impact of technology That was used in these buildings on the final formation of the building.

Guess of heat transfer coefficient for single-phase flow in a single-phase passage on vertical tub

R.Shakier
University of Thi-qar- College of engineering-Department of Petroleum and Gas engineering

Abstract: Guess his been implemented to study the coefficient of heat transfer on the vertical tube under conditions of Reynolds number on the ranges of (24293–72900). So the outcomes of this guess are predicted to drive to leader lines that can permit the styling of the vertical tube of heat flows can be perfected heat transfer coefficient of the many heat devices.

Prediction of the coefficient on heat transfer for single-phase flow in an annular passage on vertical tube

R.Shakier
University of Thi-qar- College of engineering-Department of Petroleum and Gas engineering

Abstract: Prediction has been implemented to investigation the coefficient of heat transfer on the vertical tube under conditions of Reynolds number on the ranges of (43050–129289). So the results of this Prediction ore predicted to drive to leader lines that can allow the styling of the vertical tube of heat flows can be perfected the coefficient on heat transfer for many heat devices such as power plant or any power station.

The Role of Major Contributing Factors in the Success or Failure of a Construction Project: A Review

Rana Jabbar Kasid Jalhoom
Asst. Lecturer, Building and Construction Engineering Management, Civil Engineering Department, University of Technology, Baghdad-Iraq

Abstract: The construction industry is difficult because it involves many different types of people: clients, contractors, consultants, stakeholders, stockholders, regulators, and others. It's a big deal for a country's economic and social progress. However, the development of construction projects in many nations was impacted by a number of variables. Therefore, the purpose of this research was to evaluate and rank the numerous variables that can slow or speed up building progress.

Strategies for Reducing and Reusing Construction Waste in Iraq

Rana Jabbar Kasid Jalhoom
Asst. Lecturer, Building and Construction Engineering Management,
Civil Engineering Department, University of Technology, Baghdad-Iraq

Abstract: The building sector has been expanding at a rapid pace around the world. Many developing countries are in trouble because they use their natural resources too quickly and produce too much trash. Physical and nonphysical waste from construction sites hurts the environment, economy, and society of every country in a big way. Effective management requires understanding the origin of the generation. Several causes of construction debris are examined—identification of physical and non-physical garbage. Interviews were conducted. Seven classes have been established for these variables: design, handling, workers, management, site condition, procurement, and things outside of the company all play a part. Every type of trash had its most crucial characteristics identified. The results will aid construction industry participants in avoiding, reducing, and recycling physical and non-physical waste. Additionally, the study proposes several changes that would enhance building quality in Iraq.
Keywords: Construction Waste Reduction, Construction Wastes

Construction Risk Assessment Process of Iraqi's Projects

Rana Jabbar Kasid Jalhoom[1] and Ahmed Mohammed Raoof Mahjoob[2]

1. Asst. Lecturer, Building and Construction Engineering Management, Civil Engineering Department, University of Technology, Baghdad-Iraq
2. Asst. Prof, Building and Construction Engineering Management, Civil Engineering Department University of Baghdad, Baghdad-Iraq

Abstract: There are many problems in Iraq's building industry, such as budget overruns and missed deadlines. Construction risk management has shown that it can help reduce risks that hurt project timelines, budgets, and quality. This has allowed builders to deal more effectively with these challenges. Iraq's construction industry faces several unknowns, and risk management involves assessing and mitigating those risks. In order to identify, assess, and evaluate the 62 most significant hazards, we used a 5 x 5 probability matrix technique. sixty of the sixty-two risks evaluated were deemed undesirable and unacceptable. These dangers call for preventative actions to be taken in the form of a well-thought-out risk treatment policy, as well as registration, monitoring, and review through the building process. These results show how critical it is to raise the standards for competence and performance in the Iraqi construction industry. This is so that risk management and assessment can be used to make it less likely that future projects will fail.
Keywords: Management of Risk, Probability Matrix, and Risk Analysis and Assessment.

Design of a smart wireless interactive board using Arduino

Haifaa Ahmed Hasan, Farah Nazar Ibraheem, Nada I. Najim
University of Mosul, College of Engineering, Mosul, 41002 IRAQ

Abstract This research is about the creation of a wireless interactive (touch) board. Current touch boards have many constraints, which means they are not easily accessible to the consumer and not easy to use by them. Major drawbacks are about cost, fixed sizes, and lack of universal compatibility. By the suggested interactive board, the size and wired constraints are addressed with its wireless and the cost and compatibility were enhanced by using economical materials and made the system plug_and_play. In this research we used Arduino micro because it handles the mouse library. The Arduino Nano was used to receive data from NRF24L01 ,then it was linked with Arduino Micro by protocol I2C thus the data was sent from Arduino Nano to Arduino micro which in turn sends the information to the computer that is controlling. Ultrasonic sensor was used as a mouse, by using it to detect the direction movement of the object. To check the performance of our design, we have performed another independent design by using infrared sensors and emitters, and performed

various comparisons to provide usage of different designs in different settings.
Keywords: Arduino, I2C, IOT (Internet of Things), Mouse, Ultrasonic sensor, Wireless Interactive Board

Enhancement melting process of phase change material in a triplex tube using Graphene nanoplatelets-metal foam combination

Hussein Alawai Ibrahim A[1]-Saaidi1, Firas Abdulsattar[2]
1. Department of Refrigeration and Air Conditioning Engineering, Al-Turath University College,Baghdad, Iraq
2. Department of Mechanical Power Engineering, Refrigeration and Air Conditioning Technical Engineering, Dijlah University College, Baghdad, Iraq

Abstract: Phase Change Materials (PCMs) of Latent thermal energy storage (LTES) systems provide an attractive method for effectively using intermittent energy from renewable energy sources such as wind, solar, etc. The potential applications of PCMs in thermal management and energy storage are well recognized. However, the main drawback of these materials is their poor thermal conductivity, which necessitates incorporating thermal response enhancement techniques. To improve the thermal conductivity of a Triplex Tube Heat Exchanger (TTHX) thermal storage system filled with PCM, graphene nanoplatelets (GN) and metal foam (MF) were adopted as an efficient thermal conductivity improvement method. PCM is enclosed in the middle tube while water passes through the inner and outer tubes as the heat transfer fluid (HTF). A numerical study is carried out to establish a comparative performance assessment on four TTHX configurations: TTHX with PCM (simple TTHX), TTHX with PCM and different concentrations of graphene nanoplatelets (GN-PCM TTHX), TTHX with PCM and metal foam (PCM-MF TTHX) and TTHX with PCM, Graphene nanoplatelets and copper foam (GN-PCM-MF TTHX). The result showed that the impact of compound foamed and graphene nanoplatelets on the time of a PCM melting process are more significant than using nanoparticles or foamed alone. For (GN-PCM-MF TTHX) configurations, the melting time was reduced up to 180% and 151% compared to the simple and GN-PCM TTHX configurations. Further, the highest accumulative energy stored was obtained by incorporating metal foam with graphene nanoparticles over the energy stored for simple and GN-PCM TTHX configurations.
Keywords: Phase change materials, Triplex tube heat exchanger, Graphene nanoplatelets, metal foam, melting process, Latent thermal energy storage

Architectural landscape and its impact on the sustainability of historical areas

Anfal Azzam Hamodat
Architectural department, Mosul university

Abstract: The architectural landscape in this era is no longer isolated from the urgent environmental issues that began to threaten the world and have been noticed in the last few years. These sectors, on one hand, are considered one of the main consumers of natural resources such as land, materials, water and energy, and on the other hand, the many and complex construction industry operations It results in large amounts of noise, pollution and solid waste, and the problem of wasting energy and water remains one of the most prominent environmental-economic problems of buildings due to its continuity and sustainability throughout the period of operation of the building. From here, new concepts and methods arose in the advanced industrial countries that were not familiar before in the design and implementation of projects, and these concepts "sustainable design" and "green architecture" and "sustainable buildings", Therefore, the urban sector is required to respond quickly to the environmental/economic issues that have surfaced in the last few years. Several studies have dealt with sustainability issues in architecture in general, but: There is no study dealing with the important role played by this vital sector to reduce the negative impact on The built environment Therefore, the main research problem emerged in the presence of a lack of knowledge about the role that

sustainable design strategies play in reducing those effects, especially with regard to archaeological sites.

The study assumes that the architectural landscape is one of the ingredients for preserving historical cities because of its direct connection with them, especially in the historical cities in Iraq.

Keywords: Sustainable Urban Planning, architectural landscape, Sustainability of Historic Areas

Arabic Speech Conversion with Sequence-To-Sequence Modeling based on Electro Larynx Device

Zinah Jaffar Mohammed Ameen and Abdulkareem Abdulrahman Kadhim
College of Information Engineering, Al-Nahrain University, Iraq

Abstract: Although Electro Larynx (EL) speech provides acceptable intelligibility, its quality is still far from natural speech. A speech conversion system based on sequence to-sequence (seq2seq) any-to-single modeling is proposed in this paper. The system divided into three stages: feature extraction of source and target speech, model training, and the last is the gathering of the converted feature sequences into waveform. An attention mechanism is applied to concurrently perform representation learning and alignment. Experimental results that include subjective and objective evaluations revealed that this model worked well in a non-parallel any-to-single Arabic speech conversion based on EL device.

A review of workload challenges in fog computing Environment

Omar Anwer Nafea and Turkan Ahmed Khaleel
College of Engineering, Department of Computer, Engineering,
University of Mosul, Mosul, Iraq

Abstract: Users nowadays in environments with fog computing require applications that respond quickly to their requests for everything they want to access and work quickly. To greatly increase the Quality of Service (QoS) metrics such as bandwidth efficiency and energy consumption and reduces latency in a fog network, improving the system performance. In this paper, the various fog workloads are described, along with the connection to where each one should be executed; in addition, load-balancing techniques and strategies, which count as a very important issue and one of the important challenges in the fog computing environment, that play a significant role in resource management like resource provisioning, task offloading, resource scheduling, and resource allocation this will be done based on reviewing previous research and discussing the most important concepts in it.

Keywords: Fog Computing, Workload, Quality of Service, Load-Balancing, Energy Consumption, IoT.

Performance Comparison and Evaluation of Software Defined Networks onos Controllers

Ghazwan Abdullah Mohammed[1] and Omar Abdulmunem Ibrahim Aldabbagh[2]
1. Dept. of Basic Science, University of Mosul, Mosul, Iraq
2. Dept. of Computer Science, University of Mosul, Mosul, Iraq

Abstract: Software Defined Networking (SDN) is characterized by the separation of the control plane from the data plane which consider a radical change in the traditional networks. SDN is depending on controllers. There are many types of SDN controllers depending on the goal of using the SDN network. One of the most important controllers is "Onos". This paper discusses how many Ones controllers are needed for best performance. The performance factors which taken in consideration are: measuring the delay between two ends(latency), throughput and jitter. All experiments are implemented in "mininet" network simulator program that installed on the Linux system ubuntu server. The tools used to measure are ping, CBench and iperf. The measuring was done through three different topologies linear, tree and real topology (AT&T American telecom). The results appear different results depending on the number of switches as well as the number of controllers.

Design and Analysis of GaAs/AlAs and InGaAs/AlAs ASPAT Diodes for Microwave Detections

Shamil H. Hussein and Khalid K. Mohammed
Department of Electrical Engineering, University of Mosul, Mosul, Iraq

Abstract: The Schottky barrier diode (SBD) is the most common microwave detector diode which has been used since the 1940s. The ability to produce a non-linear current-voltage (I-V) characteristic, which is required for rectifying/detection diodes. The fact that the current transmission mechanism in an SBD is highly dependent on temperature, it complicates the requirement for an SBD's use in commercial and military applications. Therefore, the Asymmetric Spacer Layer Tunnel diode (ASPAT) based on GaAs / InGaAs platforms is proposed in this paper due to it has several advantages such as zero bias voltage operation, insensitivity with temperatures, low noise, and is used in high-speed applications. This paper presented a design and analysis of the standard GaAs and the proposed InGaAs ASPAT diodes for microwave detection. SILVACO ATLAS software is used to simulate and analysis of the physical modelling for the both ASPAT devices by using numerical methods. The junction resistance (Rj), curvature coefficient (kv), junction capacitance (Cj), and series resistance (Rs) are the most crucial parameters that evaluate any microwave diode operation at zero bias detection. The optimized parameters of the proposed $10\times10\mu m^2$ mesa size InGaAs-ASPAT diodes were extracted from the both DC and RF characteristics are $1.95k\Omega$, $12.6V^{-1}$, $157fF$, and 45Ω respectively. The effects of changing in the thickness of the both thin AlAs barrier and the spacers layer were fully investigated on the non-linear relationship between current and voltage of the ASPATs diodes. In addition, it's observed that the current flow through diodes is reduced when the mesa size device is increased from $16\mu m^2$ to $100\mu m^2$. The cut off frequency of a $10\times10\mu m^2$ GaAs and proposed InGaAs-ASPAT devices are 19GHz and 23GHz respectively. Finally, we conclude that the new proposed InGaAs/AlAs/ASPAT device is the best structure compared with standard GaAs and SBD diode and can be used for microwave rectifiers and detectors in the rectenna systems. The simulated output DC voltage of the proposed ASPAT diodes has been obtained about 0.19V at the operating frequency of 7.5GHz and the RF input power of 5dBm.

Keywords: GaAs/InGaAs tunnel ASPAT diodes, SILVACO atlas software, and Microwave detection devices.

Memristive Physical Unclonable Functions: The State-of-the-Art Technology

Nawras H. Al-Khaboori and Israa B. Al-Mashhadani
Department of Computer Engineering, College of Engineering, Al-Nahrain University

Abstract: Internet of Things connected many useful electronic devifces to each other through the internet, and sharing private and sensitive data between these devices needs secure access and communication. One of the best solutions for this purpose is hardware security primitives such as Physically Unclonable Functions (PUFs). PUFs are cryptographic primitives that are employed to produce a unique and reliable digital fingerprint for a particular electronic circuit. This digital fingerprint is used in many security applications such as chip identification, authentication, and secret key storage and generation. The emergence of memristors (Memory-Resistor) as new nanotechnologies are utilized extensively in hardware security applications such as Memristive PUFs. Research progress in Memristive PUFs resulted in improved performance metrics of PUFs due to memristors' unique characteristics. This article provides an investigation of different design approaches of Memristive PUFs that were introduced in the literature. Then, provide detailed performance evaluation results obtained by simulation and fabrication processes for different Memristive PUFs designs, and make a comparison between these results. Finally, concluded that most of the circuits are evaluated by simulation, whereas few other circuits were evaluated by fabrication owing to the

expensive fabrication process. Since the memristor is a prototype and not commercialized yet, it is expected to be adopted and marketed in the next generation of hardware security.

Accessibility And Connectivity for Enhancement the Integrative Conservation of The Historic Urban Fabric of Mosul Old City

Ammar Abdullah Hamad1 and Emad Hani Ismaeel2
1. Architecture Engineering Department, Collage of Engineering, University of Mosul
2. Assistant Professor, Architecture Engineering Department, Collage of Engineering, University of Mosul

Abstract: Integrative conservation is a conservation approach characterized by attention to both the urban and human dimensions, it can provide adequate means to reach the process of preserving the historical urban fabric. It works to meet the contemporary requirements of accessibility and connectivity that enhance the vitality of old cities. This research aims to evaluate accessibility and connectivity as a basic integrative conservation criterion to know the efficiency of the historical urban fabric in responding to maintain its vitality. As well as exploring the possibility of preserving the historical fabric without making major planning or urban changes that negatively affect its authenticity. The research applies the space syntax as a tool to analyze the historic urban fabric of Mosul old city as a case study.
Keywords: Integrative conservation, Space syntax, Connectivity, Accessibility, Mosul old city, Historic urban fabric.

A New optimization approach for parallel-series double pipe heat exchangers

A A Al-Hajjaj1, Saib A Yousif2
1. Chemical Engineering Department, College of Engineering, University of Basrah, IRAQ
2. Petroleum Engineering Department, College of Engineering, Almaaqal University, IRAQ

Abstract: Heat exchangers are widely used in industrial processes. Optimization of the operating conditions of these equipments based on the minimum cost is a key objective. In the present study, a mathematical model for achieving this task for parallel-series double pipe heat exchangers is proposed. In this approach, the Lagrange based algorithm is extended to make parametric studies of heat exchangers system served in a petrochemical industry. The engineering and economical calculations and system optimization have been carried out by MATLAB. Analysis of the performance of this system is performed by comparison of the collected data from in-operation exchangers and theoretical predictions. The results indicate that the proposed approach can be successfully applied for optimization of existing industrial scale heat exchangers since there is a significant reduction in the total annual variable and operating cost due to the reduction in cooling water supply.
Keywords: Double pipe heat exchanger, optimization, Lagrange algorithm.

Patients Monitoring and Data Management System for Hospitals

Sura Nawfal Abdulrazzaq and Shahad Abdulrahman khuder
Department of Computer Engineering, Mosul University, Iraq

Abstract: The internet of healthcare things (IoHT) is undergoing many innovative revolutions to handle the current state. This paper proposes a monitoring and control system for a smart hospital to automatically record the vital signs of the patients in real time. The project is implemented using Raspberry Pi and wireless sensors to measure heart rate, the percentage of oxygen in the blood, and the body temperature of the patient, in addition to the room temperature and humidity. All these measurements is sending continuously to a central unit for data management, and also to a Graphical User Interface GUI monitor outside the room to reduce the contact between the medical staff and the patients. LabVIEW program is used to receive, process, and save the patient readings all the time and also to record the personal data of the patient. The design can automatically display an alarm message on the interface if the vital signs change to an unhealthy state and send an alarm message to the specialist doctor. All readings and patient information are recorded in a database to be stored and shown as needed or to provide the doctor with a report on the clinical examination. Finally, the designed system was tested on real cases at a hospital to evaluate its performance, it showed that the system can provide many facilities to the patients in addition to the medical staff and it can easily expand to handle hundreds of patients receiving health monitoring services.

A Model for Monitoring and Improving Customer Satisfaction for Maintenance of Government Buildings in Iraq Using Performance Indicators

Saifullah Omar Mohammed[1] and Kadhim Raheim Erzaij[2]
1. MSc. Student, College of Engineering – University of Baghdad, Baghdad-Iraq
2. Professor, College of Engineering, University of Baghdad, Baghdad-Iraq

Abstract: Customer satisfaction is an important part of quality management processes that should be measured and improved, as its measurement shows the weaknesses and strengths of the institution in providing services. Most government institutions fail or neglect to measure it for several reasons, including the lack of a system for measurement and monitoring, the inefficiency of management, corruption, and others. This research paper proposes a model to measure, monitor, and improve customer satisfaction with maintenance services for government buildings in Iraq. The model consists of four performance indicators related to customer satisfaction with maintenance, which is adopted after choosing a government institution and knowing the nature of its work and the type and volume of available data. After representing this data statistically, analyzing it, and choosing the best values, the result was four indicators for each indicator two values: the baseline value and the target value, which help in the process of measurement, monitoring, and improvement.
Keywords: Customer satisfaction, Building maintenance, Government building, Performance indicators.

The study reveals variant changes in thermal efficiency within winter and summer. In order to conserve thermal efficiency of the historic buildings, the researchers Using Genetic Algorithm to Hide Information in Image Steganography

Basil Abbas Hasan Hasan
Altinbas university, Department of electrical and computer engineering

Abstract: Since the development of the internet, it has been a challenge to make contact better. This has contributed to the invention of Cryptography, where the meaning of a message is concealed. The cryptographic techniques aim to ensure that when the message goes into the wrong hands it becomes incredibly hard to find the real meaning. This article indicates that a device of Steganography uses a crypto graphical algorithm. The file we want to make secure in the expected framework is compressed to minimize its size first and the compressed data is then converted into cipher text with the AES cryptography algorithm. Genetic algorithms are used for the pixel range of images to be revealed to multifarious identification of illegal data.
Keywords: cryptography, Genetic Algorithm, cipher text, AES

Artificial Neural Network Controller for Power Factor Compensator and Total Harmonics Distortion Reduction Based PV- STATCOM

Ammar A. A. AL- Ani and Majid S.M. Al – Hafidh
Electrical Engineering Department, Collage of Engineering, University of Tikrit

Abstract: PV-STATCOM can be used to obtain many tasks such as power factor correction, mitigating the distortion of the current and voltage waves, power oscillation damping, fault-induced delayed voltage recovery, compensating the active and reactance power, and improving the system's stability. This work is aiming to design an online ANN controller for harmonic mitigation to be within IEEE STD 519-2014 and improve the power factor to be near one. A simple three buses system is used to apply the suggested controller. A nonlinear load is designed to give the main harmonics in distorted system waves. The system is analyzed using MATLAB / SIMULINK. A wide range of load values, THD, and power factors are taken in the study. The results show that for all the studied loads, THD, and power factor, the suggested control can restore THD to be within IEEE STD 519-2014, and power factor to be near one.
Keywords: PV- STATCOM, Artificial Neural Network Controller, non-linear load, Power Factor Compensator, Total Harmonics Distortion Reduction.

Design a 5G Microstrip Antenna and Achievement of SAR Reduction at 28GHz

Huda A. Al-Tayyar[1], Y. E. Mohammed Ali[2]
1. Electrical Department, College of Engineering, University of Mosul, Mosul 41002, Iraq
2. Department of Computer and Communications Engineering, College of Engineering, Nawroz University, Duhok, Iraq

Abstract: In the modern and future communication like 5G applications, the high quality performance with high data rate and compact size of the designed antenna are the interest topics. These systems are directly attached to the human body, so it is necessary to achieve a safe design with limited radiation towards human tissues. In this paper a microstrip patch antenna MSPA will be designed at resonant frequency of 28 GHz. The compact size in 5G is a crucial issue, so the proposed antenna design dimensions should be convenient for such application. The radiating patch will be designed as copper and substrate as a low loss dielectric constant material. The reflector sheet under MSPA will be used for SAR reduction. This technique will improve the designed antenna performance to make it suitable for 5G and safe for human body especially wearable communication application, Internet of Things (IoT), and fixed or mobile local wireless networks.

Implementation of Filter Bank Multicarrier Transmitter Using Universal Software Radio Peripheral

Ali A. Abdulhussein[1] and Hikmat N. Abdullah[2]
1. Communication Research Center, Ministry of Science and Technology, Baghdad, Iraq
2. College of Information Engineering, Al-Nahrain University, Baghdad, Iraq

Abstract: Filter Bank Multi Carrier (FBMC) modulation is one of the most significant enablers for future 5G technologies. FBMC is being heavily examined as a physical layer option with many attractive features including low end-to-end round-trip, high number of connected devices, low-power consumption, and resistance to channel effects. FBMC is used to solve the disadvantages of OFDM of high overhead due to using cyclic prefix and bad localization. The work in this paper is devoted to hardware implementation of FBMC transmitter with a changeable number of subcarriers using Software Defined radio device Universal Software Radio Peripheral USRP N210 with the design tool GNU Radio 3.7. The experimental test results confirm the successful FBMC signal generation and transmission.
Keywords: filter bank, multicarrier, USRP, software defined radio, transmitter

Hiding data using LSB in combination with AES

Nora H. Sultan
Department of Computer
Sciences, College of Education Kufa University, Iraq

Abstract: The steganography is one of the safest forms of data transmissions in this digital world. The enhanced LSB technique described in this project helps to successfully hide the secret data into the cover object without any distortion. LSB based steganography in combination with AES will provide a good security model for hiding data, an LSB based AES-256 encryption has been designed, developed and implemented by using MATLAB programming language. First, the intended data image is encrypted with a 256-bit AES encryption algorithm that produced encrypted image data, put the encrypted data in an image using the LSB technique which produces the steganography image and that is sent to the destination. In the receiving end, on the received steganography image data the same reverse process has been performed to retrieve the original image. The process has been performed several times on different image data and a number of input/outputs are analyzed. It can be applied for higher level secured steganography image transactions in applied cryptographic applications.

The influence of styrene butadiene latex on sandy soil reinforced by soil mixed columns under raft foundation

Hayder A. Hasan, Zuhair Abd Hacheem, and Alaa D. Almurshedi
College of Engineering, Mustansiriyah University; 2College of Engineering, Baghdad University

Abstract: Geotechnical engineers seek to improve the engineering performance of soil-cement mixtures by adding non-traditional materials as a supplementary additive. Emulsion polymers are widely used to develop cementitious composites by forming physical bonds when the water evaporates. The study aimed to estimate the feasibility of utilizing Styrene Butadiene Latex (SBL) to increase the soil-cement mixtures strength. This study involved two parts. In the first one, the Unconfined Compressive Strength (UCS) test was carried out on sandy soil blended with 8% cement and 0, 5, 7.5, and 10% SBL after 7 and 28 days of curing. The results of the UCS test showed that the mixtures of sandy soil with 8% cement and 7.5% SBL were increased by 3% and 5% compared to soil – 8% cement after 7 and 28 curing days, respectively. In the second part of the study, Plaxis 3D software was used to evaluate the settlement of the raft foundation constructed above soil mixed columns (SMCs) using only 8% cement and 8% cement - 7.5% SBL. The SMCs were designed under various compositions, lengths and floating or end bearing conditions depending on the location of rigid layer. The influence of adding 7.5% SBL to the composition of SMCs on the vertical stress was pragmatically increased by 5% and 4% when the SMCs were rested on a rigid layer at 5 and 10 m, respectively. The implications of design are discussed.
Keywords: soil stabilization, styrene butadiene latex, soil mixed columns and Plaxis 3D

Post-crisis resilience space

Marwa Jabbar and Ammar Saleh Ashour
Architecture Engineering-University of Baghdad

Abstract: Crises of all kinds (natural and human) represent a great challenge for societies and countries around the world that have not produced significant impacts on man, his architecture and urban surroundings. Among the areas affected by these crises, architecture is the largest area in contact with humans, especially with regard to residential and administrative buildings, where it is noted that the crises have significant effects on architecture financially and morally during and after the crises, negatively and positively. Throughout history, there have been many disasters and crises that have led societies to resort to external and internal spaces to shelter from the impact of crises and to live in them for a long time until the impact of those crises was overcome, and there have been many successful and unsuccessful experiences in dealing with the design of spaces and their resiliency in accommodating the needs of users during and after crises. Including, but not limited to, the disasters of hurricanes, floods, wars and epidemics, the latest of which was the spread of the corona virus and the extent of its impact on architecture and society.

Therefore, the importance of research in addressing resilience space during crises and even for the post-crisis stage is highlighted, and the research problem appears as: "lack of knowledge about the resiliency of space in residential and administrative buildings during crises and its requirements to accommodate the needs of the user during those crises and its specifications to enable it to accept expansions and changes in its physical and psychological properties and the product of a long-lived space". The research assumes: "the design of space and its resiliency in residential and administrative buildings has a great role in absorbing the impact of crises during their occurrence and its ability to provide a safe living environment during the period of crises and even beyond". The research aims to provide new knowledge about the resilience of external and internal spaces during crises and its specifications by addressing the previous literature close to the research topic and studying global and regional experiences and discussing them to reach specific specifications for the spaces to be followed when designing buildings and their surroundings in future projects, especially in Iraq.

Keywords: Crises, Disasters, Resilience Space, Crisis Architecture.

The challenge of bio materials in the field of architecture through the scope of sustainability

Randa Hassan Mohamed and Amna Abdelhafez
Department of architecture, the higher institute of engineering, El shorouk

Abstract: Nowadays sustainable development plans and quality of life criterions directed all the researchers and the industry towards the zero emission products especially in the construction field. On the other hand, bio materials are elected to be one of the sustainable categorized materials. And recent advances in bio-based materials research have delivered several solutions for the construction sector. but it did not sound all over the world, although such materials can play an effective role in architecture and the construction field. The paper is an over view that display and evaluate the usage of the bio materials in the construction process all over the life cycle of the building, as means of sustainability to ensure its efficiency.

Keywords: Bio materials, bio-based materials, sustainability, effective maintenance.

BIM Application in Major Architectural Projects in Iraq

Munaf Fouad Hassan[1], Sajeda Kadhum Al-Kindy[2]
1. University of Warith Al-Anbiyaa, Karbala, Iraq
2. University of Baghdad-Dept. of Architecture, Baghdad, Iraq

Abstract: Building Information Modelling applications (BIM) in the fields of architecture, engineering, and construction had taken a noticeable amount of interest from practitioners and researchers due to the improvements in performance, time, and costs shown by these applications in several international projects, especially in major projects characterizing with considerable cost, large size, and complex engineering systems. This research aims to explore the status of BIM use in major architectural projects in Iraq and the reasons behind its limited application. The research methodology relies on conducting interviews with specialists, in addition to the designed questionnaires directed to clients, consultants, contractors, and practitioners in the field of BIM to get their feedback on the BIM application. Some Iraqi major projects that apply BIM technology are selected as case studies. The Research shows limited levels of BIM application in the design and construction of major projects in Iraq due to several reasons, whereby the main reason is the government and private institutions' non-stipulation of the application of BIM in the design and construction work of their projects.

Keywords: Building Information Modelling; Major Architectural Projects; application; Interview; and Questionnaires.

The relationship between ″well building standard″ and the carbon footprint of office buildings

Atyab Ali Naser and Hamzah S. AL-Mamoori
College of Engineering, University of Babylon, Iraq, Architectural Engineering Department

Abstract: Carbon emission is one of our age problems. Many studies and attitudes pay attention through specialists of our universe countries. Buried emissions is the core of the problem. LEED and Bream, through their standards as sustainable criteria, concentrating on environment protection and the conception of sustainable buildings towards social, human health, and wellbeing, are not sufficient. WELL building standards have recently been the basic rule governing that issue. The research problem appears through the shortage of knowledge between WELL standards and the impact of carbon footprint to reduce human carbonate emissions in buildings and office buildings as case study. Analytical descriptive methodology depended to reach the findings concentrating on that there is high relations between (WELL V2) characteristics and carbon footprint with the innovation well features to reduce global warming gases.

Keywords: carbon emissions, carbon footprint, Well Standard, global warming.

The role of interior design in achieving healthy workplaces according to lighting Indicators of ;WELL standard

Atyab Ali Naser and Hamzah S. AL-Mamoori
College of Engineering, University of Babylon, Iraq, Architectural Engineering Department

Abstract: The quality of interior lighting is an essential pillar in healthy architecture, which is reflected in the ″WELL Building Standard″ by adopting a holistic and durable approach to create lighting environments that promotes mental, visual and psychological health. Lighting effects, positively, in the mood and productivity of workers in workplaces. Recently, and after the outbreak of Corona virus and the increasing of health problem in buildings, there was an urgent need to pay attention to the interior space. Lighting is considered one of the most important elements of design which helps workers to aware their workplace. Therefore, the research problem has been determined in non-exploitation of interior design elements represented by lighting in the interior environments of workplaces according to international determinants and standards, which makes the environment sick and unhealthy that leads to a negative impact on the comfort, well-being and health of people living within these environments. This research suppose that the achievement of healthy interior design is related to the extent which the architectural designer for the application of lighting indicators to (WELLv2) standard in the workplace. The research relied on the descriptive analytical approach in addressing research problem by selecting three buildings and analyze them according to the indicators of lighting, in addition to the measuring of interior lighting quality according to the Wellness Score equation for lighting specifier for each one of the selected cases to measure the ability it may or not may obtain a (WELL) certificate in order to reach the results that pivoted on the existence of a positive role for the lighting indicators applicant in the iconic buildings to achieve interior environments which enhance the psychological and physical health of users.

Keywords: Health, Workplaces, Interior health design, Healthy lighting indicators, WELL standard.

Effect of Xanthan Gum- Biopolymer in the Behavior of Gypseous Soil

Lubab Ibrahim Zedan and Jawdat K. Abbas
University of Tikrit - Iraq

Abstract: Gypseous soils are disturbed in many parts of the world, including Iraq, where they cover about 31.7% of its total surface area. Due to the gypsum slates being dissolved and leached by the action of water flowing through the soil mass, the existence of these soils, sometimes with high gypsum content, caused difficult problems for the buildings and strategic projects. The collapse of gypseous soil can be divided into two types: the first type is "soaking collapse," which is caused by soaking the dry soil or partly saturated soil with water under specific pressure; this type is the main topic of this study; and the second type is leaching collapse. In this paper the soaking effect on gypseous soil treated with xanthan was

studied and compared with dry condition. The study included three tests to load the square footing (100mm x 100mm) resting on gypsous soil treated with xanthan. Xanthan was added to the soil in percentages of 6%, and the footing model is taken for Df = 0.5, 1, and 1.5 B. Soil is mixed with xanthan for the first time, and then water is added. This process is in a dry condition after that soil is soaked for 24 hours, and the water level should be equal to the soil's height, as seen through the plastic tube on one side of the box. After two hours, the dial gage readings have been taken. The results of soaking tests showed that the ultimate capacity due to soaking would be decreased by 0.3% from the dry condition.

Using Batches and Inverse Fluidization Experiments, To Remove Cadmium Cd(II) And Lead Pb(II) By Adsorption On To Inexpensive Rice Husk.

H A Gzar[1] and Saja Farhan R.[2]
1. Faculty member, PhD, Civil Engineering Department, College of Engineering, Wasit University, Iraq.
2. Civil Engineering Department, College of Engineering, Wasit University, Iraq.

Abstract: The objective of this study is to assess how well the suggested adsorbent performs (rice husk). During batch experiments the best metal ion removal effectiveness was found to be at pH 5, which was discovered after investigating several pH values to achieve this goal.180 rpm is the ideal shaking speed for batch adsorption, according to research on the impact of agitation speed. Adsorption efficiency was seen to rise as contact time in the process increased, and the ideal contact time was 180 minutes. To remove heavy metals (Cd, Pb) from aqueous solutions, the rice husk's adsorptive capacity and removal effectiveness were assessed. According to the findings, Cd and Pb had removal efficiencies of 96.83% and 91.90%, respectively. Continuous column experiments (invers fluidized bed) were used to confirm the adsorbent loading capacities for cadmium and lead determined by batch research. The proposed adsorbent's highest adsorption capacity in a batch system was determined to be 7.38 mg/g for Cd and 6.93 mg/g for Pb. Three models— Langmuir, Freundlich, and Temkin—were fitted to a series of equilibrium isothermal tests. Freundlich isotherm model provided the best fit to reflect the experimental data of this system, with correlation coefficient R^2 equal to 0.98 for Pb and 0.97 for Cd. The equilibrium isotherms of rice husk were determined to be of a favorable kind. To investigate the impact of initial concentrations, bed depth, flow rate, and particle size at a temperature of 30℃ on the effectiveness of the adsorption process, numerous experiments were conducted in an inverse fluidized bed column. According to the results, rice husk appears to be a promising material for removing contaminants and toxins from wastewater. It is a very effective adsorbent that can effectively remove a variety of heavy metal pollutants from wastewater.

Deep Machine Learning Based Approach for Face Smile Detection using HAAR Classifier and Convolutional Neural Network (CNN)

Haifaa Ahmed Hasan[1], Bushra Majeed Matar[2] and Oday Ali Hassen[3]
1. Computer Engineering Department, College of Engineering, University of Mosul.
2. Specialized Supervision Department, Wasit Education Directorate, Ministry of Education, Iraq.
3. Wasit Education Directorate, Ministry of Education, Iraq.

Abstract: Face Smile Detection is one of the key domains of research in the stream of digital images in association with machine learning and predictive analysis. The key motive of face smile detection is to analyze and classify the motions of a human being on the lips and extraction of actual emotions during the scenario under investigation. The implementation of deep learning-based classification and prediction approaches in association of specialized libraries based integration shall be used for the higher degree of classification to gain minimum error factors. Assorted natural inspired approaches devised so far for solving the engineering problems in assorted domains but there is still a wide scope of research in the segment. Nature provided us a number of approaches which

can be used for the resolving as well as solving the problems in different domains including engineering and social aspects. The recent Nature Inspired algorithms include Artificial Bee Colony Algorithm, Firefly Algorithm, Social Spider Algorithm, Bat Algorithm, Strawberry Algorithm, Plant Propagation Algorithm, Seed Based Plant Propagation Algorithm and many others. machine Learning and Predictive Analytics are key areas of research in multiple domains including Bioinformatics, Computational Anatomy, Natural Language Processing, Speed Recognition, Software Engineering, Robotics, Information Retrieval, Marketing, Computer Vision, Fraud Detection, Sentiment Analysis, User Belief Mining, Time Series Forecasting, Recommendation Systems, Economics and many others. In this proposed research work, the novel and effective approaches for deep learning and classification of face smiles shall be used so that the face smile classification on multiple classes can be done with minimum error factor. Using nature inspired approaches in association with soft computing fuzzy techniques, the higher degree of accuracy and optimization can be achieved.
Keywords: Machine Learning, Deep Learning and Biometrics, Face Smile Detection. HAAR Classifier, Convolutional Neural Network (CNN).

The Role of Heritage in Activating Urban Tourism

Neda Khalil Ibrahim Al-arab and Rawaa F. N. Abbawi
University of Technology - Iraq

Abstract: Heritage today is considered one of the most important forms of expression of civilizations and a translation of customs, traditions and human values. It is considered that activating and developing of certain tourist sites linked to heritage and archaeological aspects, especially those related to a historical value or a specific event with the aim of promoting and thus Activating these sites, so it was necessary to take into account the attractive and supporting factors to stimulate and boost tourism through several urban treatments and extrapolate those treatments with the aim of applying them to the local reality. The research aims to shed light on the center of the old city of Baghdad and highlight the most important heritage monuments of historical and social importance and apply treatments derived from global examples to make those sites an attractive tourist point for local and international tourism with the aim of Activating the tourism industry and a major pilar of the development of the city center in general. The descriptive and investigative approach to access and to analyze information in order to adopt a comprehensive framework for local sites within contemporary urban treatments that stimulate tourism and highlight the identity of the place.
Keywords: local heritage, urban tourism, tourism activation, urban tourism attractions.

The Third Space in Interior Design

Neda Khalil Ibrahim Al-arab
University of Technology - Iraq

Abstract: After the last crisis that faced the humanity, the Corona pandemic, it was necessary to pay attention to the means that gives meaning to interior spaces and express human identity and requirements. The research paper discusses the third space in architecture as an expressive interstitial space that combines two functions and its transformation into the concept of the third place and how this concept is reflected on the interior space, in addition to the spaces' contribution to supporting its social interaction as a basic need of its needs. In order to understand the third space, it was necessary to explore the theoretical frameworks on the subject and how it contributes to supporting the interior space and what are the means of achieving the third space in architecture and interior design in particular by discussing a number of descriptive projects elected for the purpose of clarifying the theoretical frameworks that contributed to the formation of the concept at the level of Interior design and architecture of interior spaces.
Keywords: the third space, the formation of meaning, the third place, interior design

The Prediction of Compressive Strength of Concrete Containing Recycled Aggregate with Different Machine Learning Algorithms

Mustafa M. Khattab[1], Bilal Al-Obaidi[2*], Yasir W. Abduljaleel[3]
1. Civil Engineering Department, University of Technology, Baghdad, Iraq
2. Civil Engineering Department, Istanbul Technical University, Turkey
3. Civil Engineering Department, Aliraqia University, Baghdad, Iraq

Abstract: The use of recycled concrete aggregate (RAC) in the creation of new concrete has gained significant attention for both environmental and financial reasons. However, the compressive strength of the product concrete is hard to predict due to many variables. In this study, the compressive strength of recycled aggregate concrete was predicted using eight well-known machine learning methods, including support vector machine (SVM), artificial neural network (ANN), XGboost, Tree, Random Forest, Gradient Boosting, CatBoost, and AdaBoost. Every machine learning algorithm's general methodology entail gathering and analyzing input data, training the algorithm, testing the algorithm, and producing an output. The used data were collected from experimental programs done by other researchers. It is obvious that the best models for estimating RAC compressive strength are Neural Network, AdaBoost, and XGBoost. The other algorithms, random forest, gradient boosting, and Catboost, performed well in predicting the compressive strength of RAC, however tree decision and SVM performed badly.
Keywords: Recycled Aggregate Concrete, Machine learning

On Asymptotic Behavior of Random Walk Process with Two Barriers in Buffer Stock Problem

Tahir Khaniyev[1,4], Zulfiye Hanalioglu[2] and Hilala Jafarova[3]
1. TOBB University of Economics and Technology, Department of Industrial Engineering,
Ankara, Turkey;
2. Karabuk University, Department of Actuarial Sciences, Karabuk, Turkey;
3. Azerbaijan State University of Economics, Department of Digital Technology and Applied Informatics, Baku, Azerbaijan;
4. Azerbaijan State University of Economics, The Center of Digital Economics, Baku, Azerbaijan;

Abstract: Consider the following stochastic model used in stock control theory. Take, for example, the work process of the buffer stock in a warehouse with volume β. Suppose that at random times $(T_n = \sum_{i=1}^{n} \xi_i)$, items are taken from (or added to) the buffer stock, in random quantities (η_n). When stochastic process $(X(t))$ which describes the stock level in the warehouse exceeds the "β" level or falls below the "0" level, the natural progression of the process is immediately interrupted, and the process is started from a new initial state $(\zeta_1 \in (0, \beta))$. The process, then, continues its natural progression in the similar way. In this study, the random walk process $(X(t))$ with two barriers at levels "0" and "β", which expresses the variation of a buffer stock mentioned above is considered and the limit form of characteristic function of the ergodic distribution of the standardized process $W_\beta(t) \equiv \frac{X(t) - \beta/2}{\beta/2}$ is found, when $\beta \to \infty$. Moreover, asymptotic results are obtained for all moments of the ergodic distributions of the processes $W_\beta(t)$ and $X(t)$. In addition to these, the asymptotic formulas for the expected value, variance, standard derivation, skewness and kurtosis coefficients of the processes $W_\beta(t)$ and $X(t)$ are derived.
Keywords: Random walk with two barriers, Characteristic function, Moments, Buffer stock.

Asymptotic results for stationary characteristics of renewal-reward process with dependent components and a special barrier

Aynura Poladova[1], Tahir Khaniyev[1,2], Salih Tekin[1]

1. TOBB University of Economics and Technology, Department of Industrial Engineering, Ankara, Turkey

2. Azerbaijan State University of Economics, The Center of Digital Economics, Baku, Azerbaijan

Abstract: In this study, a stochastic inventory model of type (s, S) with dependent components is addressed and investigated. The stock level X(t) in a depot at time t is represented by a semi-Markovian stochastic process with dependent components. The classical stochastic inventory models assume that the inter-arrival times and the amount of demands are mutually independent random variables. However, stochastic models of type (s, S) which express a large number of real life situations should be investigated using the stochastic processes with dependent components. In this paper, a stochastic process X(t) with dependent components is mathematically constructed and stationary characteristics of this process are studied. Firstly, the exact expression for the ergodic distribution of the process X(t) is obtained. Besides, an asymptotic result is obtained for the ergodic distribution of the process X(t) under the assumption that, the amount of demands and the inter-arrival time are linearly dependent on each other. Moreover, the exact expressions and asymptotic expansions are found for all the moments of the ergodic distribution of the process X(t). Finally, we test how close the obtained approximation formulas are to the exact expressions.
Keywords: Stochastic inventory model of type (s, S), Dependent components, Ergodic distribution, Asymptotic expansion.

The Impact of Sense of Place on the Urban Pattern for Modern Cities

Saja Faris Abdulkareem Alturaihi, Mohammed Qasim Abdul Ghafoor Al Ani
Al Nahrain University, College of Engineering, Architecture Department, Baghdad, Iraq

Abstract: This research deals with the subject of sense of place in urban pattern, for the importance of it is role of the city future. Especially in modern cities after the transformation of the urban pattern from organic pattern to grid pattern, After entering modernity, technology and informatics. The research reveals a problem that Modern Cities Trends downplay the significance of urban pattern in establishing a feeling of place, which has led to a loss of connection and communication in the city's urban spaces. Where, This paper analyzes the relationship between sense of place and urban pattern for modern cities. Detecting the places where the sense of place appears and the places where it disappears And where does it affect. Therefore, the research aim is to set standards for each urban pattern and where the sense of the place is achieved. An explanation of the concept of a sense of place, a study of its indicators, and then an introduction to the urban pattern and its types will be addressed, depending on the pattern language of Christopher Alexander.This conceptual paper will adopt the questionnaire is based on practical experience, It will be applied to the modern city (Basmayah city) located in Baghdad, Iraq. Our analysis of the constructs of a sense of place showed that there is a relationship between them and the constructs of urban pattern.
Keywords: sense of place, urban pattern, modern cities

Optimization methods for energy management systems used in microgrids:A state-of-the-art review

Emre GÜLER[1], Esra BOZ[2]
1. KTO Karatay University, Faculty of Economics and Administrative Sciences, Department of Energy Management
2. KTO Karatay University, Faculty of Engineering and Natural Sciences, Department of Industrial Engineering

Abstract: Energy is one of the most important needs of human history, especially with the effect of chaos environments such as war and pandemic. There have always been tensions between countries on energy due to the increasing energy need since the Industrial Revolution that started at the end of the 18th century. Due to the finite and harmful nature of existing energy sources, new energy production techniques are being developed and the tendency towards renewable energy sources such as solar, wind, hydraulic and geothermal is increasing. Microgrids that assist in the

distribution for electricity which is generated from small-scale renewable energy sources are grids with limited loads and production, which can be operated either grid-dependent or off-grid. Microgrid provides advantages such as reduced transmission and distribution costs, reducing energy losses, providing more energy efficiency, having lower capital costs, and providing a low-cost entry to a competitive market. Optimization methods can be applied for optimum use of renewable energy sources in microgrid systems. In this study, studies on optimization techniques used in microgrid systems in energy management in the current literature were examined. By researching the optimization methods used, a general framework has been presented regarding the formation of the objectives of planning the use of energy resources and minimizing costs within the optimization methods. In addition, a comprehensive analysis of the optimization methods frequently used in microgrid systems is presented.

Keywords: Microgrid, renewable energy sources, optimization techniques, energy management system

Application of 3D Printing in Ophthalmology: Challenges, Current Status, and Future Prospects

Ali Reza Karimi[1], Asma Raisi[1], Maryam Amirian[1], Kiana Niakan[1], Ahmad Saudi[1,2]
1. Faculty of Engineering, Zand institute of higher education, Shiraz, Iran
2. Department of Biomaterials, Tissue Engineering and Nanotechnology, School of Advanced Technologies in Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract: Cancer, trauma, uncontrolled infection, and glaucoma are the most important reasons for vision loss and blindness. Patients who lost their eyes need to implant prosthetic eyes, which takes a lot of time and money to create a customized ocular prosthesis. 3D printing has recently emerged as a promising approach in tissue engineering and biomedical applications. This technology is constantly evolving and it overcomes many challenges in the healthcare field and drug delivery systems. 3D printing introduces as a novel cost-effective tool whose products are created in a single step and it is often quicker and more economical than traditional methods. This system employs biocompatible materials to fabricate suitable scaffolds and implants for biomedical use. It enables the customization of bioimplants for each patient with different eye sizes and shapes. This review presents challenges, current status, and future prospects of employing 3D printing technology in the bionic eye.

Keyword: 3D printing, Tissue engineering, Ophthalmology, Bionic eye, Prosthetic eye.

Barrier analysis for the food supply chain with novel MCDM methods

Sinan ÇİZMECİOĞLU[1], Ahmet ÇALIK[2]
1. KTO Karatay University, Vocational School of Trade and Industry, Department of Transportation Services
2. KTO Karatay University, Faculty of Economics and Administrative Sciences, Department of International Trade and Logistics

Abstract: Global food supply chain system has emerged as one of the most complex concerns. The current Covid-19 epidemic, drought issues, and regional wars have demonstrated how crucial the food supply chain. In order for humans to survive, food is the most crucial necessity. For this reason, it's crucial that food is provided to everyone on time and in good condition. However, this is impractical due to global constraints. Ensuring the flawless continuity of the food supply chain will not only benefit global development but also support global sustainability. In this study, barrier analysis is implemented for obstacles in the food supply chain. Firstly, the food supply chain literature is examined detaied. Research criteria are obtained from experts and literature. Then, these criteria are analyzed with fuzzy MCDM methods. Because few experts in food suppy chain, fuzzy MCDM approaches are implemented in this study. The spherical fuzzy AHP method determined the weight of the criteria. In this way, the problems in the food supply chain have been clearly identified. The study contributed to the limited literature in this area.

Keywords: Food Supply Chain, MCDM, Barrier Analyzes, Food Security

Effectiveness of PolyLoss function for classification of steel defects on two open datasets

Emine AŞAR[1], Fatih NAR[1] and Atilla ÖZGÜR[2]
1. Ankara Yıldırım Beyazıt University, Ankara, Türkiye
2. SMS Digital GmbH, Düsseldorf, Germany

Abstract: Steel is one of the important materials of today's industry like defense, space, construction, etc. Steel quality directly impacts its usage in these industruies; therefore, the quality of steel surfaces has gained a lot of importance. Inspection and detection of defects on steel surfaces based on human vision may be problematic and prone to errors. For that reason, defect detection systems machine vision systems have gained great significance. Such systems use deep learning methods widely. This study aims to measure effectiveness of a new loss function called poly loss function on deep learning models by using transfer learning methods. Widely used MobileNet, Xception and DenseNet169 networks were used. These three models were compared on two different open datasets: NEU and SEVERSTAL. The performances of the three models were evaluated with categorical crossentropy and polyloss crossentropy loss functions. Our study results show that validation accuracy increases in models trained with both NEU(0.94% on MobileNet, 0.71% on Xception, 1.01% on DenseNet169) and SEVERSTAL(0.27% on MobileNet, 0.85% on Xception and 1,49% on Densenet).

Keywords: surface defect classification, deep learning, transfer learning, loss functions, polyloss functions, categorical loss function

Active Cell Balancing with Modified Bidirectional Cuk Converter in Battery Management System

E. Koseoglu A. Karaarslan
Yildirim Beyazit University, Ankara, Turkey

Abstract: In multi-cell battery packs, the Battery Management System (BMS) is the safety system of the battery and is responsible for keeping values such as voltage, current and temperature within safe limits. One of its most important functions is to eliminate voltage imbalances between cells in series-connected battery strings. In general, active and passive topologies are used to balance the voltage between cells. In passive cell balancing, the excess energy in the high-capacity cell is thrown out of the package as heat energy over a resistor, while in active cell balancing systems, the energy is transferred from the high-voltage cell to the low-voltage cell and the efficiency is increased. In this study, a modular and converter-based active balancing topology is presented. In the design, there are isolated cuk converter modules that perform bidirectional energy transfer corresponding to each battery cell connected in series. Such a modular design has good flexibility and extensibility in balancing many cells connected in series. By designing an isolated bidirectional cuk converter balancing circuit and equalization controller, five battery cells connected in series are separately tested in charge, discharge and idle. The PI Control Method has been implemented to proposed topology and verified with Matlab/Simulink Program.

Keywords: Cell Balancing, Cuk Converter, Active Balance, Battery Equalization, BMS

An experimental study on micro-drilling of wrought and 3D-printed Ti6Al4V alloys under eco-friendly cutting conditions

Ahmet Balcı[1], Adem Çiçek[1], Necati Uçak[1], Kubilay Aslantaş[2]
1. Ankara Yıldırım Beyazıt University, Faculty of Engineering and Natural Sciences, Department of Mechanical Engineering, Ankara/Türkiye
2. Afyon Kocatepe University, Faculty of Technology, Department of Mechanical Engineering, Afyonkarahisar/Türkiye

Abstract: This study investigates the micro-drillability of wrought and 3D-printed Ti6Al4V alloys fabricated by Laser Powder Bed Fusion (LPBF) under dry and minimum quantity lubrication (MQL) conditions. The micro-drilling tests were performed at a constant spindle speed (5000 rpm) and feed (4 μm/rev) values using uncoated WC-Co micro drills with a

diameter of 0.7 mm. The influences of workpiece material production methods (wrought and LPBF) and cooling/lubrication conditions (dry and MQL) were evaluated considering the obtained thrust force, average surface roughness (Ra), and burr height at the hole exit. Experimental results showed that due to its different microstructural and mechanical properties, LPBF Ti6Al4V alloy exhibited different machinability characteristics than wrought ones. Under dry conditions, in comparison to wrought one, higher thrust force, Ra, and burr height values were obtained for LPBF Ti6Al4V. On the other hand, MQL condition improved the hole quality and reduced the thrust force, especially for LPBF Ti6Al4V.

Keywords: Ti6Al4V alloy, metal additive manufacturing, micro-drilling, sustainable machining

Comparison of Machine Learning Algorithms to Recognition Human Activity Using Wearable Sensors

Maryam A. Fadhil and Waleed F. Shareef
University of Technology, Baghdad, Iraq

Abstract: The development of wearable sensor technology has made it possible to gather and retain information on a variety of aspects of human mobility under free-living conditions. This technology has the potential to be used in activity monitoring systems in several areas, including health, sports applications, security, and human monitoring. This produces a continuous record of activity patterns over long periods. This paper is interested in analyzing and classifying activities daily using classification methods in both time and frequency domains through using sensors embedded in two types of clothes. The results indicate that there is good potential for achieving high classification accuracy when using three methods such as SVM, KNN, and tree decision. The KNN is suitable to classify, and the accuracy rate is over 83% and 79% in both tight and loose-fitting clothes, respectively.

Keywords: Wearable sensor, Human activity, Activity monitoring, Loose-fitting clothes, Tight clothes.

A Literature Review of Green Energy by Using MCDM Methods

Merve Çalışkan, Babek Erdebilli

Abstract: One of the most crucial components for the continuation and survival of the human species is energy. It is the resource we require in a variety of scenarios, including housing, business, agriculture, transportation, communication, and information technology. Oil, gas, and coal, which have been utilized as sources of energy from ancient times to the present, are quickly running out due to a number of circumstances and environmental issues. Some of these elements have a role in rapid population expansion, industrialization, globalization, and technological advancements. Scientists are looking for clean, renewable, dependable, and limitless energy sources due to the harm done to the environment and resource depletion caused by the usage of these non-renewable energy sources. In reality, because of this circumstance, nations now include the search and assessment of clean and renewable resources in their long-term energy planning.

Keywords: Multi Criteria Decision-Making (MCDM), Green Energy, Renewable Energy Sources.

Investigation of mechanical, thermal and dielectric properties of glass/ceramic and glass/ceramic/nano h-BN composites for low-temperature co-fired ceramic applications

Oğuzhan BİLAÇ and Cihangir DURAN
Ankara Yıldırım Beyazıt University, Department of Metallurgical and Materials Science, Ankara, Türkiye

Abstract: Anorthite based glass/ceramic composites were studied for possible structural applications such as low-temperature co-fired ceramics. These materials require some optimized physical properties such as low densification temperature (<950°C), low dielectric properties (dielectric loss of 0.0007–0.006 at 1 MHz and dielectric constant of 3.8–9.2 at 1 MHz), good thermal properties (thermal conductivity of 2.0–4.5 W/m·K), a matched thermal expansion coefficient (4.5–7.5 ppm/°C) to the silicon or GaAs as well as optimum mechanical properties (Young's modulus of 80–150 GPa, the flexural strength of 116–320 MPa). A $CaO–SiO_2–Al_2O_3$-based composition was used as the glass matrix phase, Al_2O_3 and mullite were used as the crystalline phases. Nano h-BN filler was particularly added to improve thermal properties. Effect of composition (i.e., glass/ceramic ratio, nano filler amount) on densification, phase formation, microstructural development, thermal, dielectric and mechanical properties of the composites will be discussed from the structural applications of points of view.

Keywords: Glass/ceramic composites, hexagonal boron nitride, low-temperature co-fired ceramics, dielectric properties, thermal properties, mechanical properties

Turkey's Renewable Energy Projection: A Machine Learning Based Approach

Nurullah Güleç and Cihat Öztürk
Faculty of Engineering and Natural Sciences, Anakara Yildirim Beyazit University, Ankara, Turkey

Abstract: An economically, environmentally and socially sustainable world depends on the use of cheap and accessible energy resources. Especially after the industrial revolution, traditional energy sources such as coal, gas and oil have been predominantly used. However, these energy sources are one of the main causes of climate change due to their high emissions. Both social pressure and international initiatives have had a compelling effect on the promotion and use of sustainable energy sources. There are no studies on the future projection of renewable energy sources for Turkey. However, the increasing demand for energy and the pressure to combat climate change necessitates the need for such studies. This study presents the results of the analysis of energy production from renewable energy sources in Turkey and forecasts for this production until 2030. The analysis takes into account the main renewable energy sources in Turkey such as wind, solar, thermal energy. By considering data from 1970 to the present and analyzing the production volume, the estimated volumes of renewable energy sources until 2030 are presented. These forecasts are also analyzed independently for all renewable energy sources. In addition, taking into account the share of renewable energy sources in total production, realistic actions of Turkey in climate change policies are analyzed in depth. In the research, artificial neural network, one of the best known and popular machine learning method, is used to project the future. The results will provide an important source of information on the impacts of implementing climate policies in Turkey. In addition, Turkey's global position in current climate change strategies will also be revealed.

Keywords: Renewable Energy, Forecasting, Machine Learning, Artificial Neural Network

Determination of battery energy storage systems (bess) optimum location in power systems

Ahmet Karaarslan and M. Emrah ŞEKER
Electrical Electronics Engineering Department, Ankara Yıldırım Beyazıt University

Abstract: The use of Battery Energy Storage Systems (BESS) in the power system is becoming more and more widespread. Finding the optimum positioning of BESS is one of the most important problems to be addressed to increase the benefit of the battery. BESS is a device that has two modes of operation. This device can act as a load during the charging process and support generation when discharging. Hence, a methodology that considers both modes would give more accurate results. Analyses without considering both the charging and discharging modes of operation of BESS do not give the optimum location of BESS. In order to overcome the problem of determining the optimum location of BESS, Genetic Algorithm (GA), Particle Swarm Optimization (PSO), which is an approach that covers both operating modes of the battery, is applied. This method is tested on IEEE test system using MATLAB and the results are validated by power flow analysis.

Selection of best Electric Vehicle and charging stations integrated MCDM approach

Seyed Masoud Pourmohammadi Sani, Servet Soyguder and Babek Erdebilli
Industrial Engineering, Ankara Yıldırım Beyazıt University

Abstract: The fast growth of the global economy and contemporary technologies have revolutionized our lives, but they have also had a detrimental effect on the ecology and sustainability of the environment. The discharge of hazardous gases, catastrophic global warming, and background air pollution have all increased recently. A challenge to sustainable development is posed by the widespread use of internal combustion (IC) cars, which are to blame for increasing air pollution, jeopardizing societal health outcomes, and supporting the use of fossil fuels. It has long been known that traditional fuel-powered vehicle emissions are a major impediment to a sustainable environment. Reducing these emissions might provide both financial assistance for the establishment of a sustainable society and pollution prevention. Light-duty vehicle fleets, like those of taxis and buses, may gain. The electrification of fleets of light-duty vehicles, including taxis and buses, might have positive financial, economic, and environmental effects. To effectively stimulate EV adoption and dissemination in emerging economies, it is necessary to identify and evaluate the key characteristics that may facilitate the adoption process. Developing EV charging stations in the right locations has become increasingly important as the number of EVs on the road increases. This issue needs to be discussed while taking into account a variety of factors, including infrastructure, the perspectives of stakeholders and municipalities, environmental challenges, and others. This paper will first address the core selection of EVs and the ways for finding out a suitable place for establishing charging stations, and second, the use of the different MCDM methods employed for their selection, as the focus of this research is on the choosing of EVs and charging stations using the MCDM approach.

Evaluation of Renewable Energy Alternatives for Ankara and Selection of Appropriate Power Plant Location

Müşerref Nur Koruk, Furkan Algül, Babek Erdebilli
Ankara Yıldırım Beyazıt University

Abstract: From the past to the present, with the increase in the world population and industrialization, the need for energy has increased accordingly. Due to the high amount of energy obtained from sources such as coal, natural gas and oil, they are still an indispensable energy source for human beings. Although the energies obtained from these sources meet our needs for now, it should not be forgotten that they will run out in the future. In addition, these sources, which are called non-renewable energies, cause great harm to both people and the Earth due to the polluted gases they emit while burning. In order to prevent this, people should be encouraged to use renewable energy and renewable energy plants should be established in suitable regions. In this study, it is to show that our country is an extremely suitable region for the installation of renewable energies. In this project, which is planned to be made especially for the province of Ankara, it is to find the region where the renewable energy types are more suitable, less costly and the efficiency to be obtained is high. The method of this study consists of 2 stages; The first phase of the project is to determine the conditions necessary for the establishment of each of the renewable energies for the province of Ankara and to determine which one is the most suitable renewable energy for Ankara. In the second stage, it is determined in which district it is more appropriate to establish the renewable energy(s) decided by establishing a multi-criteria decision-making method and decision support models. At the beginning of the project, the dependent and independent variables related to the problem discussed first will be determined and parameters will be created. Then, the objective function and constraints will be created with the help of these parameters. According to this modelling, the optimal result will be found and the place where the project will be done will be determined.

Deep learning based on datasets for audio deepfake

Ousama A Shaaban, Remzi Yildirim
Department of Computer Engineering, Ankara Yildirim Beyazit University, 06760 Ankara, Turkey

Abstract: One of the most recent techniques that may be used to mislead and discredit individuals, particularly politicians and performers, is known as "Audio deep fake". As is well known, the significant advancement of deep learning technologies and other techniques has made it significantly more difficult to detect deepfakes where AI-based deep learning models can synthesize any person's voice with just a few seconds of audio. This is the reason why deepfake detection is becoming a much-needed area of research, and new methods of deepfake detectors must be developed to overcome this issue. Where the quality of synthetic speech is approaching that of a genuine voice. Furthermore, some state-of-the-art technologies attain such a high degree of naturalness that even people have difficulty discriminating between actual and synthetic speech. In addition, these technologies enable a user to train a speech synthesizer with a specific voice, producing a model that can accurately replicate a person's voice. which requires developing techniques that discriminate between real speech and synthetic speech. that required a large amount of high-quality data to capture real-world scenarios using one of the widely available open-source datasets. The most important contribution of this article is a review of existing audio deepfake datasets, providing the researchers with an overview of the datasets in terms of size and number of samples and also comparing them, which will provide a guide for the research community to comprehend future audio deepfakes.

Random Forest method in the inference of the relationship between neurons in Hodgkin–Huxley model

Hajar Farnoudkia
Faculty of economics and administrative sciences, Management department, Başkent University, Ankara, TURKEY

Abstract: Action potentials or spikes are the basic units of information transfer between neurons and the body. Some neuronal networks exhibit intermittent nature of the synchronized firing of spikes due to noise that is responsible for important functional roles. Here, we study the intermittent synchrony due to noise in the neuronal network with three coupled elements. The aim of this study is to investigate the effect of noise in the relationship between the neurons. In this study a random forest, an assembling machine learning method is used to modal a non-linear relationship between the neurons came from H-H model. By using some accuracy measures it can be observed that this method is robust for noise term as there is no significant change in accuracy after some noise.

Power Quality Improvement Techniques in Electrical Power System by Using Enhanced Performance of Dynamic Voltage Restorer (DVR)

Waleed Khalid Mahmood Alzaidi and Aslan Inan
Yildiz Technical University, Faculty of Electrical and Electronics Engineering, 34220, Esenler, Istanbul

Abstract: Power quality (PQ) ranks high in the trends of researchers today due to the increasing demand for electrical energy and the occurrence of power quality problems in countries that are suffering from insufficient production of electrical power. This paper provides an effective and

uncomplicated control technique for DVR by integrating three control techniques at the same time with fine-tuning of variables to obtain high-efficiency performance for DVR. The results were very excellent in keeping the load voltage at 1 P.U. and the total harmonic distortion level at an extremely low level and within the limits of the standards. The proposed model was tested by using MATLAB and Simulink in several scenarios representing power quality issues that have a negative impact on devices within its range. What distinguishes this research is more than one issue was synchronized at the same time as voltage sag/swell and harmonics to demonstrate the high efficiency of the new DVR, and the results were very impressive compared to the traditional DVR. This research presents a highly efficient model for addressing common energy quality issues such as voltage sag/swell and harmonics.

Keywords: Power Quality (PQ), Custom Power Devices (CPD's), Dynamic Voltage Restorer (DVR), Voltage sag, Voltage Source Inverter, Voltage swell.

Power system protection enhancement through fault detection, classification, and location using machine learning based on Wide Neural Network.

Faraj Khlaf Fraiah AL-BHADELY and Aslan İNAN

Yildiz Technical University, Department of Electrical Engineering, 34220, Esenler, Istanbul

Abstract: The fault in the power system is abnormal condition. The accuracy of fault detection and classification is essential to ensure quality and reliable operation of the power systems by clearing the faults that occur in only faulty section and disconnected from the rest of the system in the shortest possible time. In this paper, fault detection, classification and fault location methods are provided using machine learning algorithms. The sampled-data of current and voltage signals were extracted from standard IEEE 9-bus system (WSCC 3 machine nine bus) of different faulty and non-faulty classes were simulated in MATLAB Simulink. The Wide Neural Network Classifier Type is utilized to expose the performance of the proposed model. 10 fault types at 9 locations at each one of 6 transmission lines with varying ground fault resistances are simulated. All fault types have been simulated on the model's transmission lines. The magnitudes of current and voltage obtained from the fault simulation are used as features inputs to the machine learning algorithm. If a fault occurs, the output of the machine learning algorithm should provide information about the fault type, location, and line faulty. The performance accuracy of 99.9% for type of faults, 98.5% accuracy for fault location and 99.9% accuracy for identifying the faulty lines.

Keywords: Fault Location and Classification, Wide Neural Network Classifier (WNN), WSCC IEEE 9-bus.

Overall Survival Prediction of NSCLC using Radiomics and Machine Learning Methods

Muhammed Selman EREL, Hilal ARSLAN
Ankara Yildirim Beyazit University

Abstract: Cancer is one of the most fatal diseases. Millions of people all around the world die due to this illness as a result of abnormal cell growth. Billions of dollars are spent to cure and analyze it. Non-small cell lung cancer (NSCLC) is the most diagnosed type of lung cancer, which is a trending type of cancer. Accurate prognostic strategies are important for treating cancer patients. By this aim, radiomics is used to diagnose and prognose the disease in a non-invasive, budget-friendly, smart and fast way. In this study, 2-year survival prediction of NSCLC is performed by using radiomics and machine learning methods. Lung CT-scan images belonging to 422 patients retrieved from TCIA public DICOM archive are processed to detect meaningful features using open-source radiomics feature extractor, PyRadiomics. For classification step, K-Nearest Neighbor and Support Vector Machines classifier methods are utilized with

10-fold cross validation. To achieve the best performance, the hyperparameters of machine learning methods are tuned using grid search method. Experimental results present that the KNN is achieved the best performance with an AUC score of 0.8163, an accuracy of 0.80, a recall of 0.78 and an F-measure of 0.78.
Keywords: Cancer, NSCLC, Radiomics, KNN, SVM, PyRadiomics

An integrated decision-making model with entropy weighting and TOPSIS-Sort for occupational risk assessment

İlker Gölcük[1], Esra Duygu Durmaz[2]
1. Department of Industrial Engineering, İzmir Bakırçay University, 35665, İzmir, Türkiye
2. Department of Industrial Engineering, Gazi University, 06570, Ankara, Türkiye

Abstract: The construction industry is one of the most dangerous industries in terms of occupational health and safety. Given this fact and the rising trend of accident prevention initiatives in the industry, the necessity to improve workplace safety becomes obvious. As a result, this study provides a new risk assessment model for managing risks in the construction sector using entropy-based weighting and a sorting-based TOPSIS algorithm (TOPSIS-Sort). The proposed model is presented by assessing 32 possible dangers against three risk factors probability, severity, and occurrence. The risks have been categorized into three risk clusters, and the ways to reduce risks have been identified. The results show that the majority of the risks are placed in the high-risk cluster. Preventive measures for the high-risk cluster are suggested. The proposed model is efficient, so it can be considered an essential step toward automated risk analysis.
Keywords: Decision aiding, Entropy weighting, TOPSIS-Sort, Occupational risk assessment

Insider Threats to Physical Protection Systems in Nuclear Power Plants: Literature Review

Lütfü GÜR, Babek Erdebilli
Ankara Yildirim Beyazit University

Abstract: Critical infrastructure security is one of the main priorities for States and Nuclear power plants(NPP) are one of them. The security of nuclear facilities consists of preventive and protective measures. Evaluation of preventive and protective measures against insider threats is a key component of risk assessments designed to identify vulnerable systems. It is important to reevaluate the effectiveness of preventive and protective measures periodically, especially when there are changes to the threat assessment, including insider threats who have knowledge, access and authority, or design basis threat (DBT). In this study, 10 methods used to measure the effectiveness of the security of NPPs were examined. While examining these studies, it is recommended that it would be more appropriate to categorize insider threats in order of importance and to consider multiple insider threats rather than just one insider threat during the assessment.
Key Words: Nuclear Power Plant, Insider Threat, Physical Security Effectiveness

Study On Optimizing the Location of Offshore Wind Power Plants in Turkey

Nazife Kilinç ,Öznur Beşli, Babek Erdebilli
Ankara Yildirim Beyazit University, Industrial Engineering Department

Abstract: The use of renewable energy has increased recently as a result of the diminishing global resource base. The world's energy requirements are also rising in tandem with technological advancements, day by day. To meet this rising demand for energy, alternative renewable energy systems are used. Numerous factors influence the systems in use, and by weighing these factors, it is decided which system to use in each location. Another challenging issue is determining the best location for wind power plants.

The use of offshore wind turbines has increased in many coastal nations concurrently with the rise in the use of wind energy in recent years. Turkey doesn't have any installed offshore wind turbines. In this study, we looked at how to best use offshore wind farms in Turkey, a country surrounded by water. We looked into the areas where Turkey will benefit most from the use of offshore wind turbines, which produce more energy than onshore ones. The best location for offshore wind power was identified by analyzing the wind potentials in Turkey's seas. This study aims to shed light on Turkey's rapidly expanding energy sector and its projects for offshore wind power plants, which were previously only in the planning stages. The study was conducted in an effort to identify the best location for a Turkish offshore wind plant. The purpose of this study is to assess Turkey's wind potential, which is the highest in the world.

Graphene based nanomaterials as catalysts for hydrogen evolution reaction via electrochemical water splitting

Furkan Soysal[1], Zafer Çıplak[2]
1. Ankara Yıldırım Beyazıt University, Faculty of Engineering and Natural Sciences, Department of Chemical Engineering
2. Sivas Cumhuriyet University, Faculty of Engineering, Department of Chemical Engineering

Abstract: Hydrogen has been viewed as a promising energy source because of its high energy density and zero carbon emission properties. Recently, electrochemical water splitting has been studied extensively for hydrogen production as an alternative to fossil fuels. Electrochemical properties of graphene based materials are extraordinary thanks to high electrical conductivity, large surface area, and high mechanical strength of graphene. In this study graphene oxide (GO), nitrogen doped reduced graphene oxide (NrGO), and nitrogen doped reduced graphene oxide/silver (NrGO-Ag) were tested as catalysts for hydrogen evolution reaction (HER) via electrochemical water splitting. A three-electrode configuration was used with catalyst modified glassy carbon, Ag/AgCl with 3 M KCl, and platinum wire as working, reference, and counter electrodes, respectively. 1 M H_2SO_4 (pH=–0.34) was used as the electrolyte. Linear sweep voltammetry measurements between $-1.2 - 0.0$ V vs. Ag/AgCl revealed that overpotential values at 10 mA/cm^2 were 670, 352, and 250 mV for GO, NrGO, and NrGO/Ag, respectively. Tafel slopes of GO, NrGO, and NrGO/Ag samples were calculated as 278.8, 143.9, and 122.1 mV/dec, respectively. Electrochemical characterization of NrGO/Ag demonstrated that the nanocomposite is a promising catalyst for HER.
Keywords: Graphene, silver nanoparticles, electrochemical water splitting, hydrogen evolution reaction

A Deep Learning Approach for Feature Extraction on 1D Signals

Yusuf Şevki Günaydın[1], Baha Şen*, Dursun Delen[2]
1. Ankara Yıldırım Beyazıt University
2. Oklahoma State University

Abstract: The information amount which is gathered from an image, or a signal is directly affects the performance of any computer-based application. Thus, feature extraction is an important preprocessing task for signal processing, image processing and computer vision applications like classification, denoising, object detection, edge detection, segmentation, and image dehazing. Therefore, many implementations of the feature extraction have been proposed in the literature. Starting from this point of view, the aim of this study is to separate a signal into two main parts: the smooth layer, and detail layer to increase the information which is extracted from a signal. The smooth layer shows the general information about a signal and the detail layer represents the small changes in the signal. Since it is a non-linear problem and deep learning approaches are good at solving non-linear problems and also deep learning-based techniques improved their performance as the state-of-the-art in many areas of digital signal and image processing tasks, a feature extraction deep learning approach for one dimensional signal is proposed in this study. The total variation approach is used as the loss functions of the convolutional neural network of the model to define the smooth and detail layers of a signal. The purpose of

total variation loss is to make values of neighboring values on the signal closer. After the layers are separated, this information can be used as a preprocessing step for all signal processing applications. Experimental results on both synthetic and real data are promising and shows that the idea also can be implemented on two-dimensional or three-dimensional data.
Keywords: Convolutional Neural Network, Deep Learning, Feature Extraction, One Dimension

Performance Comparison of FFT based Frequency Estimation by using Interpolation Techniques

Gamze CABADAĞ and Ömer KARAL
Electrical and Electronics Engineering, Ankara Yıldırım Beyazıt University, Ankara, Turkey

Abstract: Fast Fourier Transform (FFT) is a widely used method in electronic support systems for frequency parameter estimation. If the frequency of the radar signal is not an exact multiple of the frequency resolution, the frequency of this signal will usually appear in an inter-line position when FFT is applied. To improve the accuracy of the estimated frequency, interpolation techniques are used to find the peak between two spectral lines. In this study, the frequency of the radar signal is estimated by employing three different interpolation techniques (Ding, Voglewede and Hanning window based interpolation) to the output obtained by applying N-point FFT to intermadiate frequency (IF) signal. In addition, unlike the literature, the behavior of signals contaminated with Laplace noise as well as Gaussian noise were analyzed with these three techniques and their performances were compared. In order to analyze the effect of the noise on each method more clearly, analysis were made at different signal to noise ratio (SNR) values of the noises and bandwith of the IF signal was changed between 100MHz to 1000MHz. For each frequency, one hundred Monte Carlo simulations were applied. From the analysis results, it was seen that the Ding interpolation technique showed the best performance. The error rates of the estimated frequencies can be sorted from the lowest to the highest as follows: Ding, Voglewede and Hanning window based interpolation.
Keywords FFT, Frequency Estimation, Interpolation, Laplace Noise, Gauss Noise

Ergonomic Risk Level Estimation for RULA with Machine Learning and Deep Learning Methods

Y. Celik[1], S. Güney[2], G. F. Can[1]
1. Department of Industrial Engineering, Faculty of Engineering, Başkent University, Ankara, TÜRKİYE
2. Department of Electrical and Electronics Engineering, Faculty of Engineering, Başkent University, Ankara, TÜRKİYE

Abstract: Working posture is the alignment of body parts in the space according to the movements required by the task performed. Awkward working postures are one of the most important ergonomic risk factors leading to occupational musculoskeletal disorders. The working postures of the workers while performing their tasks are influenced by the production method and the design of the production area. Therefore, determining the risk level of working postures also defines the improvements that should be made in the production area and the production method. The methods in the literature that analyze the risk levels of working postures are generally observational methods. Rapid Upper Limb Assessment (RULA) is one of these methods focused on the risk level of upper extremities' working postures. It is a well-known fact that for all observational methods as RULA, different working postures bring with them different risk levels. Therefore, analyzing all the different working postures and determining risk levels for them by the observer is a difficult and time-consuming activity. For this reason, in order to determine the risk levels more quickly and automatically, machine learning and deep learning methods can be used. In this study, risk levels obtained by RULA were classified by machine learning and deep learning methods. Deep learning is a type of artificial neural network. In recent years, it has given

very effective results in some applications. The results were examined by applying deep learning methods to this area as well. Additionally, results produced by different algorithms were compared and the most suitable algorithm was determined. In order to achieve high success in the estimation of risk degrees, many different classification methods were applied such as k-Nearest Neighbor, Support Vector Machines, Linear Discriminant Analysis, and Decision Trees, etc. In addition to these methods, convolution neural networks and long short-term memory architectures were used as both classification and feature extraction methods. For the left and right sides of the body, the highest estimation accuracy is obtained as 96.5% and 95.6% respectively by using a CNN feature extractor and linear support vector machine classifier. The promising results show that quick and productivity-enhancing ergonomic measures can be taken for employees using machine learning and deep learning algorithms. For future works, angles of the body parts can be obtained from the image automatically and the results of the classifier can be combined with the image results.

Keywords: Ergonomic, RULA, Machine learning, Deep learning.

An extended circular intuitionistic fuzzy TOPSIS based on similarity measures with an application to multi-criteria decision making

Mahmut Can Bozyiğit[1], Mehmet Ünver[2], Murat Olgun[2]

1. Ankara Yildirim Beyazit University, Department of Mathematics
2. Ankara University, Department of Mathematics

Abstract: A circular intuitionistic fuzzy set (value) (C-IFS(V)) is represented by a circle standing for the uncertainty of the membership and non-membership functions. The concept of C-IFS is a new generalization of intuitionistic fuzzy sets. A C-IFS models vagueness in membership and non-membership degrees thanks to its structure that allows modelling the information with points of a circle of a certain center and a radius. Thus more sensitive decisions can be made. In this study, we propose a cosine similarity measure between C-IFVs. Then, we introduce an extended circular intuitionistic fuzzy TOPSIS based on similarity measures and apply it to a multi-criteria decision-making problem from the literature. We also study the comparison analysis with some of existing methods in different fuzzy settings.

Keywords: Circular intuitionistic fuzzy set, circular intuitionistic fuzzy value, cosine similarity measure, TOPSIS, multi-criteria decision making.

Design and Implementation of a Low-Cost Wearable Blood Oxygen Saturation and Pulse Measurement Device

Shurooq S. Mahmood[1] and Saad Mahmood Ali[2]
1. Medical Physics Department - Madenat Alelem University College – Iraq
2. Biomedical Engineering Department, University of Technology - Iraq

Abstract: Many people with COVID-19 have low levels of oxygen in their blood. Low oxygen levels can be an early warning sign that medical care is needed. A pulse oximeter measures how much oxygen is in someone's blood. The main aims of the current work are to design, fabricate and test a low cost, easy to operate portable pulse oximeter device capable of providing immediate blood oxygen saturation and hear rate readings. It can be used in an intensive care departments, operating rooms and health centers as well as at homes. The designed and produced device can be used to measure the oxygen saturation and heart rate in high accuracy for various disease conditions and for all age groups. The obtained results were compared using a calibrated device produced by a reputable company. The clinical examination results were evaluated by using the Export System 13.0 statistical software program. The readings are close to each other, with an error rate of less than 1%. The obtained results show that, the average oxygen saturation level in the blood (SpO2) ranged between 73-95 % and heart rate from 72-108 bpm. It was found that for healthy people, the blood oxygen level (SpO2) ranged between 90 to 99 % for males and 92 to 96 % for females. In the case of a respiratory disease such as chronic obstructive pulmonary or other lung diseases, the percentage of oxygen saturation

decreased to between 73 to 88 %. For patients with heart disease, it was found that the oxygen saturation level changes significantly according to the type of disease. The oxygen saturation readings were ranged between 76-92 % for males and it is almost equal to the women's readings for females. For the heart rate readings, which ranged between 64 to 103 for males and 64 to 96 bpm for females. These obtained values decreased by 11.11 %, and 7.08% compared to healthy people, respectively. For the smokers, the rate of blood oxygen saturation and the heart rates decreased by 10.47% and 8.06%, and by 2.38 %, and 1.08% compared to healthy people, respectively. As for those infected with the COVID-19 epidemic, the rate of blood oxygen saturation and the heart rates decreased sharply by 31.51 %, and 27.03 %, and by 14.67% and 16.67 % compared to healthy people for male and female, respectively. For asthma patients, the rate of blood oxygen saturation and the heart rates decreased by 5.55 %, and 6.74 %, and increased by 4.65 % and 4.76 % compared to healthy people for male and female, respectively. For physical activities, such as athletes, the rate of blood oxygen saturation and the heart rates increased by 1.05 %, and 3.19 %, and by 23.26 % and 28.57 % compared to healthy people for male and female, respectively.

Keywords*: Pulse Oximeter; Blood Oxygen Saturation Level; Heart Rate Level; Oxygenated Hemoglobin; Beer-Lambert's Law; Arduino Uno; Pulse Oximeter Sensor; SpO2.

Important roles of conductive polymers in energy harvesting and energy storage applications

Meryem Sena Akkus, Bülent Yeşilata
Ankara Yıldırım Beyazıt University, Department of Energy Systems Engineering, Turkey

Abstract: Conductive polymers have become the focus of research because of their unique structure and advantageous properties, such as conductivity, enhanced electronic and magnetic properties, mechanical stability, lightweight, cost-effective production, etc. Because of these features, it has many usage areas such as electronic devices, sensors, a catalyst, energy storage and harvesting, biomedicine, etc. Scientists have particularly focused on studies on producing and storing energy efficiently. The results of conducting polymers in energy applications are quite efficient. These materials play an important role as electrodes, catalysts, electrode/catalyst support, and so on in energy conversion and storage applications such as solar cells, fuel cells, lithium-ion batteries, and supercapacitors. In this study, the synthesis of conductive polymers and their applications in the field of energy are given.

Keywords: Conductive polymers, energy application

Numerical Investigation for Strengthening a Concrete Filled Steel Tube Composite Columns Using CFRP

Salam J. Hilo[1,3*], Marwah M. Abdulrazzaq[2], Saba M. Sabih[1], Salih S. Salih[3], Samer R. Azzawi[3]
1. Civil Engineering Department, University of Technology-Iraq, Baghdad, Iraq.
2. Department of Architecture and Civil Engineering, Chalmers University of Technology, Gothenburg, Sweden.
3. Information Technology Centre, University of Technology-Iraq, Baghdad, Iraq.

Abstract: Hollow and concrete-filled steel tubes (CFSTs) are widely used as columns in many structural systems and local buckling can occur when they are subjected to axial compression loading. The critical regions for the local buckling of the columns are near the ends of the column where the moments are the highest. To strengthen the critical regions of the CFSTs the CFRP provides a simple and effective method which used previously as an enhancement for both of strength and ductility. So, this study suggests investigating the axial load behavior of CFST strengthened with CFRP using FE method after a verification study and then a various parametric studies were carried out to cover the effect of the CFRP layers, number, confinement length and position. The FE results proved that, one CFRP sheet with thickness equal to 1.2 mm was strengthened the composite

column by 8.5%, two CFRP sheets with total thickness equal to 2.4 mm was strengthened the composite column by 23.5%, three CFRP sheets with total thickness equal to 3.6 mm was strengthened the composite column by 35.1% and four CFRP sheets with total thickness equal to 4.8 mm was strengthened the composite column by 44.5%. Moreover, this study proved that by strengthened the composite columns with CFRP sheets with different lengths, the axial load resistance was improved by 8.5%, 4.6%, 0.1% and 0.0% for length percentages 100%, 75%, 50% and 25% respectively.

Keywords: Strengthening; Repair; FE analysis; Numerical study; CFRP; CFST.

The Influence of Continuous and Discontinuous Fiber Glass of Reinforced Composite Material on Mechanical Properties

Ban B. Alame[1], Haithem H. Aljawad[1] and Faruk MERT[2]
1. Baghdad University, Collage of Engineering
2. Ankara Yildirim Beyazit University, Vocational School of Technical Sciences

Abstract: To obtain specific features and properties of materials such as strength with light weight, composite materials are used with different types of matrix and reinforcement. The aerospace engineering used the composite materials in wide fields of different types of fibers like carbon and glass in order to achieve the optimal strength to weight ratio . The type and orientation with homogeneity of fibers have great influences on the mechanical properties of composites. Epoxy resins show the best performance characteristics of all the resins especially that which use in the marine industry. This study was designed to evaluate the effect of glass fiber orientation of reinforced composite material on mechanical properties :tensile strength, hardness ,and toughness .The study used to compare the effect of direction of fibers in order to improve strength and toughness , this done by using two types of fibers (E glass type) :continuous and discontinuous(Woven) , Epoxy resin is almost totally transparent when cured , two dimensional fiber reinforced polymer are characterized by a laminated structure in which the fibers are only aligned along the plane in x-direction and y-direction of the material .During tests the samples were taken in three direction :parallel to fiber direction with 0° angle , perpendicular with 90° and with angle $45°$ for continuous fiber and randomly specimen was taken for discontinuous fiber .The results show that the maximum values of hardness were for discontinuous fiber (woven) type then continuous fiber composite recorded less value for angle 45° and highest hardness for angle 90° . The maximum value for strength was recorded for the continuous fiber with angle 90° and minimum strength value for composite with angle 0° . For toughness, the impact test demonstrate that maximum toughness was for woven glass fiber while no clear differences between the continuous fiber with different fiber angles. The hardness affected by the number of laminated fabricated.

Key Words: Fiber Glass, Composite material, strength, hardness, epoxy resin

Question Answering System in Biomedical Field

Harun BOLAT[1] and Baha ŞEN[2]
1. Ankara Yıldırım Beyazıt University, Ankara/Turkey, harunbolat@hotmail.com
2. Ankara Yıldırım Beyazıt University, Ankara/Turkey, bsen@aybu.edu.tr

Abstract: Question answering (QA) system is a specific task of Natural language processing (NLP). Studies in this area have entered a new era with the Bidirectional Encoder Representations from Transformers (BERT) that is pre-training language representations. BERT was trained a general-purpose "language understanding" model on large text corpus. Therefore retraining is required for domain-specific task. To answering biomedical domain question, we trained BERT model using PubMed articles and fine-tuning with SQuAD and BioASQ dataset. For the factoid type question, our model was achieved an MRR score of 0.7235 and MAP score of 0.5939 for list type question on BioASQ dataset.

Keywords: Biomedical Question Answering, BERT, NLP, PubMed, Deep Learning

Ambiguity Multiple Target Detection with Frequency Modulated Continuous Radar System

Oğuzhan Çam, İlyas Çankaya
University of Ankara Yıldırım Beyazıt

Abstract: In this study, FMCW radar system was used because it is Frequency Modulated and the signal emitted from the transmitting antenna uses a signal type called Linear Frequency Modulation (LFM) Chirp signal. Linear frequency modulation allows the frequency of the signal to increase or decrease linearly over time. Linear frequency modulation achieves to increase the range resolution, which is the radar's ability to distinguish between targets, and makes it more protected against electronic warfare techniques. Therefore, it is widely used in military applications. As in every radar system, range resolution is an important detail in FMCW radar systems. The modules used in the radar system have an effect on the range resolution separately, as well as the processing of the transmitted and received signals is of great importance. In a FMCW radar system designed within the scope of this study, an environment with more than one target was created to provide the best range resolution, and a modeling and simulation study was carried out to determine the distances, velocities and angular positions of ambiguity multiple targets by processing the transmitted and received signals with CFAR and MUSIC algorithms.

Keywords: FMCW Radar, Radar, Signal

Prediction of Weld Strength in Power Ultrasonic Spot-Welding Process Using Artificial Neural Network (ANN) and Back Propagation method

Ziad Shakeeb Al Sarraf
Department of Mechanical Engineering, Faculty of Engineering, University of Mosul, Mosul, IRAQ

Abstract: In this presented work, the employment of artificial neural network (ANN) connected with back propagation method was performed to predict the strength of joining materials that carried out by using ultrasonic spot welding process. The models which created in this study were investigated and their process parameters were analysed. These parameters were classified and set as input variables like for example applying pressure, time of duration weld and trigger of vibrating amplitude while weld strength of joining dissimilar materials (Al-Cu) is set as output parameters. The identification from the process parameters are obtained using number of experiments and finite element analyses based prediction. The results of actual and numerical are accurate and reliability, however its complexity has significant effect due to sensitive to the condition variation of welding processes. Therefore, the needed for an efficient technique like artificial neural network coupled with back propagation method is required to use the experiments as an input data in simulation of ultrasonic welding process, finding the adequacy of modeling process in prediction of weld strength and to confirm the performance of using mathematical methods. The results of the selecting non linear models show a noticeable potency when using ANN with back propagation method in providing high accuracy compared with other results obtained by conventional models.

Keywords: ultrasonic spot welding process, artificial neural network, back propagation method, process parameters, prediction strength

Impacts of integrating 3D printed promoter to mitigate membrane fouling in the dairy wastewater treatment system

Aws Nawfal Al-Tayawi[1], Nikolett Sz.Gulyás[2], Gréta Gergely[2], Tamás Szabó[3], Cecilia Hodúr[2], Szabolcs Kertész[2*]
1. Faculty of Environmental Science and Technology, University of Mosul - Iraq
2. Faculty of Engineering, University of Szeged - Hungary
3. Faculty of Science and Informatics, University of Szeged - Hungary

Abstract: Due to the rise of the dairy industry in recent years, the amount of dairy wastewater discharged annually is increasing (Ji et al., 2020). In general, dairy wastewater treatment has some issues due to a high level of proteins and lipids, resulting in a change in pH value and high amounts of organic content (Mohebrad et al., 2022). One of the key processing combined methods in dairy wastewater treatment can be membrane technology. However, fouling remains the most stressful issue since it can result decreased flux, lessened rejection performance, and increased energy consumption. One of the newest technology used to mitigate membrane fouling is three-dimensional printing which has become more prevalent in water-related procedures such as wastewater treatment, water purification, and desalination (Ju et al., 2022). Although this field of research is still in its early stages, the use of 3D printing technologies in improving water treatment and desalination technologies remains extremely promising due to the nearly limitless applications in the design and optimization of membrane modules and promoters (Soo et al., 2021). This study aims to reduce membrane fouling using different stirring velocities and the integration of earlier designed and 3D printed promoter into an ultrafiltration dead-end cell. Two mathematical models (Hermia and resistance-in-series model) were studied. According to the modified Hermia model, there are four main fouling mechanisms: complete blocking, standard blocking, intermediate blocking, and cake layer formation (Hermia, 1982). By fitting the experimental data into four models, the prevailing fouling mechanism can be identified. The main fouling mechanism can be confirmed according to the relevant coefficients of determination (R^2) calculating experimental data and larger R^2 values indicated better fitting models. Moreover, specific energy demand, permeate flux, membrane rejection, and membrane reversible and irreversible resistances were calculated and compared.
Keywords: 3D printed promoter, Diary, Ultrafiltration, Promoter, Fouling

Attractive Design Elements of Public Art

Shahad Ali Mahmood and Ahmad Alomari
Architectural Engineering Department Architectural Engineering Department, University of Mosul University of Mosul

Abstract: Public art provides a sense of place and plays a major role in urban environment. Moreover, it attempts to entertain the audience and improve the aesthetics. In the same context, public art emphasizes the significance of displaying art on the site and the degree of harmony and integration with the urban environment. The primary objective of public art is to increase public interest in public space as well as local and cultural identity, which includes the history of the city and the conditions relates to it. This work focused on the assessment of temporary and permanent public art that attracts visual attention, whether in two-dimensional or three-dimensional shape in addition to the invisible public art. Reference points represented by landmarks and sculptures are visually distinct elements with aesthetic values in addition to their ability to leave an immense impact on people's memories and consequently draw the attention. Attention is regarded as one of the most important stages of cognitive perception, in addition to its importance in achieving pleasure of art works. Attention involves concentrating one's emotions on a single stimulating element, in addition to different types of sensory impressions that serve to draw attention. The latter can be visual or it can depend on the occurrence of multiple activities simultaneously in addition to alternating and simultaneous attention. The research problem focused on the presence of artistic works in areas that do not provide an attraction factor in cities, do not draw attention, and are visited by a small number of people. A theoretical and analytical study was carried out in order to extract elements, mechanisms and functional and formal design characteristics, that are used effectively in attracting attention to public art. Several elements were obtained including colour, strangeness of shape, texture, scale, shape with background, sound, movement, and other terms.

The role of the spatial hierarchy in organizing the Indoor common space between the apartments to Enhance Residents' Satisfaction

Aya H. Shukur Al- Khafaf[*,1], Hasan Abdulrazzaq Hasan Al. Sanjary[2]
1. Department of Architecture, College of Engineering, University of Mosul, Iraq.
2- Department of Architecture, College of Engineering, University of Mosul, Iraq.

Abstract: The spatial hierarchy is one of the most important basic concepts that regulate the social aspect of the housing environment through it`s role in organizing the spatial and privacy of the inhabitant. As part of the vertical housing style, which has become a basic pattern to fill the urban residential deficit around the world, this concept can show it`s role at several levels, whether at the level of the apartment, building or in The public open areas between buildings in the residential complex. The research discusses some of the problems of achieving this concept efficiently in the public space between the gates of the building and entrances of the residential apartments. Despite the importance of organizing the hierarchy in this space (especially with the exceptional importance imposed by the social privacy of our local community), the residential achievement of local projects can`t present a number of problems facing the design of this space and negatively affect the resident's satisfaction with his designed environment. This research aims to assess the ability of local projects that are designed to make an efficient spatial hierarchy in these spaces and the extent of its impact on the resident's satisfaction and behavior to adapt or address the design of these spaces in order to make a better environment for the residencias. The research methodology included analyzing the researcher's personal observations on a sample of one of the projects in the city of Mosul, and the results of a questionnaire of the residents' personal opinions to know the degree of their satisfaction with their designed environment. And the research concluded the excises of a number of problems and they were enough to push the residents to make a set of procedures to rearrange these spaces with many forms that are different with a group of social and economic influences for the residents on the one hand, and the nature of the surrounding public spaces of the residential building on the other hand.

Green solid-state Mechanochemical synthesis of silver nanoparticles: and their antimicrobial activities: A Mini Review

Mohammad R. Alrbaihat
Teacher Training Institute, Ministry of Education, Dubai, 3962, United Arab Emirates

Abstract. Nanotechnology is an expanding area of research that we use to deal with the materials in Nano-dimension. The conventional procedures for synthesizing metal nanoparticles need sophisticated and costly instruments or high-priced chemicals. Moreover, the techniques may not be environmentally safe. Therefore "green" technologies like mechanochemistry for the synthesis of nanoparticles are always preferred which are simple, convenient, eco-friendly, and cost-effective. Green synthesis of nanoparticles is a novel way to synthesize nanoparticles by using free-solvent techniques. It is gaining attention due to its cost-effective, eco-friendly, and large-scale production possibilities. Several metallic nanoparticles are highly functional and fascinating nanomaterials for biomedical applications, and silver nanoparticles (AgNPs) are one of them. A variety of synthesis methods for AgNPs were explored in the current work, including mechanochemical, physical, and characterization methods. Furthermore, we discussed the bioeffects of AgNPs and antimicrobials from a molecular perspective, as well as their molecular mechanisms of action. Finally, we conclude by discussing the prospects and possible applications of silver nanoparticles.
Keywords: Mechanochemistry, Silver nanoparticles, Nanoparticles, Nanobiotechnology, solid-state synthesis.

Study of the Effect of Water Content and Frequency Dependence of Electrical Parameters for Homogeneous and Multilayered Soils: Grounding of Oil Tanks

Wejdan Ibrahem and Riyadh Zaki Sabry
Electrical Engineering University of Mosul Mosul, Iraq

Abstract: This paper presents an analysis of the effect of water content and the effect of frequency dependence of soil parameters for the two types of homogeneous and multilayer soils. The research focuses on the grounding of oil tanks in the homogeneous and multi-layered soil structure. The first and subsequent types of lightning strikes were used to predict the frequency dependence effects of the soil electrical parameters. The contributions of this paper are: 1) Consideration of the frequency dependence of soil electrical parameters for both homogeneous and multilayer soil types. 2) Explain the effect of increasing the water content on the resistivity of homogeneous soils. To evaluate the transient behavior of the grounding system. The results showed that the effect of frequency dependence is more evident on the grounding system buried in soils with high resistivity than the grounding system buried in soils with low resistivity, especially when these systems are exposed to the contents of high-frequency lightning. where the effective conductivity increases with increasing frequency; This is due to the distributed relaxation of the interpolarization mechanism. Also, the values of the electrical properties of the soil increase with the increase in water content due to the increase in polarization and conduction phenomena.

A review study of previous research on the reinforced concrete curved box girders

Asala Asaad Dawood[1, a] *, Khattab Saleem Abdul-Razzaq[2, b] and Wael Shawky Abdulsahib[1, c]
1. Civil Engineering, University of Technology, Iraq
2. Civil Engineering, University of Diyala, Iraq

Abstract. The horizontally curved box reinforced concrete girders are considered important nowadays to the extent that they are used in a wide field due to their low cost compared to the load capacity they provide to the torsion moments. The AASHTO and ACI codes give the provisions of curved box bridges regarding dimensions and load application. The current study work includes a set of theoretical, experimental and numerical previous studies with various parameters. In addition to the important dead loads, the box girders are subjected to a range of moving loads which have been highlighted here in terms of vehicle loads, centrifugal, frictional forces and earthquakes. Pre-stress is also commonly used to reinforce concrete box girders against various applied loads, so its effect has been studied and mathematical models have been produced. Through these studies, it was found that the increase in horizontal curvature causes an increase in the torsional moments, shear forces, vertical deflection and flexural moments. Furthermore, the horizontal curvature causes a difference between the inner and outer faces in behavior so that the neutral axis differs between them to be inclined. The distribution factors of moment for the outer and inner girders increase as the bridge span increases, while for the intermediate girders, these distribution factors decrease.

Design and Implementation of a Real-time Health caring System Based on Edge Computing

Omar M. Ali[1] and Ahlam Fadhil Mahmood[2]
1. Department of Electrical Engineering, University of Mosul, Mosul, Iraq
2. Department of Computer Engineering, University of Mosul, Mosul, Iraq

Abstract: The demand for health monitoring systems increases exponentially, especially during periods of epidemics. Because of the exponential growth in the volume of vital sign data that must be communicated across a network, the use of cloud computing in monitoring is accompanied by an increase in latency. The amount of data transported over the Internet is decreased and latency is reduced by sending vital signals to edge computing for processing and monitoring. In this paper, an edge computing-based real-time health status monitoring system is designed. To deliver vital data to the edge server, Bluetooth and Wi-Fi are tested as two different wireless networks. The experimental results showed that the proposed Edge achieves a low cost while operating effectively.

Practical comparisons between the two wireless networks also showed that Bluetooth technology is superior. Whereas Bluetooth needed about 31 Kbps, Wi-Fi needed about 46 Kbps to transmit the same amount of vital data.
Keywords: Edge computing, Health monitoring, Internet of Things, sensors, vital signs, Raspberry Pi 4.

Flexural Behaviour of Reinforced Shotcrete Concrete Beams Containing Waste Plastic Fiber

Amer M. Enad, Yousif A. Mansoor and Abdulkader I. Al-Hadithi
Civil Engineering Department, College of Engineering, University of Anbar, Ramadi, Iraq

Abstract: Wet-mix shotcrete is often used as a placement method in tunnelling and ground support. However, to date, only a limited number of studies have been identified the effects of waste plastic fiber (WPF) on wet-mix shotcrete mixtures. This experimental study show the flexural behaviour of reinforced shotcrete concrete members (beams) containing waste plastic fiber, which may be considered as a new study. In order to achieve that, a manufacturing of wet-mix shotcrete machine has been developed to product special wet-mix shotcrete that will be used to cast reinforced shotcrete concrete members containing waste plastic fiber. Extensive attempts were done in this project to generate a special wet-mix shotcrete combinations using locally sourced waste materials like beverage bottles. The qualities of WPF shotcrete concrete (SC) were investigated in terms of fresh, hardened, mechanical, and bending behaviour, with extensive results analysis. Five SC formulations (0.25, 0.5, 0.75, 1.0, and 1.25) percent WPF content, as well as the control shotcrete (SC0.00), were used in the experimental. In addition, the flexural behaviour of SC beams casted from the same waste materials. The results revealed that all SC beams had almost similar flexural behaviour when compared to the creation of crack patterns, as well as the ductility index and stiffness. The maximum ductility index was 2.29 for SC0.25, while the minimum stiffness was 1.31 for SC 1.25 beam. The flexural resistance of SC beams show in the beams deflection state, the first crack with presence the waste plastic fibers was slight, because of the resistance of plastic fibers to tensile stresses started at a moment of growth the crack.
Key words: Sustainability shotcrete concrete, Shotcrete concrete beam, Flexural failure

Production of 2D and 3D Maps using DGPS and Remote Sensing Techniques

Maha Al-Soudani and Zaid Majid Chaloob
Civil Engineering Department, College of Engineering, Mustansiriyah University, Iraq

Abstract: Maps are the primary tools by which spatial relationships and geographic data are visualized. Maps therefore become important documents. There are several key elements that should be included each time a map is created in order to aid the viewer in understanding the communications of that map and to document the source of the geographic information used. Map production done using different methods comes from representation on paper using pencil and reaches to the modern techniques. This study reports an investigation into the integration of Global Positioning System (GPS), Remote Sensing, AutoCAD Program and Geographic Information System (GIS) tools in producing a digital 2D and 3D maps for the College of Engineering, Mustansiriyah University in Iraq by employing the capabilities of Remote Sensing and GIS techniques. This study is performed in many phases that began to get a spatial map and governmental boundaries for the investigated area that point gathers the required information for the study. The position of points is determined using a Differential GPS (DGPS) then the data is used in Google Earth with the aid of different Programs such as AutoCAD and ArcScene to generate an accurate 2D and 3D maps for the study area. Results of this study show that there is shifting in distance during representing the coordinates of DGPS on Google Earth due to the high accuracy of DGPS compared to the Google Earth.

The role of roofing systems in reducing the cost of construction A comparative study between prefabricated and on-site cast roofing floors

Doaa Sameer Abdullah, Raeed Salim Ahmed Al-Nuamman
Department of Architecture, University of Mosul, college of Engineering, Mosul, Iraq

Abstract - Roofing Floors and floors are an important part of any building in terms of energy conservation, performance and cost. As it is known that the initial stage of construction, which is the stage of building the basic structure of the building, represents the equivalent of about 35-40% of the cost of the building, so it was necessary to study the construction systems that help reduce the cost of this stage, especially the Roofing Floors and floors. Roofing Floors are considered one of the basic structural elements of buildings. The costs spent on these elements during the construction phase represent about 8-11% of the total cost of the project, so it has become necessary to resort to innovative solutions that rationalize these costs. The study aims to explore the least expensive system used in Roofing Floors and floors of buildings by comparing A set of systems for the construction of concrete Roofing Floors and floors common locally, this was done through the modeling of an existing case study according to the construction systems common locally (cast on site, prefabricated construction of various types) and thus limiting the costs achieved for Roofing Floors and floors in order to explore the least expensive system.
Keywords - Roofing system, Construction costs, Affordable Housing, The least expensive.

Review of Microgrid Energy Management Techniques on Virtual Power Plant System

Obed Nelson ONSOMU, Bülent Yeşilata
Kenya, Ankara Yildrim Beyazıt University, Energy Systems Engineering

Abstract: The growing energy supply and demand is slowly changing the nature of power transmission and distribution, and application of virtual power plant (VPP) has already gained traction in countries like Sweden, Germany, and Belgium. The dynamic nature of VPP platform to connect multiple micro-grids within the same geographical location, and to some degree large scale nationwide energy resources, makes it a state-of-the-art technological innovation. The platform has been applied for distributed energy resources (DERs) and dispatchable generation units such as combined heat and power (CHP) to monitor and control energy production and consumption, which also includes the integration of renewable energy sources (RES) into the energy mix of any nation. The control strategy of the VPP platforms is realized through the information communication system (ICT) module, which is under study and research shows there is need for a robust ICT system that can incorporate increasing RES into the grid. The energy management system (EMS) is one of the function modules in the control system of the VPP and can regulate energy stored and discharged from energy storage system (ESS), generally microgrids are known to connect regions far away from the main grid and can operate on islanding mode or on-grid, and they largely facilitate electrification of remote areas as energy production is done onsite. Therefore, in this review control strategies for energy management system are analyzed and compared, e.g., Multi-Agent System (MAS), and Model Predictive Control (MPC), i.e., chance constrained optimization, with the main emphasis being on minimizing costs and facilitating microgrid stability through economical dispatch of energy generational units.
Keywords: virtual power plant, microgrid, photovoltaic, energy management system, multi-agent system, model predictive control, chance constrained optimization.

Effect Of Metal Type on The Reflection Coefficient for Non-Invasive Glucose Sensing in The Millimeter Waveband

Ömer Faruk Göktaş, İlyas Çankaya and Esra Şengün Ermeydan
Ankara Yıldırım Beyazıt University

Abstract: Diabetes Mellitus is a chronic disease that affects more than 400 million people worldwide. There is still no cure for this disease today. Therefore, to minimize the side effects of the disease and to prevent hyperglycemia and hypoglycemia, it is important to determine and monitor the glucose level in blood. Invasive, minimal invasive and non-invasive methods can be used to determine the glucose level in the blood. Although invasive and minimal invasive methods are widely used, well-established and give satisfactory results, they bring infectious and psychological risks and they are not cost-effective solutions. Besides, invasive methods cannot provide continuous monitoring of the blood glucose level and the risks for hyperglycemia and hypoglycemia during sleep cannot be reduced. This situation has led researchers to determine the glucose level in the blood with a non-invasive method. In the search for non-invasive methods, microwave and millimeter wave portion of the electromagnetic spectrum have noteworthy potential since the radiation in this band offer lower energy per photon and less scattering, meaning it can penetrate deeper into tissue to reach areas of adequate blood concentration and provide more accurate glucose monitoring. Complex permeability of blood for millimeter waveband is very sensitive to glucose concentration. In this study, materials such as brass, steel, aluminum and copper were used to re-reflect the signals applied to the glucose solution through the WR-28 adapter. It has been shown that with better reflection coefficient, glucose level can be distinguished more clearly and steel displays better reflection performance compared to other materials. The results can be guiding for the material selection in the antenna design.
Keywords: Millimeter wave, Reflection coefficient, Non-invasive glucose detection, glucose detection, Diabetes

Production planning and loading on CNC machines

Servet Soygüder and Merve Gürcan
Ankara Yıldırım Beyazıt Üniversity, Mühendislik ve Doğa Bilimleri Fakültesi, 06010, Ankara, Türkiye

Abstract: The most important step in a production process is the correct work flow planning. The production planning process is the creation of a plan with steps such as which goods will be produced and how much will be produced, when will be produced, what will be the capacity need, determination of the necessary machines and workforce, and the most appropriate job assignment by bringing the appropriate jobs and personnel to the machines. Today, many companies use various methods for production planning, which we divide into two as long-term planning and short-term planning. In this study, it is aimed to emphasize the importance of production planning and to do business planning correctly. The increasing competitive environment has made it necessary to plan the production correctly, which is the most important place for a company. The study was evaluated by making short-term production planning for Küçükpazarlı Aviation company, which produces machining in the aviation sector in the mainland. The current works and the qualifications of production in the enterprise were determined, and the classical method, Gantt method and Johnson method were tried. Three methods were examined and the Gantt method was chosen as the most suitable scheduling method among the methods. The aim of this study is to ensure timely delivery performance by making the right business plan of the company. The results obtained were compared and analyzed with the current classical situation in the enterprise. As a result, more successful results of the applied Gantt method in production planning than the current classical method were obtained and examined.
Keywords: Scheduling, Production Planning, Workloading

Application of Multi-Criteria Decision-Making Methods in Supplier Selection

Servet Soygüder and Ebru Geçer

Ankara Yıldırım Beyazıt Üniversitesi, Mühendislik ve Doğa Bilimleri Fakültesi, 06010, Ankara, Türkiye

Abstract: The problem of supplier selection is very important in the defense industry, as in all sectors, for companies to carry out their production in a healthy way and to deliver products on time. Since the defense industry is a critical sector that directly concerns the security of the country, fast and safe supply in this sector is directly related to the country's defense. In this study, the selection problem of the suppliers used for the surface processing of the parts of a company operating in the defense industry is discussed. The criteria determined are evaluated by expert decision makers and it is aimed to select the most suitable supplier with Fuzzy AHP and Fuzzy TOPSIS methods.
Keywords: Multi-criteria decision-making, Supplier selection, Fuzzy AHP, Fuzzy TOPSIS.

The effect of changing construction materials on historical building performance in case of restoration - Case study of Al-Nabi Jirjis Mosque in old Mosul city

Faris A. Matloob, Khalid j. Aldeen Ismail and Hafedh Abed Yahya
Architecture Engineering Department, University of Mosul

Abstract: The purpose of the study is to explain the effect of changing existing material on efficiency of sustainability of historical buildings. The most vital factor of sustainability in hot and semi dry climate is thermal efficiency of inner spaces. The conventional building materials which used in historic buildings in old Mosul has high thermal efficiency. In case of restoration of old building, new material could be effect to efficiency of building within the efforts of reconstruction of old Mosul city. Al-Nabi Jrjis mosque was selected as a case study with its conventional building materials and with new contemporary materials. This research adopts ENVImet analysis method. Thermal comfort for an urban context in hot and semi-dry climate zone based on the physiologically equivalent temperature (PET) index, which have been adopted and simulated by ENVI-met program. two simulations were conducted for each case through climatic data of the hottest day in summer and coldest day in winter of 2022-2023. The first case estimates the air temperature in inner and open spaces of Al- Nabi Jrjis mosque with its original materials firstly, then to check the air temperature of the same spaces after changing materials secondly.

Implementation of a Smart Home Based on Internet of Things

Raghad Raied Mahmood
University of Mosul

Abstract: The Internet of Things (IoT) is the latest Internet phase. Communication with things via the Internet is known as the IoT. It includes applications such as smart building (SB), smart city, healthcare, etc. Traditional buildings cannot make decisions in emergencies, also the occupants of the building cannot control and monitor building devices and services remotely. To solve these problems, we propose to design and implementation of IoT based smart building automation system. This smart building (SB) providing many services such as gas leakage/fire alarms and suppression, HVAC, monitoring the temperature and humidity, indoor and outdoor lighting, water management, controlling all the windows and doors of the building, management of energy consumption, and security systems. All of these services can be managed via a smartphone at anytime and anywhere. The graphical user interfaces (GUI) are designed using the RemoteXY software system.
Keywords: Internet of Things, Smart Home, IOT, Smart Building

Using space syntax to analyze the location of the central library A comparative study between designed and cumulative universities

Shaymaa Kh. Abdulqader and Eman Khalid al-moula
Architectural Engineering Department, University of Mosul

Abstract: The research dealt with the study of the location of the central library within the urban structure of universities, due to the importance of the central library, and the fact that it stands on top of other libraries, as well as that it represents the backbone of the university institution. The current research aims to identify the spatial configuration of two types of urban formations for universities, one designed and the other accumulative in design, and its impact on the location of the library, to identify the similarities and differences between the two types. In order to achieve the goal of the research, eight samples from universities of varying spatial and design were selected as a case study for this purpose, and their plans were analyzed and the properties of the space installation were measured for each of them using space syntax analysis.

Impact of sub-rivers feeding the Shatt Al- Arab River on water quality

Zuhal Abdulhadi Hamzah
Civil Engineering, University of Basrah

Abstract: This study's objective was to evaluate the physicochemical characteristics of the Shatt Al-Arab River in the Basra Governorate for irrigation purposes. These characteristics were pH, EC, Total Dissolved Solids, Calcium, Magnesium, Total Suspended Solids, and Nitrate. The Canadian Council of Ministers of the Environment (CCME) Water Quality Index (WQI) was applied to the analytical data of the parameters in order to fulfill the goal and produce a single value that was used to rank the river at each of the sample stations. The findings showed that some parameters studied in the Shatt Al- Arab River increased as it flowed through the study area, which could be primarily attributed to rising wastewater discharges into the river, which have a negative impact on the WQI values for these stations, which range from 41.6 to 44.0. As a result of these analyses, the Shatt Al- Arab River's water quality at the stations Karma Ali and Al-Sindbad is classified as "Poor quality" for irrigation purposes.
Keywords: CCME WQI, Shatt Al-Arab, Water Quality Index, Basra, Iraq.

Production planning and loading on cnc machines cnc tezgâhlarinda üretim planlama ve iş yükleme

Servet Soygüder[1] and Merve Gürcan[2]
1. Ankara Yıldırım Beyazıt Üniversitesi, Mühendislik ve Doğa Bilimleri Fakültesi, 06100, Ankara
2. Ankara Yıldırım Beyazıt Üniversitesi, Fen Bilimleri Enstitüsü, Mühendislik Yönetimi Anabilim Dalı, 06010, Ankara, Türkiye,

Abstract: The most important step in a production process is the correct planning. Production planning process, how much of which goods will be produced, when it will be produced, what results of capacity power, determination of necessary machines and work control, bringing suitable works to machines and customers; is the arrangement of the plan with pictures, such as making the most appropriate job assignment. Today, we distribute many companies as various users for production planning, which we divide into long-term and short-term. This study was carried out to emphasize the importance of production planning and to do business correctly. The increasing competitive environment has made it necessary to plan the production correctly, which is the most important place for a company. The study was evaluated as short-term production operators for Küçükpazarlı Aviation company, which produces machining in the aviation sector in Mainland. The Gantt Method, which is one of the most suitable shaping methods for the current situation, has been applied to determine the dimensions of the existing works and production in the enterprise. The purpose of the article is the timely delivery results of the working companies by making the right business plan. The results obtained were compared with the current situation in the enterprise and analyzed. As a result, this newly applied production planning methodology has been determined and the results have been achieved.
Keywords: Scheduling, Production Planning, Workloading

Application of multi-criteria decision-making methods in supplier selection

Servet soygüder[1] and Ebru geçer[2]
1. Ankara Yıldırım Beyazıt Üniversitesi, Mühendislik ve Doğa Bilimleri Fakültesi, 06100, Ankara, Türkiye
2. Ankara Yıldırım Beyazıt University, Department of Industrial Engineering, 06010 Ankara, Turkiye

Abstract: The problem of supplier selection is very important in the defense industry, as in all sectors, for companies to carry out their production in a healthy way and to deliver products on time. Since the defense industry is a critical sector that directly concerns the security of the country, fast and safe supply in this sector is directly related to the country's defense. In this study, the selection problem of the suppliers used for the surface processing of the parts of a company operating in the defense industry is discussed. The criteria determined are evaluated by expert decision makers and it is aimed to select the most suitable supplier with Fuzzy AHP and Fuzzy TOPSIS methods.
Keywords: Multi-criteria decision-making, Supplier selection, Fuzzy AHP, Fuzzy TOPSIS.

A new framework to increase rest area efficiency for long haul truck drivers

Fatih Ertan and İbrahim Yılmaz
Ankara Yıldırım Beyazıt University, School of Engineering and Natural Sciences, Department of Industrial Engineering, Ankara, Turkey, 06010

Abstract: This research aims to provide a new rest area appointment policy to increase the rest area efficiency regarding to international road transport (AETR) regulations. European agreement concerning the work of crews of vehicles engaged in AETR regulates specific driving and rest times in order to increase road safety by controlling the activity of the drivers, ensure minimum working conditions standards for professional drivers and guarantee fair competition between transport companies. Same or similar driving/rest times are applied for the domestic transport in the contracting parties of AETR as well. In this context, the parking areas on where heavy goods vehicles and busses can take mentioned obligatory daily/weekly rest times and short breaks (max. 45 min.) and have pit stops are playing a key role for road transport. Increasing trade volumes and efficient roadside and company controls of working times induces truck park area demand gradually. In this research, Monte-Carlo simulation model is used to examine parking area usage pattern and elaborated the effect of parking area design in terms of efficiency and cost optimization. Type of parking areas is evaluated as a uniform model, and they serve for both long rest and short break requests. In this study, parking areas are separated into 2 types based on occupancy categories of vehicles by the virtue of the assumption that the capacity requirements, incomes and costs of parking areas would be different for long rests and short breaks. The proposed model of this study will support the decision-making process of investment plans of public authorities and private companies which are interested in truck parking area infrastructure and/or management. Further studies regarding management aspects of the parking areas such as dynamic pricing will also be beneficial and supplementary for this study. The studies on the mentioned issue are generally based on and limited to projections of parking area requirements in a specific region. Efficiency of infrastructure planning is a new approach in this area and public authorities which are about to make investments to fulfil massive demands such as regional or nationwide dimension will have opportunity to decrease their costs with the mentioned approach.
Keywords: Rest area policy, resource allocation, road traffic.

A call center employee scheduling model for improve shift efficiency

Betül Erol and İbrahim Yilmaz
Ankara Yıldırım Beyazıt University, School of Engineering and Natural Sciences, Department of Industrial Engineering, Ankara, Turkey, 06010

Abstract: An optimization approach is provided in this research to solve call center staff scheduling concerns as well as several major issues originating from effective workforce management. The staff scheduling problem in call centers is defined as determining working/non-working days for a specific number of employees and their shift types in working days, considering service level requirements, some labor regulations and preferences. In this study, it is aimed to use the integer programming technique, which is one of the mathematical programming techniques for the optimum shifts and the number of personnel to work in these shifts, and the decision maker tried to reach the most appropriate result. With the work to be done on the shift work system of the personnel in the e-pulse call center, optimum results will be achieved, customer satisfaction will be ensured, and personnel productivity will be increased. The computational experiments will be applied to show the strong performance of the model and highlight the model's capacity to manage system needs as well as to assure work activity continuity. The proposed workforce policy that is based on the proposed workday organization requirements is better to meet shift needs. In addition, this study will help call centers make the right decisions when planning their employees.
Keywords: Service systems, call-center employee scheduling, shift planning.

A new multi-period resource allocation model for healthcare suppliers

Muhammed Onur Karamuk and İbrahim Yilmaz
Ankara Yıldırım Beyazıt University, School of Engineering and Natural Sciences, Department of Industrial Engineering, Ankara, Turkey, 06010

Abstract: Companies have to provide the most suitable product for customers' or firms' demands in the fastest way with the least cost in order to withstand the competition conditions and gain a place in the market. All these factors have encouraged companies to focus on the design and planning of well-organized inventory systems that ensure the right amount of product from the right source is distributed to the right place at the right price. In the multi-period model, a multi-period planning horizon is applied to account for a detailed timing of supplies and production. Many organizations use multi-period planning models that involve optimization to decide things like the best production or investment levels in multiple periods into the future. In this study, it is aimed to solve the multi-period planning problem and calculate the results. This research contains a detailed explanation of a real case situation. The case is about a multi-period problem of a company that manufactures medical equipment through a certain demand involving some variables such as normal time and overtime production amount, labor amount, subcontract amount, backorder amount, and inventory levels. The time period of the case study is defined as six-mounth period. The way of solving the model is trying to clarify by pointing out the variables which have an effect on the solution, the parameters that are considered, and the constraints that turn up in this situation. The proposed model aims to minimize the cost of the company while providing the desired amount to the consumer by applying optimization techniques.
Keywords: Operations research, optimization, multi-period planning, resource allocation

Prediction of Pm 2.5 Concentration Utilizing Univariate Time Series Models

Burcu Devrim- İçtenbaş[1] and Babek Erdebilli[2]
[1.] Department of Industrial Engineering, Faculty of Engineering, Ankara Science University, Ankara 06200, Turkey
[2.] Department of Industrial Engineering, Ankara Yıldırım Beyazıt University, Ankara 06010, Turkey

Abstract: Air pollution is a critical issue to handle immediately since it has significant effect on human life and environment. The aim of this study to forecast the PM 2.5 pollutant for Ankara the capital city of Turkey and the city has had major air quality problems in the past. In this study,the air quality data was used from the Bahçelievler station between January and December 2018. The univaraite time series models namely Auto-Regressive Integrated Moving Average (ARIMA) and Seasonal Auto-

Regressive Integrated Moving Average (SARIMA) employed the prediction PM 2.5 pollutant and the results have compared.

Usability analysis of mHealth application of e-Pulse in Turkey during the pandemic

Çiğdem Sıcakyüz[1], Yavuz Selim Özdemir[1], Ayse Özdemir[2]
[1.] Department of Industrial Engineering, Ankara Science University, 06200 Ankara, Turkey,
[2.] Department of Electrical - Electronics Engineering, Ankara Science University, 06200 Ankara, Turkey,

Abstract: There have been many changes in the processes in the health sector due to technological developments in recent years. In order to increase the satisfaction of patients, especially many steps in the pre-and post-hospital processes of patients have been digitized with the help of mobile health applications. This study aims to investigate the usability of the "e-Pulse" mobile health application, officially used in Turkey during the COVID-19 period. The variables measuring usability were determined as performance and efficiency, usability, ease of use, content and availability, non-interruption, capacity, and the intention of using the application, and they were analyzed. The opinions of 71 users about the mobile health application were obtained through a questionnaire. Multiple regression analysis and Analytical Hierarchy Process were used as the analysis method. As a result of the analysis, several differences were found between the two methods. The difference between the technically experienced decision makers and the opinions of the end users of the application regarding the application will be used to improve the mobile health application and related services.

Multi Response Simulation Optimization Of Fms: A Case Study

Orhan Dengiz[1], Yusuf Tansel Ic[2], Berna Dengiz[2]
1. Department of Industrial Engineering, Nuh Naci Yazgan University, Kayseri-TURKEY
2. Department of Industrial Engineering, Baskent University, Ankara-TURKEY

Abstract: This paper presents multi response simulation optimization (MRSO) with Taguchi integrated Multi Criteria Decision Making (MCDM) to achieve a new system design that will improve the performance of a real Flexible Manufacturing Systems (FMS). Taguchi method, useful way to obtain robust system design by evaluating minimum variance integrated with Multi Criteria Decision Making (MCDM) is used as a MRSO. We consider the Technique for Order Preferences by Similarity to the Ideal Solution (TOPSIS), Grey Relational Analysis (GRA), and Very Large Scale Integration Criteria Optimization and Compromise Solution (Serbian name is Vlse Kriterijumska Optimizacija I Kompromisno Resenje-VIKOR) approaches to combine multiple FMS performance measures affected by qualitative and quantitative factors into a single comprehensive performance measure. The outcomes from each approach are investigated in terms of improved performance metrics such as cycle time (CT), throughput (T), waiting times in queue (WIQ) and investment cost (IC). The aim of this study is twofold. The first is to determine the optimum working conditions of the considered FMS. The second is to provide a map considering all practical challenges to properly design a MRSO processes. A scenario analysis is also demonstrated how the change of the weights of the MCDM methods affects the results. The results reveal that this approach can be taken into account for the optimization of working conditions in complex FMS.

Crime analysis and forecasting using machine learning

Hilal Arslan and Aslınur Doluca Horoz
Department of Computer Engineering, Ankara Yıldırım Beyazıt University, Ankara, Turkey

Abstract: Analyzing and predicting crime with machine learning methods is a very important development for preventing crime. The estimation of the place where the crime may take place is also very useful, especially for police units. Machine learning methods also facilitate crime and crime scene prediction. In this study, crime prediction performances of different machine learning algorithms were compared by analyzing crime data. For this comparison, historical data of different crimes that took place in 2019 in New York state, published by the NYPD, were used. Some of the methods compared are Random Forest, KNN, Naive Bayes, Hoeffding Tree, etc. It has been concluded that machine learning algorithms show different results in predicting crime.

Performance Comparison of FFT based Frequency Estimation by using Interpolation Techniques

Gamze Cabadağ andÖmer Karal
Electrical and Electronics Engineering, Ankara Yıldırım Beyazıt University, Ankara, Turkey

Abstract: Fast Fourier Transform (FFT) is a widely used method in electronic support systems for frequency parameter estimation. If the frequency of the radar signal is not an exact multiple of the frequency resolution, the frequency of this signal will usually appear in an inter-line position when FFT is applied. To improve the accuracy of the estimated frequency, interpolation techniques are used to find the peak between two spectral lines. In this study, the frequency of the radar signal is estimated by employing three different interpolation techniques (Ding, Voglewede and Hanning window based interpolation) to the output obtained by applying N-point FFT to intermadiate frequency (IF) signal. In addition, unlike the literature, the behavior of signals contaminated with Laplace noise as well as Gaussian noise were analyzed with these three techniques and their performances were compared. In order to analyze the effect of the noise on each method more clearly, analysis were made at different signal to noise ratio (SNR) values of the noises and bandwith of the IF signal was changed between 100MHz to 1000MHz. For each frequency, one hundred Monte Carlo simulations were applied. From the analysis results, it was seen that the Ding interpolation technique showed the best performance. The error rates of the estimated frequencies can be sorted from the lowest to the highest as follows: Ding, Voglewede and Hanning window based interpolation.

A Case Study for The Selection of Aluminum Material Suitable for Critical Parts Used in The Field of Aviation

Burak Meriç Hamzaoğlu[1] and Yusuf Tansel İç[2]
1. Airbus Helicopter, 128 Langford Ln, Kidlington, OX5 1QZ
2. Department of Industrial Engineering, Baskent University, 06790, Ankara, Turkey

Abstract: Aluminum parts are widely used in aviation because of the need for lightness. However, in addition to lightness, it is also developed in critically important parts that must have high strength properties. In this case, corrosion resistance, resistance to high temperatures, workability has been investigated. When added in the features, it becomes difficult to choose among many aluminum materials that can be alternatives to each other. In order to overcome this difficulty, the developed model that takes into account many of the features listed above and ultimately recommends to the user the most suitable aluminum material for the relevant critical part will be a useful tool in overcoming the difficulties in this process. A

material selection model will be proposed in this paper for this purpose, and the decision-making model is demonstrated with examples in the field of aviation. The aviation industry is developing rapidly in terms of both commercial aircraft production and military aircraft/helicopter production. This development necessitates the production of these vehicles with better quality and suitable materials, and the effect of competition brings with it the necessity of realizing this situation at the lowest possible cost. Therefore, the development of models that will enable the selection of the most suitable materials among alternative materials, especially in the production of critical parts in the field of aviation, will be a guide for professionals working in this field. For this purpose, the fuzzy TOPSIS method is applied in the paper, and suitable alternatives are determined as a result of ranking the alternative alloys.

Keywords: Aluminum, material selection, mechanical properties, aerospace

Analysis of the Pest Control Processes of Municipalities and Potential Improvement Issues: The Case of Gaziantep Municipality

Dursun Emre EPCİM[1], Umutgül BULUT[1], Zeynep YÜKSEL[1], Süleyman METE[1], Eren ÖZCEYLAN[1], Faruk SERİN[2], Muhammed Yasin AÇIKGÖZ[3]
1. Gaziantep University, Industrial Engineering Department, Gaziantep 27310, Türkiye
2. Mersin University, Computer Engineering Department, Mersin 33343, Türkiye
3. Gaziantep Municipality, Pest Control and Spraying Services Department, Gaziantep 27090, Türkiye

Abstract: Pest control is the regulation or management of a species defined as a pest; any animal, plant or fungus that impact adversely on human activities or environment. The most common method of pest control is the use of pesticides - chemicals that either kill pests or inhibit their development. The pest control and management process in Türkiye is carried out by the municipalities. Although the municipalities are clearly aware of the need and willing to use environment friendly, alternative pest management approaches to protect biodiversity, public health and to ensure occupational safety; there is still room (e.g. routing of vehicles, scheduling of staff, chemical inventory and mix control, vehicle and staff tracking, balanced determination of chemical spraying zones) for productivity improvement needs to be addressed. In this paper, the pest control process of Gaziantep Municipality is considered and detailed analyzed. The weaknesses and potential improvement issues are determined and discussed. Finally, some suggestions from the viewpoints of operations research and industrial engineering are provided.

Keywords: Pest control process, Gaziantep Municipality, Challenges, Productivity, Process improvement.

Overall Survival Prediction of NSCLC using Radiomics and Machine Learning Methods

Muhammed Selman EREL, Hilal ARSLAN
Ankara Yildirim Beyazit University

Abstract: Cancer is one of the most fatal diseases. Millions of people all around the world die due to this illness as a result of abnormal cell growth. Billions of dollars are spent to cure and analyze it. Non-small cell lung cancer (NSCLC) is the most diagnosed type of lung cancer, which is a trending type of cancer. Accurate prognostic strategies are important for treating cancer patients. By this aim, radiomics is used to diagnose and prognose the disease in a non-invasive, budget-friendly, smart and fast way. In this study, 2-year survival prediction of NSCLC is performed by using radiomics and machine learning methods. Lung CT-scan images belonging to 422 patients retrieved from TCIA public DICOM archive are processed to detect meaningful features using open-source radiomics feature extractor, PyRadiomics. For classification step, K-Nearest Neighbor and Support Vector Machines classifier methods are utilized with 10-fold cross validation. To achieve the best performance, the hyperparameters of machine learning methods are tuned using grid search method. Experimental results present that the KNN is achieved the best performance with an AUC score of 0.8163, an accuracy of 0.80, a recall of 0.78 and an F-measure of 0.78.

Keywords: Cancer, NSCLC, Radiomics, KNN, SVM, PyRadiomics

Review on five phase PMSM drive performing optimal control in EV

Laith Omar Maheemed Alsabaawi
National Engineers' School, University of Monastir, Tunisia

Abstract: The future of electric drives will include multiphase electric motors working in tandem with power semiconductor converters. Multi-phase electric machines are more popular and highly recommended for transportation applications due to the growing need for dependability and high efficiency of electric cars. For the purpose of EV (Electric Vehicle) applications, this research examines the evaluation of five-phase permanent magnet synchronous machines. Studies on the likelihood of system failure must take a unique approach due to the importance placed on reliability in electric propulsion systems. Installation of resilient designs, such as fault-tolerant motor drives, is an integral part of improving the propulsion system. Specifically for use in electric vehicles (EVs), this research presents a five-phase permanent magnet synchronous motor (FPPMSM).

Keywords: Five-phase Permanent Magnet synchronous Motor, electric vehicle.

The elements of tourist attraction of the ancient Nineveh

Ahmed Alomary and Yasmin Abdulrhman
Architectural Engineering Department, University of Mosul

Abstract: Ancient city of Nineveh is one of the most famous cities of the ancient world and the third Assyrian capital, mentioned in the Testament and the Holy Quran and reported by historians and Arab countrie , which motivated experts and interested European archeaologists and others to take an interest in the of Nineveh and its remains. Based on biographical sources and physical evidence, the ruins of Nineveh are located on the eastern side of the Tigris river in front of the ancient city of Mosul that has an area of (8,325) square kilometers, which is equal to three thousand dunams, surrounded by a straight-sided wall close to the trapezoid and distributed along the wall from its four sides by eighteen main gates. The city includes the hills known as the hill (the Prophet yunis), upon which peace is made, and the hill (Quianjaq) as it embraces the interior of these two ruins of the royal palaces and Assyrian temples and other villas. The city also includes the important cultural and architectural features" Sennacherib" Palace, the palace of Asarhaddon, the palace of Ashurbanipal and temples, including the festival of Assyria and Ishtar Wadad, Shamash, and Naboo, as well as Assurbanipal library, which is also one of the largest in the ancient world, were dedicated to the preservation of documents and the fold number, which included all science and knowledge. As a city of this particular geography, its historical and cultural status makes it necessary to revive its tangible and intangible heritage by investing its archaeological sites and making them attractive to tourists from all over the world.

Smart assistive system prototype for blind challenged persons

Hamed A. Mahmood, Mohammad Tarik Mohammad, Akram T. Saeed, Mohammad M. Abbas
Computer Engineering, University of Mosul

Abstract: Many people experience visual losses, so those who are blind or visually impaired struggle to move around in a variety of environments, according to statistics from the World Health Organization (WHO). Many of the assistive technologies has made it possible for people who are blind to move, but lot of these schemes are require users to buy extra equipment, which is burdensome for visually impaired users. In this research, a prototype was designed in the form of smart devices such as: gloves, shoes and a hat to help the blind person. The idea of this system to act as an artificial vision unit by warning. This system was low-cost, efficient, high-

accuracy, low-error rate, and capable of detecting a wide range of ambient obstacles. And because the Corona virus still lives among us and poses a danger to everyone, including the visually impaired, another improvement has been added that guarantees health protection for them and solves the problem of social distancing to maintain a distance of 2 meters or more during their movement between people infected with the Corona virus. The social distancing alarm alerts the blind person and display warning messages for the surrounding people. Its use has shown high accuracy and promising results.

Review of High RF Power Amplifier for 5G Applications

Khalid Khalil Mohamed and Marwah Ezzulddin Merza Al-abasy
Department of Electrical Engineering, University of Mosul

Abstract: One of the most important circuits in any wireless communications transmitter circuit is the power amplifier. The 5G base station requires power amplifiers with high output powers, excellent efficiency, and high gain. A review on 5G sub-6 GHz base station power amplifier is offered in this paper. This study examined reviewed power amplifier high electron mobility transistor (HEMT) semiconductor technology based on gallium nitride (GaN). The researchers claim that the highest choice for offering high power in the output, high back-off power, and high efficiency is gallium nitride (GaN HEMT)-based PA. This study will evaluate Doherty power amplifiers (DPAs) based on class J.

Assessment Drivers' Sop/Go decision during Yellow Indication at signalized intersections

Bushra Fahad Jasim Ghlayan
University of Karbala

Abstract: At high-speed intersection approaches, there is a zone known as the yellow light (Amber) dilemma zone where vehicles cannot safely stop before the stop line and cannot cross the intersection during the amber period. A vehicle may be involved in a right-angle collision or a rear-end collision in such a place. The main motive of this study, we examine the behaviour of drivers while the traffic light is yellow and evaluate. The data gathered over a five-day period in the holy Karbala, Iraq using cameras positioned at two intersections: the Al-Dhareeba intersection and the Saif Saad intersection. The SPSS statistical tool was used to analyse the data. binary logistic regression model represents the driver's behaviours throughout the yellow time were investigated. found to be significantly influenced by the vehicle type, which is a feature of mixed traffic conditions, as well as by vehicle speed, distance to the stop line, and length of the yellow signal. According to the results of the current study at the intersection of Saif Saad, the significant (0.65, 0.23, 0.01, 0.27) findings for the speed, headway, time to stop line, and classification of vehicle intersection were, respectively, while results Al-Dhareeba intersection had (0.001,0.06,0.00, and 0.97) respectively. The results of this study will help Karbala city's traffic planners and decision-makers make the best decisions feasible when dealing with yellow light (Amber), while also assuring performance efficiency and safety at signalized intersections.

Influence Parameters Identification on Early Age Creep of High Strength Concrete using Artificial Neural Networks (ANNs)

Lana A. Abdulateef and Salim T. Yousif
Nawroz University, College of Engineering

Abstract: The early creep of concrete is affected by several factors, including the compressive strength of concrete and concrete mixing ratios. In this research, the data of the early creep of high-strength concrete will be collected from literature, the artificial neural network technic will be used to find out the most factors affecting the early creep of high-strength concrete.

Dynamic Routing Problem for Electrical Vehicles to Minimize Trip Distance

Makbule Hilal Özay, Yaren Nur Aktürk, Babek Erdebilli
Department of Industrial Engineering, Ankara Yildirim Beyazit University

Abstract: The demand for using vehicles for transportation is rising along with the population density. The main effects of this condition on the environment are an increase in CO2 emissions. Additionally, the amount of oil in our world's reservoirs is running out every day, which drives up the cost of fuel. Electric cars are a result of technology being developed as a response to the material and environmental problems encountered. The Ankara region was chosen for the research study, and the goal of the study is to reduce travel distance and to develop mathematical models using dynamic programming while taking into account the limitations of the demands of the present. Due to the restricted resources, we have, the research makes use of the Dijkstra shortest path method, linear programming, and complex integer programming to get the most accurate results. The adaptability of these models to the requirements guarantees the sustainability and extensibility of the project's subject matter.
Keywords: Electrical Vehicles, Routing Optimization, Dynamic Programming, Travel Distance, Complex Integer Programming, Linear Programming, Dijkstra

The Effect of Semi-Conductor Analogue Electronic Technology on The Development of Other Science Areas

Remzi Yildirim, Abdurrahman Hazer and Abubekir Alqutar
Ankara Yıldırım Beyazıt University

Abstract: In this study, a brief analysis of the semiconductor era, the development of science and technology, made of semiconductor germanium, silicon and other materials was made. It is seen that analog electronics, which is used as a basic technology, contributes greatly to the development of other fields of science. In other technologies developed depending on this basic area, the pyramid structure is given according to the signal processing techniques and the order of development. Design techniques have been added to this pyramid depending on the signs used by the systems. The designs of the systems are generally determined according to the signal processing techniques, and the processes for modeling, simulation and standard production are also determined. In this, system design techniques, signal processing techniques, testing, durability and stages until the production stage are defined together.
Keywords: Semiconductor, Diode, Transistor, Chip, Technology

The Role of Oxygen Vacancies in Non-oxidative Propane Dehydrogenation

Gokhan Celik and Asmae Bouziani
Department of Chemical Engineering, Middle East Technical University, 06800 Ankara, Turkey
Corresponding Author: Gokhan Celik

Abstract: Propene is a versatile compound in the petrochemical industry, serving as a building block for the production of a wide variety of chemicals. Conventionally, propene is produced as a by-product during fluid catalytic cracking (FCC) and steam cracking (SC) of oil fractions. However, the supply-demand gap of propene produced from these processes and their economic/environmental limitations have led to alternative greener propene production routes such as nonoxidative propane dehydrogenation (PDH). The PDH technology has been commercialized and applied on a wide scale where alumina-supported chromia or platinum catalysts are used. However, the toxicity of chromia and the high cost of platinum has surged interest in the use of low-cost and environmentally benign catalysts. Bulk metal oxides such as zirconia, titania, and alumina are the quintessence of such materials and have shown promising results for non-oxidative propane dehydrogenation. Over these materials, coordinatively unsaturated cations located near oxygen vacancies(defects) are demonstrated to be the active sites for C-H activation. Studies of using metal oxides with high concentration of oxygen mobility have been performed in literature to demonstrate the redox

mechanism for alkane dehydrogenation. In fact, the oxygen mobility was improved by addition of cationic metals to metal oxides or perovskite materials. Motivated from these studies, we performed the incorporating of anions including chloride, phosphide, and fluoride to metal oxides such as ZrO_2 and TiO_2 during the sol-gel synthesis. These samples exhibited remarkable propylene selectivity (higher than 99% at 550 °C), significantly higher than precious-metal free catalysts (~70%) and higher than Pt-based commercial catalysts (~85%). While the activity enhancement over the ZrO_2 and TiO_2 by anion incorporation was similar, the characterization results showed that anion incorporation cause distinct characteristic changes. For instance, Cl-treatment of TiO_2 enhanced the oxygen mobility significantly without any chloride entering to the matrix of TiO_2. Cl-treatment of ZrO_2, on the other hand, did not change the oxygen mobility significantly while Cl was doped to ZrO_2, as confirmed by laser Raman spectroscopy and XRD. Incorporation of anions also affected textural, electronic, and chemical properties. The new details of dehydrogenation chemistry our work is revealing using such materials provide the kind of fundamental understanding that will lead to the rational improvement of precious metal free catalysts for hydrocarbon processing reactions.

Keywords: Oxygen vacancy, metal oxides, catalysts, propylene, characterization

Solidification-controlled patterning of multicomponent colloidal particles

M. Ulusel, O. Dinçer, O. Şahin, S. Çınar-Aygün
Metallurgical and Materials Engineering, Middle East Technical University, 06800 Ankara, Turkey
Corresponding Author: Simge Çınar-Aygün

Abstract: Anisotropic particles are attractive as functional materials due to their asymmetric response to external stimuli. This property enables applications such as such as sensors, surfactants, micromotors and building blocks of supramolecular structures. Most production methods for such particles involve coatings, including physical vapor deposition and chemical vapor deposition. While the surface structure of the particles can be precisely controlled, these methods result in core-shell particles with low yield. Here we show that it is possible to produce such particles with a top-down scalable approach by controlling the solidification characteristics of bismuth-tin particles produced from an alloy at eutectic composition. While solidification is a stochastic event for bulk materials, it is possible to control the phenomena by isolation and control of its catalysts in the particle form. Size effects are not as prominent in sub-micron particles compared to nano materials, so principles of bulk solidification can be applied in this controlled environment to predictand modify solidification behavior. Simple heat treatments can be utilized to produce such particles in the gram scale, enabling applications previously hindered by the challenge of production. With this approach, we demonstrated the synthesis of lamellar, composite, Janus and stripe particles. The novel properties of resulting particles will also be discussed in this presentation.

Keywords: BiSn, Janus particles, solidification of particles, liquid metals

Coated Bio-Based Polymers

Alina Marguta, Justina-Georgiana Motas, Simona-Nicoleta Mazurchevici, Dumitru Nedelcu
"Gheorghe Asachi" Technical University of Iasi, Blvd. Mangeron No. 59A, 700050, Iasi, Romania

Abstract: Bio-polymers are materials where at least part of the polymer consists of material from renewable raw materials, having a smaller CO_2 footprint and being associated with the property of sustainability. The current global conditions fully justify worldwide research to find new bio polymers or even biodegradable materials. Take into account the above important aspects, the purpose of this paper consists in a deeply study of coated Arboblend V2 Nature with ceramic particles and nano silver particles. Using injection moulding technology were obtained the samples and atmospheric plasma spray method and SPRAYWIZARD 9MCE facility in order to get the coated material. At the very beginning three

intermediate layers of Ni 78W 14Mn 6Al 2, Ni 55W 26Cr 13F 6, W 49Ni 44Cr 6Mn 1 and a final ceramic layer of aluminum oxide (Al_2O_3) were deposited. Afterwards the research going to directly coating of Arboblend V2 Nature with ceramic particles using Amdry 6420 (Cr2O3), Metco 143 (ZrO2 18TiO2 10Y2O3) and Metco 136F (Cr2O3-xSiO2)-yTiO2) ceramic micro powders. During the second part some experimental results will be presented about the coating of Arboblend V2 Nature granules by silver nano particles using PVD process and obtaining the parts through the injection moulding. The main results will be focus on DSC, TG, DTG, DTA, SEM, EDX, XRD analyzes. Also, the scratch and microindentation tests will be presen ted. The final conclusions can appreciate the fact that the coated bio-polymers with micro ceramic powders can be used in harsh operating conditions such as the automotive industry and the bio-polymers coated with silver nano particles can be successfully used in food industry because a good antibacterian properties obtained.

Keywords: bio-polymers, injection moulding, ceramic layer, silver nano-particles.

Functional Biomaterials and Biofabrication Strategies for Tissue Engineering

Murugan Ramalingam
Dankook University, Cheonan 31116, South Korea.
Chengdu University, Chengdu 610106, China.

Abstract: Advances in tissue engineering and regenerative medicine over the past decades have led to significant changes in clinical treatment modalities, and currently, there is a drive toward precision or personalized medical interventions. However, the continued efforts to translate tissue engineering strategies into clinical treatments have been hampered by several factors. The significant challenges faced by tissue engineers while engineering human-size tissues/organs include the induction of vasculature within a tissue-engineered construct. The vasculature plays an important role in the development of physiologically-functional tissues/organs by providing essential oxygen and nutrient supplies. Engineering the right microenvironment specific to cell/tissue impart the pre-vasculature in vitro. In addition, living tissues possess inherent multi-cellular heterogeneous structures, and recreating such complex tissue systems often requires subtle arrangements of different cell types, including stem cells, and biomaterials. All these are prerequisites for engineering 3D complex tissues and organs, and challenges still remain. However, recent advances in the development of biomaterials/bioinks, biofabrication technologies, and 3D cell culture methods hold great promise for addressing current limitations and advancing the research from lab to clinical translation. In this talk, a variety of technological approaches for engineering biomaterials and cells at different length scales, from macro to micro to nano, suitable for building tissue and organ structures will be discussed, along with their translational perspectives.

Electrochemical Nitridation of Yttria-Stabilized Zirconia (YSZ) to Produce Nitride Conducting Electrolytes

Onur Öztürk[1], Büşra Eryıldırım[1,2], Doruk Doğu[1,3]
[1]Atılım University, Department of Metallurgical and Materials Engineering, Ankara, Turkey
[2]Gazi University, Department of Chemical Engineering, Ankara, Turkey
[3]Atılım University, Metal Forming Center of Excellence, Ankara, Turkey
Corresponding author: Doruk Doğu

Abstract: Ammonia, one of the most produced chemical products in the world, is used in many areas from energy to cleaning. Today ammonia is produced using the Haber-Bosch process. In this process, which requires high temperature (450-500 °C) and pressure (200-250 bar), H2 and N2 gases are reacted over Fe-based catalysts to produce ammonia [1]. Researchers are looking for alternative ammonia production methods due to problems associated with the Haber-Bosch process such as high temperature and pressure requirement, high-energy consumption, thermodynamic limitations, environmental impact, and non-scalability. Electrocatalytic ammonia production is a promising alternative that

eliminates high-pressure requirement, increases energy efficiency, and simplify reactor design. Current research on electrocatalytic ammonia production focuses on oxide and proton-conducting electrolytes. In both methods, ammonia production takes place on the cathode side through the reaction between nitrogen molecules (N2) and hydrogen ions (H+). However, due to strong N-N triple bonds, hydrogen ions often recombine to produce H2 without reacting with nitrogen leading to low ammonia selectivity [2]. As an alternative, if nitride conducting electrolytes are used, nitrogen is ionized at the cathode and carried to the anode as N-3 ions where it meets with hydrogen. This can highly increase ammonia selectivity by reducing hydrogen recombination. In this study, 8% YSZ, which is an electrolyte commonly used in solid oxide fuel cells (SOFC), was preferred as the main electrolyte material due to its high stability, low electronic conductivity under operating conditions, and can become nitride conducting when nitrided. 8% YSZ was electrochemically nitrided and nitrogen content at the anode outlet was analyzed with the aid of a mass spectrometer.

Keywords: Ammonia, Electrocatalysis, Solid Oxide Electrolyte, Yttria-Stabilized Zirconia (YSZ)

Solidification-controlled patterning of multicomponent colloidal particles

M. Ulusel, O. Dinçer, O. Şahin, S. Çınar-Aygün
Metallurgical and Materials Engineering, Middle East Technical University, 06800 Ankara, Turkey

Abstract: Anisotropic particles are attractive as functional materials due to their asymmetric response to external stimuli. This property enables applications such as such as sensors, surfactants, micromotors and building blocks of supramolecular structures. Most production methods for such particles involve coatings, including physical vapor deposition and chemical vapor deposition. While the surface structure of the particles can be precisely controlled, these methods result in core-shell particles with low yield. Here we show that it is possible to produce such particles with a top-down scalable approach by controlling the solidification characteristics of bismuth-tin particles produced from an alloy at eutectic composition. While solidification is a stochastic event for bulk materials, it is possible to control the phenomena by isolation and control of its catalysts in the particle form. Size effects are not as prominent in sub-micron particles compared to nano materials, so principles of bulk solidification can be applied in this controlled environment to predictand modify solidification behavior. Simple heat treatments can be utilized to produce such particles in the gram scale, enabling applications previously hindered by the challenge of production. With this approach, we demonstrated the synthesis of lamellar, composite, Janus and stripe particles. The novel properties of resulting particles will also be discussed in this presentation.

Keywords: BiSn, Janus particles, solidification of particles, liquid metals

Nonlinear Model Predictive Controller for Omnidirectional Mobile Robot Trajectory Tracking

Mohammed Qasim, Omar y. Ismael and Mohanad n. Noaman
Electronics engineering college, Ninevah University, Mosul, Iraq

Abstract: Omnidirectional (holonomic) robot platforms have a superior performance in tracking complex trajectories over non-holonomic (conventional) vehicles. The designing of control laws that make the robot track predefined reference trajectories based on the trajectory error can solve the trajectory tracking for an omnidirectional mobile robot. Complex nonlinear terms and significant uncertainties of omnidirectional robots dynamics are drawbacks that this type of approach suffers from. To solve this issue, this paper proposes a Nonlinear Model Predictive Control (NMPC) to track the trajectory of an omnidirectional mobile robot. The proposed NMPC is implemented in MATLAB using the CasADi toolbox in which the direct multiple-shooting method is used to discretize the associated Optimal Control Problem (OCP). The simulation is performed

using the CoppeliaSim robot simulator in conjunction with MATLAB to implement the tracking of predefined reference trajectories to verify and validate the applicability of the proposed controller. Simulation results show that the designed controller can track the predefined reference trajectory, and the performance was satisfactory.

Study of the Effect of Water Content and Frequency Dependence of Electrical Parameters for Homogeneous and Multilayered Soils: Grounding of Oil Tanks

Wejdan Ibrahem and Riyadh Zaki Sabry
Electrical Engineering, University of Mosul, Mosul, Iraq

Abstract: This paper presents an analysis of the effect of water content and the effect of frequency dependence of soil parameters for the two types of homogeneous and multilayer soils. The research focuses on the grounding of oil tanks in the homogeneous and multi-layered soil structure. The first and subsequent types of lightning strikes were used to predict the frequency dependence effects of the soil electrical parameters. The contributions of this paper are: 1) Consideration of the frequency dependence of soil electrical parameters for both homogeneous and multilayer soil types. 2) Explain the effect of increasing the water content on the resistivity of homogeneous soils. To evaluate the transient behavior of the grounding system. The results showed that the effect of frequency dependence is more evident on the grounding system buried in soils with high resistivity than the grounding system buried in soils with low resistivity, especially when these systems are exposed to the contents of high-frequency lightning. where the effective conductivity increases with increasing frequency; This is due to the distributed relaxation of the interpolarization mechanism. Also, the values of the electrical properties of the soil increase with the increase in water content due to the increase in polarization and conduction phenomena.

Multi-Frequency Low Power Low Density Parity Check Encoder Using Dynamic Voltage and Frequency Scaling Approach

Noora Nazar[1], Qusay Al-Doori[1] and Omar Alani[2]
1. University of Technology, Baghdad, Iraq
2. University of Salford Manchester, Salford, UK

Abstract: In terms of correction efficiency, Low Density Parity Check (LDPC) codes are widely regarded as one of the best error correction coding (ECC) methods. They have been utilized in numerous modern data transmission standards, where the codecs are frequently built within specialized integrated circuits (ICs). Nowadays, market-driven vital requirements and technological limitations to forced researchers to create new model methods and strategies to meet the power requirements for Complementary Metal-Oxide-Semiconductor CMOS circuits. Furthermore, power requirements for CMOS circuits with a wide frequency range are a critical issue for future communication generations that many researchers have overlooked. As a result, this paper focuses on a multi-frequency power reduction strategy for LDPC encoders, by using a well-known power reduction method known as Dynamic Voltage and Frequency Scaling (DVFS) which is one of the most powerful power reduction strategies in CMOS circuits. The suggested system employs a fuzzy logic controller combined with the DVFS to control and select the optimal voltage that reaches the encoder to reduce total power consumption. This combination achieves substantial power reduction with a wide frequency range while having no effect on LDPC efficiency, flexibility, or performance.

Keywords: low-density parity checks code (LDPC), forward error correction codes (FEC), power reduction in CMOS circuits, dynamic voltage and frequency scaling (DVFS), fuzzy logic controller.

Adaptive PID control for 8/6 switched reluctance motor drive based on BFO

Muhammed A Ibrahim[1,2] and Ahmed Nasser B. Alsammak[2]
1. Ninevah University
2. University of Mosul

Abstract: The switched reluctance motor has been increasing importance both at the scholar and industrial levels. Its most suitable characteristics are the non-use of rare earth materials and the low manufacture charge. But one of the disadvantages for SRMs is difficult to control its responses, as a result of their nonlinear magnetization characteristics. This paper achieves a control solution adaptive PID control-based bacteria foraging optimization (BFO). This method selects benefit of BFO to adjust the three factors of the PID controller. With the intended method, satisfying response of the rotor speed stable operation has been achieved by simulink validation.

Keywords: Switched reluctance motor (SRM) , Speed control , PID Controllers , Optimization.

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