



INTERNATIONAL CONFERENCE ON ADVANCED SCIENCE AND ENGINEERING

October 9 -11, 2018

BOOK OF ABSTRACTS & PROGRAM BOOK

THE CONFERENCE IS JOINTLY ORGANIZED BY
THE UNIVERSITY OF ZAKHO AND DUHOK
POLYTECHNIC UNIVERSITY, AND TECHNICALLY
SPONSORED BY IEEE



IEEE
iraq section



Welcome Messages

Welcome to ICOASE 2018

Welcome to the International Conference on Advanced Science and Engineering 2018 (ICOASE2018). The conference is technically sponsored by IEEE which is represented by IEEE Iraq Section.

The conference is jointly organized by the University of Zakho and Duhok Polytechnic University.

The Conference is the premier forum for presenting the new results of advanced topics in science, engineering, and their applications. The aim of the conference is to bring together leading academic, scholars and students, in order to discuss theoretical and practical issues through sharing their experiences and research results. Its focus is to create and distribute knowledge about the use of scientific and engineering applications.

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Welcome Message from Honorary Chairman



I would like to express my gratitude to all of you for joining us at the International Conference on Advanced Science and Engineering 2018 (ICOASE 2018). To our guests who have come from other universities, I welcome you to our conference, we indeed honored to have you here with us.

In an increasingly globalized world, there is a critical need to develop and recommendations for promoting level, but beyond universities and research centers, it is equally important that the businessmen and the leaders of public and private sectors are committed to the best practices in research guidelines integrity in research at an international. Thus, I am confident that this conference will allow researchers, industry players, academicians and decision makers share their experiences and knowledge to generate innovative research with the use of modern technologies efficiently and provide solutions to various issues of governance.

In addition, I encourage everyone to engage in fruitful discussions with each other and trying to establish scientific collaboration between our universities and institutions

I would like to thank the scientific and the organizing committees, and everyone involved in this event for their unlimited efforts, especially our partner organizations and companies that have contributed to the ICOASE2018

Finally, I wish you a successful conference, fruitful discussion, and I hope you will spend a pleasant time in Duhok and Zakho, and enjoy the pleasant atmosphere of Kurdistan.

Asst. Prof. Dr. Lazgin A. Jamil
President,
University of Zakho

Welcome Message from Honorary Chairman



It is my pleasure to welcome you all in Duhok, I do appreciate your attendance and participation in our conference, The International Conference on Advanced Science and Engineering, that will introduce new scientific conclusions on the worldwide hot-topic scientific issues related to science and engineering. Thanks for being part of this scientific event. I'd like to extend my thanks to all people who helped in organizing this conference and our friends and colleagues from Kurdistan Region and other parts of Iraq.

Universities have always been a source of innovation and development in societies, this conference was organized through a collaboration among Duhok Polytechnic University, University of Zakho, and IEEE Iraq section. We worked together as one team and we will try to elaborate this collaboration even more in the near future. Our universities are in so much need for such partnership among academic institutions, we are open for collaboration with other universities for the sake of advancement in education, industry, technology and any other sector that could benefit the humanity.

It is worth mentioning that although this conference was in its first edition, we received submissions from different worldwide countries that made our conference an international event. I am pretty sure that you will benefit from the scientific discussions that will take place during the technical sessions, and hopefully you all will utilize this opportunity.

Finally, I would like to thank all of you once again for being part of this conference. I wish you enjoy your stay in Duhok and Zakho cities and I hope you will have a fruitful scientific meetings and discussions during this conference.

Prof. Dr. Adnan Mohsin Abdulazeez
President,
Duhok Polytechnic University

Welcome Message from the Chair of ICOASE2018



First of all, I would like to thank the staff members of University of Zakho and Duhok Polytechnic University for their excellent support and cooperation on this event. This international conference is the first of its kind held in Duhok Province which is technically sponsored by IEEE Iraq Section (Institute of Electrical and Electronics Engineers).

The target of this event is to provide a platform for researchers, scientists, and software developers to meet and discuss on the new research and development and trends in science and engineering. The conference has attracted many professionals and researchers from universities, research centres, research institutions, and government agencies around the globe. A highly ranked papers were accepted in the conference and will be submitted to the IEEE Xplore digital library (indexed by Scopus) for publication.

The main idea of this conference is to become a starting point to establish a series of conferences and involve members especially scientists and researchers to work together within the umbrella of ICOASE community. My dream is to establish ICOASE society and make it a worldwide society of professionals from research, applications and industry sectors.

Finally, I would like to acknowledge and highly appreciate international scientific committee members, local organizing committee members, exhibitors, and other individuals for their great contributions.

Asst. Prof. Dr. Yaseen T. Mustafa
Chair ICOASE 2018,
IEEE Iraq Section, Member
Vice President for Scientific & Postgraduate Affairs,
University of Zakho

Welcome Message from the Chair of ICOASE2018



Welcome to the International Conference on Advanced Science and Engineering 2018 (ICOASE2018) which is sponsored technically by IEEE. We appreciate your attendance in this conference. ICOASE2018 is an annual conference organized by both: Duhok Polytechnic University and University and Zakho. This conference aims to promote the development of new methodologies, algorithms and applications related to the representation of advanced science and engineering. ICOASE2018 provided a great opportunity to the researchers from all over the world to get involved and publish their work with the IEEE Conference Proceedings. It is my hope, that this conference will benefit all participants and will promote research to open new gate of collaboration.

I would like to thank IEEE Iraq branch and all contributors of the conference including all authors, organizing committee, editorial review board members, session chairs, all presenters, our financial sponsors for making ICOASE2018 an excellent conference. It is our pleasure and honor to host all of you in Duhok and Zakho, and I cordially wish that this conference would be fruitful for all of you.

Asst. Prof Dr. Eng. Subhi R. M. Zeebaree
Chair ICOASE 2018,
IEEE Iraq Section, Member
Duhok Polytechnic University

Welcome Message from IEEE Iraq Section



It is my pleasure to be a part of this scientific event and be one of the stones who tries to raise the scientific level in the whole Iraq. We are, as IEEE Iraq section, confident that such technical sponsoring of international conferences will provide good opportunities to the researchers, industry players, and decision makers to share their experiences and knowledge. Ultimately, will provide suitable solutions to various issues which need a good scientific cooperation among the different

research disciplines.

This conference was organized through a collaboration among three parties: University of Zakho, Duhok Polytechnic University, and IEEE Iraq Section, as the scientific sponsorship of this event is authorized by the IEEE Organization. These three parties worked hard to gain good scientific outputs which will inform the world that Iraq has a good scientific mind, and capable to produce such excellent scientific outputs.

Finally, we would like to thank the scientific and organizing committees, and everyone involved in this event, especially authors, for their unlimited efforts. We also would like to take the advantage of the opportunity to express my gratitude to all national and international reviewers. Without their scientific supports, such scientific event would not be achieved.

Prof. Dr. Sattar B. Sadkhan
Representative,
IEEE Iraq Section

Welcome Message from Secretariat of ICOASE2018



It was a difficult task for me to be a secretariat of the conference. However, I am extremely happy to get reach to this point and having such a nice conference output. Therefore, I take the advantage of this opportunity to thank the University of Zakho, Duhok Polytechnic University, and IEEE Iraq section for this trust. I would like to thank all the participants (authors, reviewers, and attendees) for their patient since announcing the conference till

today.

Finally, it is my pleasure to welcome all of you in this scientific event and get to know each other.

Dr. Karwan Jacksi
Secretariat,
IEEE Iraq Section, Member
University of Zakho

Conference Date and Venue

Conference date and time

The conference date is October, 9th-11th, 2018.

Venue

The first day of the conference will be held at conference hall in Duhok City at 8:30 am.

The 2nd and 3rd days of the conference will be held at the University of Zakho, Faculty of Science halls, Zakho City at 8:30 am.

Maps

Locations of the first day of the conference



Conference hall in Duhok City



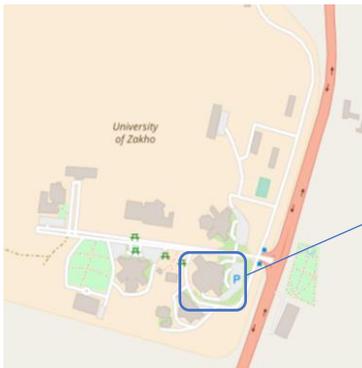
Technical sessions in DPU



Duhok

City Map

Location of the second and third days of the conference



University of Zakho



Faculty of Science

Hotels

JAMAL, Hotel & Rest.

Address:

Saleh Yousifi Str. – Zakho, Kurdistan Region of Iraq

Contacts:

Mobile (Hotel): +964-750-4572832, +964-750-4324905

<http://bot.gov.krd/hotel/jamal-hotel>

Jotyar Hotel

Address:

Azadi hospital St., Duhok, Kurdistan Region of Iraq

Contacts:

Email: jotyarhotel@yahoo.com

Mobile: +9647504061005, Landline: +964627632005

<http://bot.gov.krd/hotel/jotyar-hotel>

Jiyan Hotel

Address:

Jiyan Road, No:9/1000 AD Duhok – Kurdistan Region of Iraq

Contacts:

Mobile: +964 (0)750 442 7711, Email: jiyan.hotel@hotmail.com

<http://bot.gov.krd/hotel/jiyan-duhok-hotel>

Parwar Hotel

Address:

Duhok- Barzan St. 25– Kurdistan Region of Iraq

Contacts:

Mobile: +964 (0)750 878 2424, +964 (0)770 033 2424

Email: hotel@yahoo.com

Website: <http://bot.gov.krd/hotel/parwar-hotel>

Conference Program

Program at a glance

Day 1

Opening Ceremony

Time	Duhok - Conference Hall
08:30 am-04:30 pm	Registration
10:00 am-10:05 am	Opening Ceremony
10:05 am-10:15 am	President Speech (University of Zakho)
10:15 am-10:25 am	President Speech (Duhok Polytechnic University)
10:25 am-10:40 am	MHE-KRG Speech
10:40 am-10:50 am	Conference Chair Speech
10:50 am-11:20 am	IEEE Representative Speech
11:20 am-12:00 am	Keynote Speaker (Prof. Idris H. Salih)
12:00 pm-12:30 pm	Photo Session
12:30 pm-02:30 pm	Lunch

Technical Sessions

Time	DPU - Hall 1	DPU - Hall 2	DPU - Hall 3
03:00 pm-04:30 pm	Session 01	Session 02	Session 03

Day 2

Technical Sessions

Time	UoZ Hall 1	UoZ Hall 2	UoZ Hall 3	UoZ Hall 4
09:00 am 10:30 am	Session 01	Session 02	Session 03	Session 04
10:30 am 11:00 am	Coffee Break			
11:00 am 12:30 pm	Session 05	Session 06	Session 07	Session 08
12:30 pm 02:00 pm	Lunch			
02:00 pm 03:30 pm	Session 09	Session 10	Session 11	Session 12
03:30 pm 04:00 pm	Coffee Break			
04:00 pm 05:10 pm	Session 13	Session 14	Session 15	Session 16

Workshops

Time	UoZ - Chemistry Hall	UoZ - Hall 5
09:00 am 10:30 am	Workshop Session 01	Workshop Session 02
10:30 am 11:00 am	Coffee Break	
11:00 am 12:30 pm	Workshop Session 01	Workshop Session 03
12:30 pm 02:00 pm	Lunch	
02:00 pm 03:30 pm		Workshop Session 04
03:30 pm 04:00 pm	Coffee Break	
04:00 pm 05:10 pm		Workshop Session 04

Day 3

Technical Sessions

Time	UoZ Hall 1	UoZ Hall 2	UoZ Hall 3	UoZ Hall 4	UoZ Hall 5
09:00 am 11:10 am	<i>Session 01</i>	<i>Session 02</i>	<i>Session 03</i>	<i>Session 04</i>	<i>Session 05</i>
11:10 am 11:30 pm	<i>Coffee Break</i>				

Closing Ceremony

Time	Conference Hall – Faculty of Science
11:30 am-12:00 pm	<i>Closing Ceremony</i>
12:00 pm-12:10 pm	<i>Best 3 Students' Paper Awards</i>
12:10 pm-12:20 pm	<i>Best 2 Reviewers' Awards</i>
12:20 pm-12:30 pm	<i>Thanks & Appreciations Awards to Sponsors</i>
12:30 pm-01:00 pm	<i>Conference Conclusion</i>
01:00 pm-03:00 pm	<i>Lunch</i>
03:00 pm-06:00 pm	<i>A Trip to Historical Places</i>

Technical Sessions

Tuesday, October 9

Tuesday, October 9 (3:00 pm - 4:30 pm)

Session 01

Room: Duhok Polytechnic University - Hall 1

Chairs: Nawzat Ahmed, Ari Shawkat Tahir Almahmada

3:00 Design and Evaluation of a Course Recommender System Using Content-Based Approach

Ammar Neamah and Amer Saleem Elameer

3:20 A new dimensional reduction based on Cuttlefish algorithm for human cancer gene expression

Yousif Arshak and Adel Eesa

3:40 Implementation of LRU Replacement Policy for Reconfigurable Cache Memory Using FPGA

Safaa Omran and Ibrahim Amory

4:00 Developed NSGA-II to Solve Multi Objective Optimization Models in WSNs

Saad Talib Hasson, Aljebori and Hayder Ayad Khudhair

4:20 Certificates

Session 02

Room: Duhok Polytechnic University - Hall 2

Chairs: Shavan K. Askar, Musaab Sultan

3:00 Analysis and Simulation of LTE Downlink: EPA and ETU model

Mohammed kadhim Shaybeth, Salman Goli and Amer Saleem Elameer

3:20 Fast QR Decomposition based on FPGA

Safaa Omran and Ahmed K. Abdul-abbas

3:40 Microstrip Array Antenna Design with Directivity Enhancement using Reflector Surface

Ahmed Jameel Abdulqader and Yaser Ali

4:00 Orientation Effect of n-Type PSi on Integrated Interdigitated Electrode EGFET pH Sensor Performance

Akram Radhi and Ghusoon Ali

4:20 Certificates

Session 03

Room: Duhok Polytechnic University - Hall 3

Chairs: Maiwan Bahjat Abdulrazzaq, Haval Sadeeq

- 3:00 A Modified Table Lookup Substitution Method for hiding data in DNA**
Haval Ismael Hussein and Wafaa Abuduallah
- 3:20 Image Steganography Based on Least Significant Bit (LSB) and 4-Dimensional Lu and Liu Chaotic System**
Jinan Shehab and Hussein A. Abdulkadhim
- 3:40 A New Initial Authentication Scheme For Kerberos 5 Based On Biometric Data And Virtual Password**
Alaa Farhan and Hakeem Mhaibes
- 4:00 PAC-RMPN: Password Authentication Code based RMPN**
Salah Rfesh
- 4:20 Certificates**

Wednesday, October 10

Wednesday, October 10 (9:00 am - 10:30 am)

Session 01

Room: University of Zakho - Hall 1

Chairs: Adel Eesa, Abdurraheem Ahmed

- 9:00 Design and implementation of Wireless Controllers for Oil Tank using Internet of Things Techniques**
Ali Abbas Abbod, Ashwaq Hameed and Amer Saleem Elameer
- 9:20 Real-Time Face Tracking and Recognition System Using KLT and 2DPCA**
Nawaf Barnouti, Mohanad Hazim Nsaif and Sinan Al-Dabbagh
- 9:40 Hardware Implementation of Firefly Optimization Algorithm Using FPGAs**
Haval_Sadeeq and Adnan Brifcani
- 10:00 GPU Accelerated Rotation about an Arbitrary Axis**
Sura Nawfal and Fakhruldeen Ali
- 10:20 Certificates**

Session 02

Room: University of Zakho - Hall 2

Chairs: Firas Mahmood Mustafa, Naji Majedkan

- 9:00 RMS Delay Spread and Path Loss Dependency for Mobile Outdoor UWB Channels**
Yasser Zahedi and Razali Ngah

9:20 Geostationary and Nongeostationary Earth-Satellite Telecommunication System Elevation Angle Effect*Riyadh Ahmed and Huda Hamd***9:40 Design and Implementation Prepaid Energy Meter Supported by RFID and GSM Technologies***Eyad I. Abbas, Mohammed Safi and Mustafa Jaber***10:00 Certificates****Session 03****Room: University of Zakho - Hall 3*****Chairs: Nawzat Ahmed, Mohammad Abdulwahab*****9:00 Dynamic Hand Gesture Recognition System for Kurdish Sign Language Using Two Lines of Features***Mayyadah Mahmood, Adnan Brifcani and Zeynep Orman***9:20 Comparative study between different rectangle iris templates***Safaa Omran and Aqeel Al-Hilali***9:40 Time Sharing based Parallel Implementation of CNN on Low Cost FPGA***Shefa Dawwd and Basil Shukir***10:00 Certificates****Session 04****Room: University of Zakho - Hall 4*****Chairs: Salah Naman, Nidhal Mohammed*****9:00 Development a QSAR Model of 1,3,4-triazole derivatives for antioxidant activity prediction***Salim Saber, Hikmat Mohamad and Madzlan Aziz***9:20 Photocatalytic degradation of Toluidine Blue Dye in Aqueous Solution using Zinc Oxide as a Photocatalyst Under Fluorescent Light***Hayder Salim, Shinwar Idrees, Reving Rashid, Ibraheem Mohammed, Sherwan Simo and Idrees Khalo***9:40 Optimization of Congo-red photo-catalytic degradation by Central Composite Design***Shinwar Idrees and Myasar Ibrahim***10:00 Flow- Injection Spectrophotometric Determination of Calcium Using PAN as a Color Agent***Lazgin Jamil and Sameer Rahim***10:20 Certificates****Wednesday, October 10 (11:00 am - 12:30 pm)**

Session 05

Room: University of Zakho - Hall 1

Chairs: Idrees Sarhan Hussein, Iman Baqir

11:00 An Optimization approach for Waste Collection routes based on GIS in Hillah City
Saad Talib Hasson, Aljebori and Zainab Adnan Jwad

11:20 Contrast Enhancement for Visible-Infrared Image using Image Fusion and Sharpen Filters
Nada Jasim Habeeb, Salman Omran and Dahir Radih

11:40 Small Footprint Mix-Column Serial for PHOTON and LED Lightweight Cryptography
Yasir Amer Abbas, Razali Jidin, Norziana Jamil, Mohammad Reza Z'aba and Saad Al-Azawi

12:00 Wavelet Denoising Based on Genetic Algorithm
Majd Matti and Ahmed Al-Sulaifanie

12:20 Certificates

Session 06

Room: Zakho - Hall 2

Chairs: Mohammed Ahmed Shakir, Somaye Mohamadi

11:00 Microwave Power Absorption Evaluation Of micro-particles CuO Filler Reinforced Epoxy Composites
Raad Thaher and Heba Hadi Ali

11:20 Maintain Load Balancing in Wireless Sensor Networks using Virtual Grid Based Routing Algorithm
Husam Kareem and Hadi Jameel Hadi

11:40 An Experimental Study of Real-Time Voice over Wireless Sensor Network (VoWSN) Platform
Ina'am Fathi, Qutaiba Ibrahim Ali and Jassim M. Abdul-Jabbar

12:00 Comparative Study of Channel Coding Schemes for 5G
Abdulkareem Abdulrahman Kadhim and Walled Khalid Abdulwahab

12:20 Certificates

Session 07

Room: University of Zakho - Hall 3

Chairs: Yasser Ahmed Fadhel, Abdullah Abdullah

11:00 Performance Evaluation of Parallel Particle Swarm Optimization for Multicore Environment*Eman Abdulah, Ibrahim Saleh and Omar Al Saif***11:20 A Study on Implementation of Cloud Computing Technology using Data Mining Algorithms***Aljwhrh Almtrf and Mohamed Zohdy***11:40 A Novel Approach for Occluded Ear Recognition Based on Shape Context***Rizhin Othman, Fattah Alizadeh and Alistair Sutherland***12:00 Pattern formation for a new model of Reaction-diffusion system***Shaker Rasheed***12:20 Certificates****Session 08****Room:** University of Zakho - Hall 4**Chairs:** Maher Ali, Alya Dawood**11:00 Evaluation of Environmental Risk Index for Heavy Metals in Pollution of Some Babylon Governorate Soils***Abbas AL-Wotaify, Noor Al-Silmawy and Luay Chfat***11:20 Standard potential of the silver-silver chloride electrode in X% ethylene glycol - water mixtures at different temperatures***Soleen Ahmed and Lazgin Jamil***11:40 Application n-d-M Method to Investigate the Carbon distribution & Structural Group Composition of Different Kurdistan Crude Oils***Sherwan Simo, Salah Naman and Kanaan Ahmed***12:00 Mechanism and thermodynamic parameters of Paternò-Büchi reaction of benzene and furan***Hayder Salim, Hassan Abdallah and P Ramasami***12:20 Certificates**

Wednesday, October 10 (2:00 pm - 3:30 pm)

Session 09

Room: University of Zakho - Hall 1

Chairs: Subhi Zeebaree, Shereen Ahmed

2:00 Impact of Alamouti Space - Time Block Coding on The Performance of V2V Communication

Ahmad Baheej Al-Khalil and Alyaa AL-Barrak

2:20 Multi-Robot Path Planning based on MAX-MIN Ant Colony Optimization and D* Algorithms

Ali Al-Najar and Akmam Mosa

2:40 Modeling the Healthcare Services in Hilla Emergency Department

Rafal Yasen and Saad Talib Hasson, Aljebori

3:00 Performance of BCH and RS codes in MIMO system using MPFEC Diversity Technique

Alyaa AL-Barrak and Ahmad Baheej Al-Khalil

3:20 Certificates

Session 10

Room: University of Zakho - Hall 2

Chairs: Ramadhan Zaidky, Faris Yousif

2:00 Estimation and Mapping of Dates Palm Using Landsat-8 Images: A Case Study in Baghdad City

Muntadher Aidi Shareef, Sumaya Hasan and Qayssar Ajaj

2:20 Mapping Environmental Sounds Using Google Map (Acoustic Maps)

Hanan Taher

2:40 Estimating and Mapping Aboveground Biomass of natural Quercus Aegilops using WorldView-3 imagery

Mohammed Obeyed, Yaseen T. Mustafa and Zeki Akrawee

3:00 Spatio-Temporal Estimation of Water Surface Area in Duhok Governorate, Kurdistan Region, Iraq

Jian Hassanpour, Yaseen T. Mustafa and Hendaf Habeeb

3:20 Certificates

Session 11

Room: University of Zakho - Hall 3

Chairs: Shavan K. Askar, Wathiq Ali

- 2:00 An ICI Reduction based on PAPR Clipping in Coherent Optical OFDM System**
Leqaa Abdul Sattar, Ghaida AL-Suhail, Sinan Majid Abdul Satar, Mohammed Husien and Ali Noore Kareem
- 2:20 Performance Analysis of Native IPv4/IPv6 Networks Compared to 6to4 Tunneling Mechanism**
Mohammed Sardar Ali and Tara Ali Yahiya
- 2:40 Cost Minimization of GPS-GSM Based Vehicle Tracking System**
Fatima Nadhim Ameen, Ziad Mohammed and Abdulrahman Ikram Siddiq
- 3:00 Artifact Paths Removal Algorithm for Ultrawideband Channels**
Yasser Zahedi and Razali Ngah
- 3:20 Certificates**

Session 12

Room: University of Zakho - Hall 4

Chairs: Maiwan Bahjat Abdulrazzaq, Sarbast Ali

- 2:00 Speech Scrambling Based on Arnold-Lucas Mapping**
Nidaa Abdual Muhsin Abbas and Zena Al Hadad
- 2:20 A Proposed Evaluation method for Bluetooth E0 Security based on Fuzzy Logic**
Sameer Alibadi and Sattar B. Sadkhan
- 2:40 A DNA-Sticker Algorithm for Cryptanalysis LFSRs and NLFSRs Based Stream Cipher**
Sattar B. Sadkhan and Basim S. Yaseen
- 3:00 Distributed Cloud Computing and Distributed Parallel Computing: A Review**
Zryan Rashid, Subhi Zeebaree, Karzan Sharif and Karwan Jacksi
- 3:20 Certificates**

Wednesday, October 10 (4:00 pm- 5:10 pm)

Session 13

Room: University of Zakho - Hall 1

Chairs: Ismael Ali, Mohammed Mohammed Sadeeq

- 4:00 Simulation of Nanoscale Optical Signed Digit Addition Based on DNA-Strands**
Alaa Al-Saffar and Qabeela Qassim

4:20 Collaborative Remote Laboratories for Serving Sciences and Engineering Education in Iraq: REXNet Project
Sazwan Mohmed Salah, Joe Cecil and Diler Atrushi

4:40 Video streaming processing using fog computing
Saba_Hassan and Rana Ghani Al-Tuma

5:00 Certificates

Session 14

Room: University of Zakho - Hall 2

Chairs: Mudhafer Selman, Sheimaa Mohammed

4:00 Institutional Framework Sustainable Transportation for Iraq
Saad Fawzi Alnuaimi, Nabil T. Ismael and Areej Abdulwahab

4:20 Planning and Design of Highways According to AASHTO Standards Using Remote Sensing Technology
Ali Abed, Yaha

4:40 Creating a Bathymetric contour map of small earth dams in Duhok governorate: a comparative study
Farsat Abdulrahman

5:00 Certificates

Session 15

Room: University of Zakho - Hall 3

Chairs: Shamil Talal, Hussein Salim

4:00 Characterization of black nickel solar absorber coatings on brass substrates
Kamil Yousif and Sayran Abdulgafar

4:20 Hybrid Design of Solar Collector, similar to a dish pickup (LNB), for Sterilization and Water Heating by Solar and Electrical Energy
Rusul Salim

4:40 Determination of the influence forces affecting the surface layers of the rotating magnetic Neutron stars
Sundus Abdullah, Zena Kadhim and Hareth Mahdi

5:00 Certificates

Session 16

Room: University of Zakho - Hall 4

*Chairs: Karwan Jacksi, Noor Kakos***4:00 A Proposed security Evaluator for Cryptosystem based on Information Theory and Triangular Game***Sattar B. Sadkhan and Dhilal M. Reda***4:20 Multi-Level of DNA Encryption Technique Based on DNA Arithmetic and Biological Operations***Dilovan Zebari, Habibollah Haron, Subhi Zeebaree and Diyar Saleem***4:40 Fuzzy Logic for Performance Analysis of AES and Lightweight AES***Sattar B. Sadkhan and Akbal Omran***5:00 Certificates****Thursday, October 11**

Thursday, October 11 (9:00 am - 10:50 am)

Session 01

Room: University of Zakho - Hall 1

*Chairs: Lokman Hassan, Masoud Muhammed Hassan***9:00 Convolutional Neural Networks Based for Gene Selection and Classification of Microarray Data***Adnan Brifcani, Diyar Zeebaree and Habibollah Haron***9:20 Live Monitoring System for Detecting Emotions of Autistic Children***Tamara Z. Fadhil and Ali R. Mandeel***9:40 Impact Analysis of HTTP and SYN Flood DDoS Attacks on Apache 2 and IIS 10.0 Web Servers***Rizgar Zebari, Subhi Zeebaree and Karwan Jacksi***10:00 Internet of Things Security A Survey***Mohammed Mohammed Sadeeq, Subhi Zeebaree, Riyadh Qashi, Sarkar Ahmed and Karwan Jacksi***10:20 Design and Implementation of a Wireless Robotic Human Hand Motion-controlled Using Arduino***Zeyad Karam, Aymen M. Al-Kadhimi and Elaf Saeed***10:40 Certificates**

Session 02

Room: University of Zakho - Hall 2

*Chairs: Adel Eesa, Jwan Saeed***9:00 Clarify of the Random Forest Algorithm in an Educational Field**

Nawzat Ahmed and Mohammed Sadiq

9:20 Gait-Based Human Gender Classification using Lifting 53 Wavelet and Principal Component Analysis

Omer Hassan, Adnan Brifceni and Volkan Müjdat Tiryaki

9:40 An Investigation of Pixel-Based and Object-Based Image Classification In Remote Sensing

Mohammed Chachan Younis, Edward Keedwell and Dragan Savic

10:00 SCPK: Enhancing SSL against HTTPS Man-in-the-Middle Sniffing AttackMohammed Abdulridha Hussain, Zaid Alaa Hussien, Zaid Ameen
Abduljabbar, Sarah A. Subber and Mustafa A. Al-sibahee**10:20 Certificates****Session 03**

Room: University of Zakho - Hall 3

*Chairs: Ibrahim Abdulqadir, Omar Ali***9:00 Investigation Study of the Factors That Affecting in Frictional Welding of Similar Metals**

Nabel Kadum Abd Ali and Ahmed Madeh

9:20 Dissimilar Welding of AISI 309 Stainless Steel to AISI 1020 Carbon Steel Using Arc Stud Welding

Muhaed Alali, Mohammed H. Abass, Salman H. Omran, Adnan Abood and Ehab Abbas

9:40 Effects of Different Biodiesel on Diesel-Engine Performance and Emissions

Karam Hashim Mohammed, Omar Rafae Alomar and Rafie Rushdy Mohammed

10:00 Heat Flux in Friction Clutch with Time Dependent Torque and Angular Velocity

Jenan Sherza, Ihsan Y. Hussain and Oday Abdullah

10:20 Graph-Based Efficiency Analysis of Simpson Gear Train

Essam Esmail, Al-Tamimi, Hamed Hussien and Tamather Najji Ali

10:40 Certificates**Session 04**

Room: University of Zakho - Hall 4

Chairs: Ezideen Hasso, Firas S. Mohammed

- 9:00 Low Frequency Filters Design Based on Frequency Depend Negative Resistance (FDNR)**
Faris Hassan Taha and Noor Thamer
- 9:20 Impact of Inverter-Fed Power Supply on Copper and Iron Losses of a Three-Phase Induction Motor**
Amer Ali and Ahmed Abdul Saheb
- 9:40 Tunable Plasmonic Resonances Below Schottky diode Band-gap Based on Elliptical Nanoantennas**
Abdalem Rasheed, Khalil Hassan Sayidmarie, Prof and Khalid Mohammed
- 10:00 Simple Environmental Treatments for Heat Transfer of Building Ceilings**
Narmeen AL-Hamawendi
- 10:20 Semi Cylindrical Non-Tactile Capacitive Sensor: equipotential contour and Electrical Field Analysis**
Ezideen Hasso and Lokman Abdulkareem
- 10:40 Certificates**

Thursday, October 11 (9:00 am - 11:10 am)

Session 05

Room: University of Zakho - Hall 5

Chairs: Saad Mana'a, Fadhil Easif, Hariwan Zikri Ibrahim

- 9:00 Convergence theorems of a finite-step iteration algorithm under two finite families of total asymptotically quasi-nonexpansive maps**
Salwa Abed and Zahra Mohamed
- 9:20 Bayesian Sensitivity Analysis to Quantifying Uncertainty in a Dendroclimatology Model**
Masoud Muhammed Hassan
- 9:40 A Novel Numerical Approach of Time Fornberg-Whitham Equation Using Residual Power Series Method**
Majeed A. Yousif and Bewar Mahmood
- 10:00 Construction and Nullity of Some Classes of Smith Graphs**
Gohdar Hashem Mohiaddin and Khidir Sharaf
- 10:20 On Soft Bench Points**
Fatima Saleem Awadh and Luayhh Al-swidi
- 10:40 Soft Separation Axioms on Fuzzifying Soft Topological Spaces**
Ramadhan Hajani
- 11:00 Certificates**

Workshop Sessions

Wednesday, October 10

Wednesday, October 10 (9:00 am - 12:30 pm)

Nanostructures Preparation

Dr. Ahmed Fattah Abdulrahman, University of Zakho, Department of Physics

Room: University of Zakho – Chemistry Hall

Nanostructure covers the major concepts and fundamentals of nanoscience and nanotechnology confirming characteristics, properties and applications of numerous nanostructures. Nanostructures is the significant source of reference for early-career researchers, practicing materials scientists and engineers seeking a focused overview of the science of nanostructures, systems of nanostructured, and their industrial implementations. Also the nanostructures refer to structures or materials that have at least one dimension falling in nanometer scale between 1 and 100 nm. The different sub-fields of nanotechnology focus on the fabrication (synthesis), characterization, and application of nanostructures. Clearly, there are two approaches to preparation or fabrication of the nanostructures which are bottom-up and top down. In addition to wide effort in the nanostructures fabrication, the present research and development of nanostructure are focused on the investigation of fundamental properties of materials such as, optical, electrical, and mechanical properties at the scale of Nano, and the development of novel implementations in broad domain of engineering fields. The goals of this workshop are to provide the excellent opportunity to present latest topics (Nanomaterials) and inexpensive methods or techniques of nanostructures fabrication (preparation) such as seed layer preparation and nanostructures growth with their implementations related to the field of nanoelectronic (optoelectronics) devices with discussion the key aspects of them.

Theme and Topics

- Introduction to Nanotechnology and Nanostructures.
- Characterization of Nanostructures (Microscopy & Spectroscopy)
- Seed Layer Preparation.
- Nanostructures Growth (MCBD).
- Nanostructures Growth (Microwaves Assistant CBD).
- Applications of Nanostructures.
- Nanostructures Growth Laboratory Demonstration.

List of Presentations and Speakers

- (Introduction to Nanotechnology and Nanostructures), Asst. Prof. Dr. Azeez Abdullah Barzinjy, Salahaddin University, Department of Physics,
- (Characterization of Nanostructures (Microscopy & Spectroscopy), Asst. Prof. Dr. Sabah Mohammed Ahmed, University of Duhok, Department of Physics,
- (Seed Layer Preparation), Asst. Prof. Dr. Samir Mustafa Hamad, Soran University, Department of Physics.
- (Growth of Nanostructures Part 1 (MCBD)), Dr. Ahmed Fattah Abdulrahman, University of Zakho, Department of Physics,
- (Growth of Nanostructures Part 2 (Microwaves Assistant)), Dr. Amin Kalo Qasim, University of Zakho, Department of Chemistry,
- (Applications of Nanostructures), Dr. Hussein Ismael Salim, University of Zakho, Department of Physics,

Schedule

- 08:30 – 09:00, Registration
- 09:00 – 09:10, Opening the Workshop & Welcoming Speeches
- 09:10 – 09:25, First Presentation
- 09:25 – 09:40, Second Presentation
- 09:40 – 09:55, Third Presentation
- 09:55 – 10:05, Coffee & Tea Break
- 10:05 – 10:20, Fourth Presentation
- 10:20 – 10:35, Fifth Presentation
- 10:35 – 10:50, Sixth Presentation
- 10:50 – 11:50, Nanostructures Growth Lab. Demonstration (Laboratory Demonstration)
- 11:50 – 12:00, End Notes
- 12:00 – 12:30, Certificates & Closing the Workshop

Wednesday, October 10 (9:00 am - 10:30 am)

Internet of Things

Dr. Sattar B. Sadkhan
Mr. Sarkar Hasan Ahmed

Mr. Mohammed Abdulrazaq
Mr. Saleem Ibraheem

Room: Zakho - Hall 5

Internet of Things (IoT) is a huge number of objects they communicate over a network or the Internet. These objects are a combination of electronics, sensors,

and a software to control the way of working other parts of the object. Each object generates and collects data from its environment using sensors and transfer to other objects or a central database through a channel. Keeping this generated data and its transformation is one of the biggest challenges in IoT today and it is one of the biggest concerns of all organizations that they use IoT technology. In this workshop, we will start by introducing Internet of Things, then we will give some examples of IoT such as Smart Home, and finally we will talk about IoT Security and Challenges. IoT Security ranges from the software layer security, board and chip, vulnerable cryptography algorithm, protocol and network security, social engineering, malware like (viruses, ransomware, trojan horses). As there are a variety of IoT devices and the rapid emergence of new devices, it is difficult to measure the security of IoT systems and identify risks and vulnerabilities.

Theme and Topics:

- Introduction to IoT
- Smart Home as an application of IoT
- IoT Security and challenges

List of Presentations and Speakers:

- (Introduction to the Internet of Things), Presented by Mohammed Abdulrazaq, Duhok Polytechnic University, Department of Computer Science
- (Smart Home as an application of IoT), Saleem Ibraheem, Duhok Polytechnic University, Department of Computer Science
- (IoT Security and Challenges), Sarkar Hasan Ahmed, Sulaimani Polytechnic University, Computer Science Institute

Schedule

- 08:30 – 09:00, Registration
- 09:00 – 09:10, Opening the Workshop & Welcoming Speeches
- 09:10 – 09:35, First Presentation
- 09:35 – 10:00, Second Presentation
- 10:00 – 10:30, Third Presentation

Wednesday, October 10 (11:00 am - 12:30 pm)

Partial Shading of Solar Panel

Dr. Ezideen A Hasso

Mr. Swar A Zubeer

Room: Zakho - Hall 5

Partial shading of photo voltaic panels can highly degrade their performances and paralyse them from producing any significant energy. In extreme cases, a permanent damage can be inflicted on the system that can lead to out of service situation. In this workshop, a faulty system is analysed from electrical circuit point of view by using photo voltaic cells equivalent circuit. At the same time the problem is modeled on MATLAB simscape and the results are compared with theoretically obtained ones.

Theme and Topics

- Introduction to Solar Energy in Kurdistan (Mr. Swar Zubeer)
- Effect of Partial Shading Problem of Solar Panel (Mr. Swar Zubeer)
- Circuit Analysis of Partial Shading (Dr. Ezideen Hasso)
- MATLAB Simulation (Dr. Ezideen Hasso)
- Remedy (Dr. Ezideen Hasso)

Schedule

- 10:30 – 11:00, Registration
- 11:00 – 11:10, Opening the Workshop & Welcoming Speeches
- 11:10 – 11:35, First Presentation
- 11:35 – 12:10, Second Presentation
- 12:10 – 12:20, End Notes
- 12:20 – 12:30, Certificates & Closing the Workshop

Wednesday, October 10 (02:00 pm - 05:00 pm)

Machine Learning and Mathematical Inference

Dr. Adel Sabri Essa, University of Zakho, Computer Science Department

Room: Zakho - Hall 5

Machine Learning (ML) algorithms have provided successful methods to obtain prediction models and algorithms from large databases. Methods such as neural networks, Bayes Naive and support vector machines have produced a big deal of empirical success at different disciplines. Understanding ML algorithms preliminary depend on understanding the mathematical methods

and statistical inference used to build such algorithms. The intention of this workshop is to bring together Computer Scientists, Statisticians and Mathematicians working at the field of Machine Learning and formalized statistical theory. We hope this workshop can provide a forum for researchers to help them in applying new mathematical learning techniques to solve problems in their disciplines.

Theme and Topics

- Mathematics of Machine Learning.
- Machine Learning Algorithms (Neural Networks & Naive Bayes).
- Learning Theory (Bayesian Approaches).

List of Presentations and Speakers:

- (Mathematics of Machine Learning), Dr. Masoud Muhammed Hassan, University of Zakho, Computer Science Department
- (Machine Learning Algorithms: Neural Networks & Naive Bayes), Dr. Maiwan Bahjat, University of Zakho, Computer Science Department,
- (Learning Theory: Bayesian Approaches). Dr. Adel Sabri Essa, University of Zakho, Computer science Department.

Workshop Schedule

- 13:30 – 14:00, Registration
- 14:00 – 14:10, Main Introduction
- 14:10 – 14:50, First Presentation
- 14:50 – 15:00, break
- 15:00 – 15:45, Second Presentation
- 15:45 – 16:00, Coffee Break
- 16:00 – 16:45, Third Presentation
- 16:45 – 17:00, General Discussion

Abstracts

Computer and Information Technology

Paper ID: 1570449471

Design and Evaluation of a Course Recommender System Using Content-Based Approach

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Abstract

Finding a user relevant information among huge number of data that are available in web is a difficult process. Therefore, an information filtering technique is needed to help the users to find their desired contents. Recommender system is the most famous technique which is used nowadays in many websites to support the suggestions making process. This paper will explain how to design a course recommender system by using KNN and Naïve Bayes classification algorithms, and evaluate their performances. The proposed recommender system follows content-based approach, by building a user profile (model), based on his/her prior knowledge and actions like, enrolling and rating courses, and compare it with courses attributes to generate recommended courses.

Keywords— Recommender system; Course recommender system; Content Based; Classification; KNN; Naïve Bayes

Comparative Study Between Different Rectangle Iris Templates

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Abstract

The iris recognition is the best biometric method that used today for distinguish between users. The iris recognition system is providing to distinguish between human based on unique features located inside irises. Ridge-Energy-Direction (RED) algorithm is used for extracting iris features from the rectangle iris template. This research presents comparative between four different ways of choosing iris region of human or identifications and tries to locate the best way among them. These ways are tested on two different databases (CASIA V1 and CASIA Interval). A full design of iris recognition system is made from segmentation, normalization, features extraction, and matching to test these rectangle iris templates. This paper recommends choosing the iris region that near to the pupil likes quarter iris region template, since this iris region template has small sizes among other templates in terms of pixels and gives 100% accuracy in identification and verification.

Keywords— Iris recognition, iris region recognition, Ridge Energy Direction, Hamming Distance.

Implementation of LRU Replacement Policy for Reconfigurable Cache Memory Using FPGA

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Abstract

Cache memory is an important part in computer systems. In set associative cache memory each incoming memory block from the main memory into cache memory should be placed in one of many specific cache lines according to the degree of associativity. In case of all ways lines are fill, a replacement policy should be designed to indicate which line of that cache memory ways will be replaced. In this paper a LRU (Least Recently Used) replacement policy has been implemented in two different methods for reconfigurable cache memory using FPGA (Field-Programmable Gate Array) and programmed using VHDL (Very high speed IC Hardware Description Language). The tree based pseudo LRU replacement policy is much simple and requires less LRU array size than Conventional LRU because it needs only 7 bits for each cache line. While the conventional LRU is easier in implemented and also require only one unit to managing the LRU replacement policy.

Keywords—Hit ratio; Replacement policies; LRU; FPGA; VHDL.

Developed Nsga-Ii to Solve Multi Objective Optimization Models in Wsns

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Abstract

Wireless sensor networks (WSNs) are spatially distributed at diverse locations to monitor different physical or environmental conditions". Subject to the sensing part duty, sensors can transmit their data through the network to other nodes or to the base station. The growth of WSN applications was motivated to assist the awkward activities in military, industrial and healthcare applications. Sensors size and cost restrictions add many constraints on its performance such as energy, computational speed, "communications bandwidth" and memory. Most of the real-world engineering optimization problems represent multi-Objective problems. Objectives are often conflicting. Multi-objective optimization (MOO) is the optimization of conflicting objectives. Their solutions are set of answers that describe the best tradeoff between conflicting objectives. In this paper, a developed non-dominated sorting genetic algorithm (NSGA-II) will be proposed to address certain WSN issues. It aims to control the overlapping level between nodes via unit desk graph connectivity model. A suggested Multi-objective optimization model will also help in defining the best tradeoff between network coverage and connectivity as two competing objectives.

Keywords— NSGA-II, WSNs, Overlapping, Coverage, Connectivity, Optimization and multi objectives.

Real-Time Face Tracking and Recognition System Using Kanade-Lucas-Tomasi and Two-Dimensional Principal Component Analysis

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Abstract

In this paper, a system for face tracking and recognition in a video sequence is proposed based on KLT (Kanade-Lucas-Tomasi) tracker and 2DPCA (Two-Dimensional principal Component Analysis). Before using KLT algorithm for tracking faces, Viola-Jones face- detection-algorithm is applied to-detect all faces in the image or video sequence. KLT tracks face objects after being detected in the consecutive frames and sustaining long-term- tracking when faces come in/out. Face features are captured and selected using 2DPCA technique which is applied as feature extraction in order to eliminate noise and recognize faces more efficiently using a distance classifier. Face94 dataset and images captured by computer webcam are-used-to test the proposed system. Experimental results-show-that Viola-Jones algorithm is efficient when detect front faces. The KLT algorithm is tested to track faces using ten different videos captured by computer webcam. KLT is successfully applied and is able to track multiple faces even when the detected face turns left or right. Finally, 2DPCA is successfully applied and is able to recognize faces in both Face94 dataset and computer webcam video sequence.

Keywords— Face Detection, Face Tracking, Face Recognition, Viola-Jones, KLT, 2DPCA

Hardware Implementation of Firefly Optimization Algorithm Using FPGAs

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Abstract

Mimicking natural phenomenon of social insects, such as bird flocks and insect colonies by merging randomness facility and some other simulation rules, are the core tasks of the artificial meta-heuristic algorithms. Such algorithms are the most efficient and powerful techniques used to solve various complicated real-world optimization problems. Firefly algorithm, which belongs to nature meta-heuristics algorithms, is inspired by mating and flashing behavior or the phenomenon of bioluminescent communication of fireflies in the nature. In this paper, a hardware structure design for firefly algorithm has been proposed. Firefly algorithm is executing sequentially as all meta-heuristic algorithms, due to the nature of the algorithm. Therefore, sequential hardware structure design for the algorithm using Finite State Machine (FSM) system has been proposed. The hardware design structure implementation is mapped into a FPGAs (SPARTAN 3XS1600) device. Numerical results of the comparison between the hardware and the software (using C++ programming language) implementation of Firefly algorithm were obtained. These results indicate that the hardware implementation is executed 461 times faster than the software implementation. Indeed, the required execution time for finding the optimal solution can be reduced rapidly using the proposed hardware design structure.

Keywords—Firefly Algorithm, FPGAs, Meta-Heuristic Algorithms, Optimizations, Unconstrained Optimization.

GPU Accelerated Rotation about an Arbitrary Axis

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Abstract

The three dimensional (3D) rotation about any axis is essential in diverse applications and fields, particularly in computer graphics. This paper focuses on accelerating the operation of this transform using GPU in a real-time environment. This special type of rotation is complicated compared to rotation about the conventional axes due to having many matrix operations, so accelerating such a transform with parallel techniques is an important issue to reduce the execution time that is important to ensure the realistic view of 3D animation scene. In addition to that, concatenating these many operations in a single rotation matrix also gives a significant reduction in computation time required to perform the rotation. The rotation transform is applied to complex models with hundreds or even millions of vertices, so standard 3D objects with different resolutions are used for testing the rotation about a selected axis that created interactively using LabVIEW and Visual Studio software environments. The experimental results showed the significant speedup on CUDA/C++ compared to LabVIEW computations for the same model complexity.

Keywords— GPU, 3D object, arbitrary axis, vertices, rotation.

Dynamic Hand Gesture Recognition System for Kurdish Sign Language Using Two Lines of Features

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Abstract

Hand gesture recognition forms a great difficulty for computer vision especially in dynamics. Sign language has been significant and an interesting application field of dynamic hand gesture recognition system. The recognition of human hands formed an- extremely complicated mission. The solution for such a difficulty requires a robust hand tracking method which depends on an effective feature and classifier. This paper presents a novel, fast and simple method for dynamic hand gesture recognition based on two lines (hundred) of features extracted from two rows of a Real-Time video. Feature selections have been used for hand shape representation to recognize the dynamic word for Kurdish Sign Language. The features extracted in real time from pre-processed hand object were represented through the optimization values of binary captured frame. Finally, an Artificial Neural Network classifier is used to recognize the performed hand gestures by 80% for training and 20% for testing with success 98%.

Keywords— hand gesture; sign language; Kurdish sign language; feature extraction; artificial neural networks

A new dimensional reduction based on Cuttlefish algorithm for human cancer gene expression

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Abstract

Currently, the main problem in DNA Microarray is classification due to the thousands of numbers of genes together, and this huge number of genes can make the classification task very difficult. Therefore, feature selection is a very important task for gene classification. This paper presents a new model which uses a Cuttlefish Algorithm (CFA) to select the most informative features, while K-Nearest Neighbor (KNN) is used to measure the quality of the selected features that are produced by the CFA. Eight datasets are used to evaluate the performance of the proposed model and compared with the performance of four well-known existing classification techniques such as KNN, DT, Hidden Markov models (HMM), and SVM. The obtained results show that the proposed technique outperforms these existing techniques in five datasets among eight datasets.

Keywords— Cuttlefish Algorithm, K-Nearest Neighbor, DNA Microarray, Gene Expression, Feature Selection

Time Sharing based Parallel Implementation of CNN on Low Cost FPGA

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Abstract

Convolutional neural network (CNN) is a multi-layer architecture, and considered as a robust model for image recognition. Learning in this neural network achieves progressively in its successive layers such that the layers produce higher-level features and the categories are produced by the last layer. To use the CNN in different real time applications, high performance implementation is required. To reduce the resources required for implementation, in this paper a time sharing based parallel implementation of CNN is proposed. The computing of the upper convolution nodes is done sequentially while the parallelism is increased in the direction of the preceding layer resulting maximum parallelism in the bottom layer. Then the CNN relatively complex design is implemented on an FPGA model with no more than 200,000 gates and can speed up computation up to 166 times.

Keywords— Convolutional Neural Networks, Time Sharing, Hardware Implementation.

An Optimization approach for Waste Collection Routes based on GIS in Hillah-Iraq

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Abstract

Waste management is one of the fundamental services undertaken by municipalities to retain cities clean and healthy. It represents a high priority and urgent issue for many communities around the world. Rapid progress in the economy and urbanization has had a significant impact on the increase in waste disposal volumes. In this study, Geographical information system GIS was suggested and implemented for optimizing the waste collection (WC) routes in Al Hillah city. The ArcGIS Network Analyst model was developed to improve the efficiency of WC in the Municipality of Hillah (MoH), through the redistribution of waste collection bins and improved trucks routing in terms of distance and time. Sixty routes are resulted and optimized to minimize the total distances of the current route. Simultaneously, it helps in reducing the time required for each route to complete the waste collection process. The final result shows about 30% of the aggregated route distances are minimized in addition to the resulted duration times. The optimal scenario suggested in this study is found to be more efficient in terms of assembly time and distance traveled by waste trucks.

Keywords— Waste collection, GIS, Network Analyst, vehicle routing problem, route optimization, TSP, modeling.

Contrast Enhancement for Visible-Infrared Image using Image Fusion and Sharpen Filters

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Abstract

Image enhancement using image fusion is very important for many applications. Image fusion is performed in spatial domain or in transform domain. Weighted averaging based image fusion is achieved in spatial domain. The fused image using this method is a low-contrast and blurriness image. The quality of the fused image in transform domain is better than fused image in spatial domain. The standard Discrete Wavelet Transform (DWT) based fusion is performed in transform domain and it produces better result compared with the weighted averaging based fusion. However, The fused image using DWT based fusion lacks spatial details. In this paper, a simple image fusion is proposed in order to enhance the quality of the fused image using weighted averaging or DWT based image fusion for visible-infrared images. In nature, infrared image is a blurred image, so the convolution process is performed between the input infrared images and the proposed sharpen filter. The output is an image with highlighting edges and fine details. Using weighted averaging or DWT based image fusion to fuse the visible image and the enhanced infrared image to obtain the final image. The experimental results showed that the proposed fusion method produces better results than the standard fusion methods.

Keywords— Visible-infrared images, image fusion, weighted averaging, DWT, sharpen filters.

Small Footprint Mix-Column Serial for PHOTON and LED Lightweight Cryptography

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Abstract

Lightweight cryptography such as PHOTON or LED has a transform named as Mix-Column-Serial (MCS). Within the MCS, matrix manipulations use Galois polynomial multiplications that require lengthy steps of logical operations. This paper proposes the use of a look-up table with comparators to replace the lengthy steps. As PHOTON's Galois matrix multiplication produces identical results for pairs of column-row and row-columns, with comparators, the table size is reduced to half. The tables and comparators have been implemented on FPGAs. FPGA's synthesized results of the newly proposed MCS in the form table with comparators are superior in terms of throughput and area compared to other MCS hardware implementations found in literatures.

Keywords— Lightweight cryptography, MixColumns, PHOTON, LED, FPGA.

Wavelet Denoising Based on Genetic Algorithm

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Abstract

This study is about using the genetic algorithm (GA) with wavelet transform (WT) for signal denoising purposes. The WT is a time-frequency signal analysis, and the GA is an optimization technique based on survival of the best solution using the maximized or minimized fitness value obtained from the fitness function. In this study, the parameters of WT are used as inputs for the GA for denoising the input signal that is corrupted by white Gaussian noise and gives an output of MSE_o as fitness value. The input corrupted signal will pass through decomposition process to extract approximation and details coefficients, then thresholding the details coefficients using a threshold value in order to remove the noise, and finally reconstruction of the signal using the approximation and denoised details coefficients. Four standard benchmark signals are used to test this technique then a comparison is done with other studies in the same field, and the comparison showed that the results of this work is better.

Keywords— wavelet transform, genetic algorithm, denoising, DWT, GA.

Performance Evaluation of Parallel Particle Swarm Optimization for Multicore Environment

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Abstract

Particle swarm optimization (PSO) has become universal due to its simplicity and effectiveness in solving many problems in various applications with low computational cost. This algorithm consumes time as dealing with large tasks programs. The main goal of this paper is to introduce a parallel particle swarm optimization (PPSO) on multi-core processing kernel to decrease the determination. In order to ease transfer information among particles of shared area and exchange information by switching randomly. Most of serial PSO algorithms allow updating information among particles which takes a long time during the implementation period. The algorithm was applied to the standard optimization test set CEC (Congress on Evolutionary Computation) 2014 and gave good results compared to the previous algorithm. The empirical results shows the execution time of Shared-PSO is more efficient than the serial PSO's. The proposed algorithm using a multicore CPU technique to improve it via parallelization and enhanced the efficiency of an algorithm by increase the range of PSO application.

Keywords— Parallel processing, particle swarm optimization, Multicore computing Environment Optimization, Parallel Particle Swarm Optimization.

A Study on Implementation of Cloud Computing Technology using Data Mining Algorithms

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Abstract

There are some implementation stuck and flexibility issues when standard data mining structure is utilized as a bit of appropriated figuring. In this paper, we introduce an information mining stage in context of Cloud Computing innovation. Separated and a standard information mining structure, this stage is altogether adaptable, has gigantic information managing capacities' is advantage masterminded, and has low equipment cost. This stage can bolster the outline and livelihoods of an expansive variety of dispersed information mining frameworks. In this paper we will think about on huge information mining and extraordinary process and data taking care of limits of dispersed registering give extreme help to information mining. Through the examination of the information mining and the appropriated registering development, in this paper, new idea to design the association rule mining algorithm along with MapReduce parallel processing architecture is introduced. An experimental investigation on this idea is carried out. In recent times, Aneka Cloud Strategy is becoming a well utilized cloud strategy worldwide and it will be discussed.

Keywords— Cloud, Cloud Computing, Data Mining, Association Rule Mining, FP algorithm, Cloud Strategy, Distributed Computing.

A Novel Approach for Occluded Ear Recognition Based on Shape Context

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Abstract

The amount of digitized application is growing fast and continuously. As the result of such growth, professional, reliable and secure techniques for identifying people inside both real and virtual worlds are mandatory. In this paper, we present a fully automatic ear-based biometric system which needs no human intervention and can be used in a real-time manner. The proposed system aims to recognize people based on their ear shape extracted from a profile facial image which usually suffers from partial occlusion caused by hair and/or earrings. First, a cascaded classifier-based ear detection approach that uses Haar-like features is used to detect ears in profile images. Later, the process is followed by a novel ear recognition technique based on Shape Context descriptor. The results of testing the proposed approach on some of the standard datasets show promising results; for non-occluded images 100% recognition achieved while for the images where the ear was occluded by both hair and earring, the accuracy was 57%.

Keywords— Human Ear Biometrics, Ear Recognition, Ear Occlusion, Shape Context.

Pattern Formation for a New Model of Reaction-Diffusion System

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Abstract

The applications of pattern formation in nature attract a huge number of researchers and thus increase the production of researches in this field. In this paper, we introduce a new model of the reaction-diffusion system which satisfies Turing conditions and formulates complicate solutions such as pattern formation. We used for finding the numerical results and forming the patterns software COMSOL Multiphysics finite element package. We have discussed the condition of diffusion-driven instability theoretically and showed the region where these conditions can be satisfied. It was shown that the key fact for instability and the existence of pattern formation is the diffusion coefficient d . When d is large enough we can construct pattern formation with variants rings. The number of rings increases as the domain we use for study increases. Finally, we compared our results to real patterns in nature and we show how they matched together.

Keywords— Reaction-diffusion, Pattern formation, Finite element.

Impact of Alamouti Space – Time Block Coding on the Performance of Vehicle – to – Vehicle Communication

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Abstract

A network that has recently received a lot of interest is the Vehicular Ad hoc Network VANET. Vehicle – to – Vehicle V2V communication is the conventional method in VANET communication, where vehicles can share information regarding the road status such as a warning message related to the incidence of an accident. The aim of this paper is the use of Multiple – Input – Multiple – Output MIMO diversity technique called Alamouti Space-Time Block Coding STBC as a channel coding in V2V communication. The simulation tests were constructed according to the conditions of vehicles speeds, modulations and the distances between the vehicles. These tests included both symmetric and asymmetric channels. The results showed that Alamouti STBC is suitable for slow fading channel communication rather than for mobility communication such as V2V.

Keywords— Alamouti, VANET, V2V, MIMO, LoS.

Multi-Robot Path Planning Based on Max–Min Ant Colony Optimization and D* Algorithms in a Dynamic Environment

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Abstract

This paper involves a proposition of a new method to find the optimal path for centralized and competitive multi-robot in the same dynamic environment. These robots can start from different location(s) and destination to the same goal. The method used to hybrid the pheromone trail updating of MAX–MIN ACO (MMAS) algorithm with D* algorithm strategies to construct a trail of the modified (deposited) pheromone which is updated in each iteration. The robots use tour construction probabilities to choose the best solution to move from the start nodes through the dynamic environment, which contains dynamic obstacles moving in free space, by finding and displaying the optimal path for each robot. A number of experimental results simulated on different dynamic environments for different number of robots indicated that the proposed method performed well. The robots are competitive with each other to reach their targets without colliding with obstacles, and they find the optimal path with minimum iterations and minimum total arc cost. Generally, the increase number of the implemented robots increases the occupy time. However, the amount of that increase varies. It goes from (7%) to (15%) when one to two robots are implemented. It is also noticed that the increase in the time occupy turns to be limited in comparison to the previous ratios, i.e. from (27%) to (30%) when four to five robots are implemented.

Keywords— Multi-robot Path Planning; D* Algorithm; Max–Min ACO Algorithm and Dynamic Environment.

Modeling the Healthcare Services in Hilla Emergency Department

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Abstract

Emergency department (ED) represents a crucial and suitable for most patients' emergency cases at any time. It is extremely associated health services dedicated mostly to treat the arriving patient's with uncertain illnesses and without previous appointment. Patient flow sequences represent a very complex process due to the different uncertain requirements and different possible paths that patients may guide to follow to complete his/her treatment. This study aims to maximize the patient's throughput, minimize their waiting times and optimize the resources utilization. The methodology that followed in this study is to estimate the optimal required ED staff's number, which involves nurses, doctors, and receptionist, lab and x-ray technician. Patients were modeled as agents having an ability to interact with others and with staffs and to select whether to be patience and wait in queue then stay in the system or decide to leave at any stage of the treatment process. The simulation results is implemented according to the real collected data and the managers experiences about the averages of arrival and service rates with flow sequence probabilities. Waiting and idle times for the patients and staffs showed a good indication about the quality of services.

Keywords— Healthcare, ABM, ED, modeling, discrete event simulation.

Performance of BCH and RS Codes in MIMO System Using MPFEC Diversity Technique

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Abstract

Multipath propagation phenomenon often causes Inter-Symbol Interference (ISI) because several copies from the originally transmitted signal travel in different directions and reach the destination with different time delays. This paper offers a new diversity technique to eliminate the effect and utilise multipath propagation phenomenon. The new diversity technique is known as MultiPath Forward Error Correction (MPFEC) technique. The MPFEC technique considers some of the multipath copies as an existing resource (redundant copies of the transmitted signal) which can be utilised to enhance the performance of Forward Error Correction coding (FEC) techniques, hence saving significant channel resources otherwise given to a feedback channel, without adding redundancy. Two different coding techniques BCH and RS coding are used in the simulation to perform the Bit Error Rate (BER) analysis. The result reveals that BCH and RS codes performance can be enhanced by utilising the MPFEC technique without increasing the number of redundancy. This paper is implemented by using MATLAB. The results are analysed and compared.

Keywords— Multipath, Phenomenon, FEC, BCH, RS, Alamouti, MIMO, BER, SNR.

Simulation of Nanoscale Optical Signed Digit Addition Based on DNA-Strands

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Abstract

Recently, the interest of most researchers is to find ways to design for biomaterials with certain specifications. The proposed research introduces a new design for an arithmetic circuit which process signed-digit number by adopting conversion the input rules into an array of a strand of DNA according to a specified output for each case. In other words, gates are designed using DNA strand while the inputs are designed depending on molecular beacons (MBs). The MB is a single strand of DNA that is basically in a stable state which consists of two regions, the loop, and stem. The MB consists of 25 nucleotides, where the stem region consists of 10 nucleotides, five on each side and each side is complementary to another side. This work is divided into two parts, each part represents the code for one of the inputs. Also, each code of the sign numbers (-1, 0, 1) and its complement has its own predesign pattern. Three of these pattern numbers represent inputs, while the other complement three patterns represent gates. To design the gates we start from the top and when finishing the specific value we return from the bottom and vice versa to avoid the similar design and also to make the gates take the least number of DNA strands. The outputs of each signed digit (-1, 0, 1) are indicated by optical color lights red, no light and green, respectively. The simulated results for two 3-bit signed digit number for three steps addition operation show the correctness of proposed design. The addition process is executed in parallel, so the length of the number does not exceed the calculation time.

Keywords— DNA computing, three-step algorithm, binary modified signed digit (BMSD), molecular beacon MB, DNA strand.

Collaborative Remote Laboratories for Serving Sciences and Engineering Education in Iraq: REXNet Project

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Abstract

Currently, higher education systems in the Middle East and North Africa region face several challenges in terms of developing, learning, and teaching. For example, the higher education system in Iraq, which is the same as in other countries as a whole, has not adapted instructional technology into the education system efficiently. Nowadays, several technologies have been implemented (e.g. Remote Experimentation Labs and Virtual Reality) to serve the higher education systems and their teaching abilities, especially in Sciences and Engineering disciplinary. This paper presents a Remote Experimentation Labs project, named “Building a Remote Experimentation Network for serving higher education teachers and students in Iraq (REXNet)”, that is implemented to serve students and teachers of Iraqi universities. It is a collaborative work among three universities (i.e. Duhok University, Zakho University, Duhok Polytechnic University) in Kurdistan Region-Iraq and Oklahoma State University (OSU) in United States, and supported by the International Research & Exchanges Board organization for creating Virtual Learning Environments (Cyberlearning Environment) for enhancing students learning experience and pedagogical by using Remote Experimentation Labs. In general, the project aimed to include several modules for students from those universities that can be running via the Internet, and helping to increase the collaborative work among researchers in Kurdistan region and Iraq.

Keywords— Remote Experimentation Labs, REXNet project, Modules, Cyberlearning Environment, Virtual Learning Environments, Collaborative work.

Video streaming processing using fog computing

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Abstract

The most prevalent media on the Internet is Video streaming which has the greatest bandwidth expended. The massive quantity of internet usage goes for video streaming that expends nearly 70% of the internet today. However, there are constraints for Interactive media represented by increased bandwidth usage and lateness. Cloud computing not suitable for interactive application because the data transmissions between cloud centers and end users have a high response time. Fog computing is extending of cloud service, it's an intermediary layer between cloud and end user, it aims to provide services close to the user onto the network edge. This study proposes an architecture to reduce the limitation in video outflowing by employing fog computing to deliver very lower response time and real-time communication, and weighted round robin algorithm for scheduling streaming task in fog environment. The experiment results display that in the suggested architecture the latency is minimum and good quality of video with bandwidth changes.

Keywords— Fog Computing, video streaming, task scheduling, WRR, DASH technology.

Gene Selection and Classification of Microarray Data using Convolutional Neural Network

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Abstract

Gene expression profiles could be generated in large quantities by utilizing microarray techniques. Currently, the task of diagnosing diseases relies on gene expression data. One of the techniques which helps in this task is by utilizing deep learning algorithms. Such algorithms are effective in the identification and classification of informative genes. These genes may subsequently be used in predicting testing samples' classes. In cancer identification, the microarray data typically possesses minimal samples number with a huge feature collection size which are hailing from gene expression data. Lately, applications of deep learning algorithms are gaining much attention to solve various challenges in artificial intelligence field. In the present study, we investigated a deep learning algorithm based on the convolutional neural network (CNN), for classification of microarray data. In comparison to similar techniques such as Vector Machine Recursive Feature Elimination and improved Random Forest (mSVM-RFE-iRF and varSelRF), CNN showed that not all the data have superior performance. Most of experimental results on cancer datasets indicated that CNN is superior in terms of accuracy and minimizing gene in classifying cancer comparing with hybrid mSVM-RFE-iRF.

Keywords— Deep Learning; Convolutional Neural Network (CNN); Microarray Cancer Data; Classification.

Live Monitoring System for recognizing varied Emotions of Autistic Children

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Abstract

A rising line of research that endeavors to uncover implicit mechanisms of Autism Spectrum Disorder (ASD). Children with ASD can't express their feelings unequivocally; this makes it troublesome for the parents and overseers related with these youngsters to comprehend their conductance, Causing a noteworthy difficulty in the child's initial formative stages. In this paper, a system was implemented to monitor children with autism remotely to help specialists follow their patients' progress and analyzing the collecting data. The system consists of NodeMCU ESP8266, galvanic skin response (GSR) sensor, broker (server) and a smartphone or personal computer. NodeMCU (ESP8266) reads the data from the GSR sensor and publishes it on the server. This system observes the subjects' reactions to different emotions like sadness, happiness, nervous, hunger, relaxation and trepidation, and then records the data. Message Queuing Telemetry Transport (MQTT) protocol had been used to publish the data online. Finally, a comparison had been made between the obtained data for children with autism and without autism.

Keywords— Autism spectrum disorder, Remote healthcare, GSR sensor, NodeMCU, Internet of Things.

Impact Analysis of HTTP and SYN Flood DDoS Attacks on Apache 2 and IIS 10.0 Web Servers

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Abstract

Nowadays, continuously accessing Internet services is vital for the most of people. However, due to Denial of Service (DoS) and its severe type 'Distributed Denial of Service (DDoS), online services becomes unavailable to users in sometimes. Rather than DDoS is dangerous and has serious impact on the Internet consumers, there are multiple types of that attack such Slowrise, ping of death and UDP, ICMP, SYN flood, etc. In this paper, the effect of HTTP and SYN flood attack on the most recent and widely used web servers is studied and evaluated. Systematic performance analysis is performed on Internet Information Service 10.0 (IIS 10.0) on Windows server 2016 and Apache 2 on Linux Ubuntu 16.04 Long Term Support (LTS) server. Furthermore, the key metrics of the performance are average response time, average CPU usage and standard deviation as a responsiveness, efficiency and stability of the web servers. The results show that the IIS10.0 outperformed Apache2 web server in efficiency and responsiveness during HTTP flood attack. However, Apache2 web server achievement was more responsive and performed more stability with SYN flood attack.

Keywords— DoS, DDoS, HTTP flood attack, SYN flood attack and Web server performance analysis.

Internet of Things Security: A Survey

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Abstract

Internet of Things (IoT) is a huge number of objects which communicate over a network or the Internet. These objects are a combination of electronics, sensors, and a software to control the way of working other parts of the object. Each object generates and collects data from its environment using sensors and transfers them to other objects or a central database through a channel. Keeping this generated data and its transformation is one of the biggest challenges in IoT today and it is one of the biggest concerns of all organizations that they use the IoT technology. In this paper, the most crucial researches related to security in the IoT field have been reviewed and discussed while taking account of the great power of the Quantum Computers. Significant attributes of these studies are compared. IoT security ranges from the software layer security, board and chip, vulnerable cryptography algorithm, protocol and network security, social engineering, malware like (viruses, ransomware, trojan horses). Due to a variety of IoT devices and the rapid emergence of new devices, it is difficult to measure the security of IoT systems and identify risks and vulnerabilities.

Keywords— Internet of Things, IoT attacks, Cyber privacy, data security, security safeguards.

Distributed Cloud Computing and Distributed Parallel Computing: A Review

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Abstract

In this paper, we present a discussion panel of two of the hottest topics in this area namely distributed parallel processing and distributed cloud computing. Various aspects have been discussed in this review paper such as concentrating on whether these topics are discussed simultaneously in any previous works. Other aspects that have been reviewed in this paper include the algorithms, which simulated in both distributed parallel computing and distributed cloud computing. The goal is to process the tasks over resources then readjusted the calculation among the servers for the sake of optimization. These help us to improve the system performance with the desired rates. During our review, we presented some articles which explain the designing of applications in distributed cloud computing while some others introduced the concept of decreasing the response time in distributed parallel computing.

Keywords— Distributed Cloud Computing, Distributed Parallel Processing, Load Balancing, Scheduling, Measuring Throughput, Response Time.

Gait-Based Human Gender Classification Using Lifting 5/3 Wavelet and Principal Component Analysis

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Abstract

This study describes a representation of gait appearance for the purpose of person identification and classification. The gait representation is based on wavelet 5/3 lifting scheme simple features such as features extracted from video silhouettes of human walking motion. Regardless of its effortlessness, this may lead us to say that, the resulting feature vector contains enough information to perform well on human identification and gender classification tasks. We found out the recognition behaviors of different methods to total features over time functions under different recognition tasks. In addition to that, we provide results of gender classification based on our gait appearance features using a (C4.5 algorithm). So, the result of classification rate for CASIA - B gait databases is 97.98% and the result of recognition rate for OU-ISIR gait Database Large Population Dataset is 97.5%, these results have been obtained from gender classification data. Gait database demonstrates that the proposed method achieves better recognition performance than the most existing methods in the literature, and particularly under certain walking variations.

Keywords— Gait Recognition, Lifting 5/3, C4.5 Algorithm, Principal Component Analysis (PCA).

Clarify of the Random Forest Algorithm in an Educational Field

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Abstract

Many supportive decision systems using classification algorithms have been built as a black box in the last years. Such systems were hiding its inner operations to users. Lack of explanation of these algorithms leads to a practical problem. The education field is one of the areas that needs more clarification in such systems to help users in order to get more information for a right decision. In this paper, the Random Forest algorithm has been clarified and used in analyzing the students' performance, as a dataset. The result showed that the clarified method of the aforementioned algorithm can give an accuracy of 83.56%. On the other hand, WEKA tool gives an accuracy of 80.82% for the same algorithm and dataset. Also, the proposed method of the Random Forest algorithm has been tested using another previous study's dataset. The comparison results showed that the proposed method can give an accuracy of 92.65%, which is in turn better than the accuracy of 91.2% that obtained by another study done. Furthermore, to make the Random Forest algorithm work as a white box, Rules have been extracted from the Random Forest black box algorithm in order to make it more interpretable and helpful in predicting student's performance.

Keywords— rules extraction, classification, random forest, black-box, white-box.

Analysis and Simulation of LTE Downlink: EPA and ETU model

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Abstract

Long Term Evolution (LTE) technology can provide 100 Mbps and 30 Mbps in down and upstream. Its improvement in latency and scalable bandwidth capacity depend mainly on the channel numbers and quality. Analysing the performance of LTE downlink using Environmental Protection Agency (EPA) and Extended Typical Urban (ETU) models can lead to better usage of these networks. Therefore, in this paper physical layer for downlink channel of LTE in FDD (frequency division duplexing) mode will be analysed. Where the two propagation techniques of LTE Physical Downlink Shared Channel (PDSCH) will be compare to choose the best in this paper. The simulation results show that ETU better and faster than EPA in reaching target throughput and reaching higher maximum throughput for all cases at all Doppler values.

Keywords— Frequency Division Duplexing (FDD), Physical Downlink Shared Channel (PDSCH), Modulation, Throughput, Signal to Noise Ratio (SNR), LTE simulation

Fast QR Decomposition based on FPGA

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Abstract

The QR-decomposition (QRD) is an implementation necessary for many different detection algorithms such as MIMO (Multiple Input and Multiple Output) in wireless communication system. In this article, a QRD processor which decomposes the matrix into an orthogonal (Q matrix) and upper triangular matrix (R matrix) using Gram Schmidt algorithm is designed and implemented using a 32-bit High speed processor based on FPGA. This design requires 16 clock cycle to compute QR decomposition with 15.625 M QRDs per second throughput at 250 MHz operating frequency.

Keywords— 32-Bits processor; Gram-Schmidt; Verilog HDL, QR decomposition; CORDIC square root.

Microstrip Array Antenna Design with Directivity Enhancement using Reflector Surface

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Abstract

The goal of this paper is to enhance the Directivity in Microstrip Antenna Array by adding Reflector Surface plane in ground plane. The Microstrip Antenna (MSA) is an antenna that is widely used in microwave waves which has many advantages, however, it represents a low built-in directivity. The suggested antenna array is made by using metamaterial reflecting surface to get the maximum directivity and high gain. In this research, a MSA is designed at 2.1 GHz and maximum directivity and gain are studied. A coaxial probe feeding technique is adopted to feed the antenna array. CST (Computer Simulation Technology) simulation of the suggested single and array antenna shows enhanced the gain, directivity and return loss at the center frequency of 2.1 GHz. At single element antenna, the gain is enhanced from 3.3225 to 6.462db and the directivity from 3.310 to 6.462dbi. Improvement in the performance of the design is achieved by using two elements antenna approach. Further improvement achieved in the work of the design by using four elements antenna approach.

Keywords— Reflector Surface, Enhancement Gain, Enhancement Directivity, Microstrip Antenna, Array of Microstrip Antenna.

Orientation Effect of n-Type PSi on Integrated Interdigitated Electrode EGFET pH Sensor Performance

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Abstract

The effect of the crystalline orientation of n-type porous silicon (PSi) on an integrated interdigitated extended-gate field-effect-transistor (IEGFET) pH sensor performance was studied. The PSi n-type $\langle 100 \rangle$ and n-type $\langle 111 \rangle$ are prepared by a Laser-assistant etching method (LAEM) as sensing layer in the same conditions. The scanning electron microscope (SEM) revealed that the PSi pore size and depth of n-type $\langle 100 \rangle$ are 1 to 4.5 μm and 1.5 μm , respectively, whereas for n-type $\langle 111 \rangle$ sample are 2 to 4 μm and 0.4 μm , respectively. The integrated interdigitated electrode consists of the reference and the extended gate on a single PSi sensing substrate. The n-type $\langle 100 \rangle$ PSi and n-type $\langle 111 \rangle$ PSi as the sensing layers were compared and contrast in the pH range from 3 to 11. n-type $\langle 111 \rangle$ PSi does not exhibit any pH sensitivity. On another hand, The n-type $\langle 100 \rangle$ PSi sensing layer shows a better sensitivity as compared to n-type $\langle 111 \rangle$ PSi. The voltage and current sensitivities of n-type $\langle 100 \rangle$ PSi are found to be 13 mV/pH and 30.94 $\mu\text{A}/\text{pH}$, respectively. The sensitivity enhancement for n $\langle 100 \rangle$ sample is attributed to the larger porosity and pore deepest, as compared to for n-type $\langle 111 \rangle$ which that result in a higher surface area/volume ratio which causes better sensitivity. The studied IEGFET based on PSi is a completely solid-state device which opens a new area to investigate of miniaturization pH.

Keywords— IEGFET, pH-sensor, LAEM, PSi, Crystalline orientation.

RMS Delay Spread and Path Loss Dependency for Mobile Outdoor UWB Channels

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Abstract

Root Mean Square (RMS) delay spread and path loss are two important parameters for any wireless channel characterization, and the relation between them was also under investigation for different signals. In this paper, the investigation of the dependency between the RMS delay spread and path loss was performed for the case of outdoor ultrawideband (UWB) channels with a frequency of 3.1-5.3 GHz. Both parameters were calculated based on measured channel impulse responses (CIRs), where PulsON 410 transceivers have been used for these measurements. Then analyzing the correlation coefficient between the obtained RMS delay spread and path loss values was achieved. Results show that there is a fluctuated positive linear correlation between the two parameters, where the maximum correlation value was 0.7675 reflecting higher correlation in comparison to the lowest value of 0.2951 in another measured channel. The scattering environment has a major effect on the relation between the parameters and consequently led to the fluctuation in the correlation properties.

Keywords— Ultrawideband; RMS delay spread; path loss; correlation; channel measurement.

Elevation Angle Influence in Geostationary and Non-Geostationary Satellite System

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Abstract

Earth stations elevation angle of antenna have to be established in order to communicate with satellites. In spite of crucial impairments in the uplink and down link of satellite communication between earth station and satellite such as noise, rain and atmospheric attenuations still earth station elevation angle is a key limiting factor to specify the communication link budget. In this paper, comparative study of satellite communication attenuation resulting from earth station elevation angle for geostationary and non-geostationary satellite system is presented. The present of free electrons in ionosphere is the impact factor to attenuate the radio wave when the high frequency radio waves penetrate it. Using MATLAB, the results report that the minimum elevation angle is about 5° but this makes negligible difference to the maximum value of transmission path when $\theta=0$.

Keywords— satellite, uplink, down link, elevation angle, earth station, attenuation, path loss.

Design and Implementation Prepaid Energy Meter Supported by RFID and GSM Technologies

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Abstract

This paper introduces a modified management system for smart electrical energy meter. The proposed smart meter has feature to inform the consumer about energy consumption, this feature serves energy consumption reduction by self-awareness of real consumption. The other important feature is to eliminating the difficulties by direct contact by employee and consumer to getting the reading of the conventional meter and also reduction of error in bill. The proposal system consists of two parts: client's side part (the prepaid meters in consumer houses) and server side (electrical sub-station). The client part consists of an RFID reader, credit cards, GSM network, Arduino microcontroller and electronic meter. The system operates with high accuracy which could tell the user the amount of energy consumed at any moment and these results the user will be urged to rationalize energy consumption.

Keywords— Energy Meter ; Microcontroller; RFID ; GSM.

Microwave Power Absorption Evaluation of Micro-Particles CuO Filler Reinforced Epoxy Composites

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Abstract

Epoxy resin is of the most used materials in the field of insulating purposes such as in high voltage applications. In order to create an enhanced material with new properties, epoxy resin can be processed by using different fillers. In this paper, microwave power absorption evaluation of Micro-particles CuO filler reinforced epoxy composites is investigated. CuO metal oxide loadings were taken in four different percentages as (5%, 10%, 15%, and 20%) of the full sample size. Samples were casted in a square shape of (10 cm) side length along with four different thicknesses stated as 1mm, 2mm, 3mm, and 4mm for each loading value. Within an x-band frequency range of 8-10 GHz, the objectives of this paper were examined to determine the amount of microwave power absorption when each loading value is tested with its four different thickness values taken in consideration. The epoxy resin samples were prepared and tests were done to measure the microwave power absorption for each sample in the x-band frequency range. Generally, it has been found that the microwave power absorption is proportional to the thickness value whether it was a pure epoxy composite or a reinforced composite. Moreover, the test results revealed that the case of the (5%) CuO metal oxide filler is significantly related to the maximum power absorption when compared to other loading percentages. The obtained results provided information about the influence of the CuO filler on the insulating property of the non-filled epoxy specimens. Therefore, this composite could be regarded for applications where absorbing microwave energy is of importance and utmost necessity.

Keywords— Epoxy Resin, CuO metal Oxide, Free-space, X-band, MUT, and Microwave Power Absorption.

Maintain Load Balancing in Wireless Sensor Networks using Virtual Grid Based Routing Protocol

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Abstract

Based on the wide variety of applications of wireless sensor networks (WSNs) in different aspects of life, research focusing on WSNs have rapidly increased in the recent few years. Different challenges shorten the operation of sensor nodes over the targeted area for different reasons such as danger, inhospitality, and limited energy resources of the surrounding area. One major issue is the energy required to operate the individual sensor nodes that definitely affect the operation of the entire sensor network. Accordingly, energy consumption must be minimized as possible which requires to compromise sensor network activities as well as network operation. One fundamental solution commonly used for minimizing the energy consumption in each sensor node is using an energy-efficient routing algorithm. In this study, a routing approach depends on the grid topology of the sensor network is presented to maximize the lifetime of WSNs via balancing a load of data traffic among sensor nodes as evenly as possible. The evaluation process is done using CFDASC routing protocol since it represents the most comparable and related algorithm among previous work. Simulation results prove that the presented approach outperformance CFDASC algorithm in terms of network stability and load balancing of the entire network.

Keywords— Grid-based, wireless sensor network, cell-head, load balancing, the stability period.

Design and Implementation of Real-Time Voice Streaming Evaluation Platform Over Wireless Sensor Network (VoWSN)

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Abstract

The vast progress of embedded low-cost, low-power Wireless Sensor Network (WSN) technology has prompted researchers attention to exploit this technology in applications those require real time voice transmission. By equipping WSN devices with some extra components, the devices are able of streaming or transmitting voice in real-time. This paper is aimed to propose, implement, and evaluate (using performance evaluation parameters: one-way delay , jitter, B.W, and CPU usage) the performance of a framework to be used for processing, compressing and streaming voice to a remote computer over Wi-Fi (IEEE 802.11) network using a Raspberry Pi3 (RPi3) and open source FFmpeg technology. The framework has to be configurable to use AC3, MP3 and OPUS audio encoding algorithms with different sampling rates. For voice streaming, this paper presents unreliable transport mechanisms involving combinations of MPEG-2 Transport Stream (MPEG-2 TS) container, Real Time Transport Protocol (RTP) and User Datagram Protocol (UDP). To keep the cost low, the operating system used within this research is the Raspbian and the device driver is Advance Linux Sound Architecture (ALSA).

Keywords— Raspberry Pi, audio encoding, Real time voice streaming, embedded systems, mpeg-ts.

Comparative Study of Channel Coding Schemes for 5G

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Abstract

In this paper we look into 5G requirements for channel coding and review candidate channel coding schemes for 5G. A comparative study is presented for possible channel coding candidates of 5G covering Convolutional, Turbo, Low Density Parity Check (LDPC), and Polar codes. It seems that polar code with Successive Cancellation List (SCL) decoding using small list length (such as 8) is a promising choice for short message lengths (≤ 128 bits) due to its error performance and relatively low complexity. Also adopting non-binary LDPC can provide good performance on the expense of increased complexity but with better spectral efficiency. Considering the implementation, polar code with decoding algorithms based on SCL required small area and low power consumption when compared to LDPC codes. For larger message lengths (≥ 256 bits) turbo code can provide better performance at low coding rates ($< 1/2$).

Keywords— 5G, Channel coding, convolutional code, Turbo code, LDPC, Polar code.

An ICI Reduction Based on PAPR Clipping in Coherent Optical OFDM System

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Abstract

The Inter-Carrier Interference (ICI) compensation for Coherent Optical Orthogonal Frequency Division Multiplexing (CO-OFDM) system has been studied in this paper. The purpose behind is to investigate the presence of ICI due to the impact of Laser Phase Noise (LPN) and Fiber Non-Linearity (FNL). Thereby, we propose a simple clipping scheme which represents an effective distortion algorithm to decrease the Peak to Average Power Ratio (PAPR) for 4QAM system. The method exhibits a significant process on ICI cancellation in CO-OFDM system. The OFDM signal is basically transmitted along 550km distance rated at 10Gbps single mode fiber for the coherent optical mode. The new findings show that the receiver sensitivity is highly improved below 10⁻³ FEC for laser power 5dBm; and archives about 1dBm to 2.4dBm when laser power becomes 8dBm at a typical clipping ratio of 0.6. In particular, the system exhibits a good performance over a 385 km transmission distance in comparison to the conventional CO-OFDM. As a result, the proposed clipping shows that the system can enhance its the performance by reducing ICI in the CO-OFDM system; in addition to present a high robustness in BER metric against FNL by a clear reduction in PAPR.

Keywords— Coherent Optical Orthogonal Frequency Division Multiplexing (CO-OFDM), Inter-Carrier Interference (ICI), Peak to Average Power Ratio (PAPR), Laser Phase Noise (LPN), Fiber Nonlinearity (FNL), Bit Error Rate (BER).

Performance Analysis of Native IPv4/IPv6 Networks Compared to 6to4 Tunneling Mechanism

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Abstract

The rapid advancement of technology in the recent years, and the increasing of the devices that use the Internet; led to, the inference of IPv4 addresses. Therefore, IPv6 has emerged with trillions of available addresses. Despite that, a new problem arises, since not all devices support IPv6, and a direct transmission between IPv4 and IPv6 is not a possibility. Different Transmission mechanisms were produced. The three main transmission mechanisms are Dual-Stack, Translation and Tunneling. In this paper, the 6to4 tunneling transition technique is studied in an integrated architecture of networks using IPv4 and IPv6, and a comparison is done to study the performance of this tunnel compared to IPv4 and IPv6 networks for different types of applications.

Keywords— IPv4, IPv6, 6to4, Tunneling.

Cost Minimization of GPS-GSM Based Vehicle Tracking System

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Abstract

Many vehicle tracking systems are based on Global Positioning System (GPS) and Global System for Mobile communications (GSM) due to the wide areas covered by these services. In these systems, the GPS coordinates of a moving vehicle is encapsulated in an SMS and transmitted to the monitoring server. In this paper, a GPS-GSM based system is designed and implemented to economically track vehicles moving over wide geographical areas. A scheme is proposed to reduce the number and cost of the used SMS messages. Performance evaluation under hypothetical and practical test cases showed the capability of the proposed system to achieve significant cost reduction. The proposed system also provides a trade-off between cost reduction and tracking accuracy. This enables the designer to select suitable system parameter values to minimize the cost for a given level of tracking accuracy.

Keywords— Tracking systems, GPS, GSM, Threshold, Microcontroller, Android application, Tracking protocol.

Artifact Paths Removal Algorithm for Ultra-wideband Channels

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Abstract

Channel impulse responses (CIRs) are extracted from measured waveforms based on a deconvolution process. In the case of Ultra-wideband (UWB) communications, CIRs are extracted from measured UWB waveforms using some deconvolution algorithms, where CLEAN deconvolution algorithm is a well-known procedure for this aspect. However, the extraction of UWB CIRs is mostly prone to errors that are shown as artifact paths in the extracted CIRs. These artifact paths are represented as multipath components within the CIRs. In order to obtain more accurate CIRs, the artifact paths need to be eliminated. In this work, an algorithm is developed to remove the generated artifact paths available within UWB CIRs due to CLEAN utilization. The artifact paths removal (APR) algorithm has been developed based on the elliptical modeling concept applied for wideband channels. Results show that the APR algorithm has successfully removed the artifact paths from UWB CIRs. Moreover, a slight enhancement of the received power has been seen due to the removal of these weaker paths.

Keywords— Artifact Paths; Algorithm; channel measurement, CLEAN; Ultra-wideband

A Modified Table Lookup Substitution Method for hiding data in DNA

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Abstract

Concealing confidential messages within DNA sequences has turned into a well-known research in latest years. This paper presents a modified scheme which is based on the Table Lookup Substitution Method (TLSM) to increase its security. The proposed scheme uses an 8-bit binary coding to transform a reference DNA sequence into a binary format to increase the security of the original TLSM. A comparison between the proposed modified scheme with the existing schemes besides the original TLSM is presented. The results and comparisons have proven the ability of the proposed scheme in balancing among the three critical properties for any DNA steganography scheme: capacity, payload, and BPN. In addition, the cracking probability of the proposed modified scheme is more complex than the original TLSM.

Keywords— TLSM, DNA, Security, BPN

Image Steganography Based on Least Significant Bit (LSB) and 4-Dimensional Lu and Liu Chaotic System

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Abstract

One of the tasks in steganography is extend area in the cover media for embedding more secret messages with enhancing security key and then extract messages with minimum error. In this direction, this paper propose hiding gray images inside a color image based on steganography Least Significant Bits method (LSB) with shuffling by using two types of 4-D chaotic system (Lu and Liu). The color image (RGB model) separated into three cover images (red, green, and blue) and each one of these three cover images may be used to hide 3-shuffled secret images. 4-D chaotic system provide an efficient security key and more difficult to forecast attack. Peak signal to noise ratio (PSNR) and mean square error (MSE) proves that both of secret and cover images are retains its explicitness and characteristics after reconstruction in the receiver.

Keywords— Steganography, LSB algorithm, 4-D Liu chaotic system, 4-D Lu chaotic system, information hiding

A New Initial Authentication Scheme for Kerberos 5 Based on Biometric Data and Virtual Password

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Abstract

Kerberos is a third party and widely used authentication protocol, in which it enables computers to connect securely using a single sign-on over an insecure channel. It proves the identity of clients and encrypts all the communications between them to ensure data privacy and integrity. Typically, Kerberos composes of three communication phases to establish a secure session between any two clients. The authentication is based on a password-based scheme, in which it is a secret long-term key shared between the client and the Kerberos. Therefore, Kerberos suffers from a password-guessing attack, the main drawback of Kerberos. In this paper, we overcome this limitation by modifying the first initial phase using the virtual password and biometric data. In addition, the proposed protocol provides a strong authentication scenario against multiple types of attacks.

Keywords— Three Party Protocol, Kerberos, Symmetric cryptography, Biometric data, Virtual Password, Authentication.

PAC-RMPN: Password Authentication Code Based RMPN

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Abstract

Password authentication code (PAC) is a very important issue in many applications such as web-sites and data base systems etc. In this paper, PAC between two users to confirm authentication between them has presented. This research presents a novel solution to the era long problem password authentication at incoming level. A legitimate user typing his password only and press enter to propagate it to another user which he wants to be authenticated. My solution does not require the password (input code) to be hidden from anyone for security reasons. PAC-RMPN uses routing in message passing networks method (RMPN) which determine the positions of bits which sent to reach the destination. My method regenerates a new code each authentication process based RMPN that is convincingly more secure against both online and offline attacks. This scheme has some advantages such as secrecy of session key, and password privacy. This method proves the users authenticated does not need to hide passwords.

Keywords— Password authentication code, routing in message passing networks method..

Speech Scrambling Based on Arnold-Lucas Mapping

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Abstract

In the increasing needed for security of communication and transmitted media and the development of communication system which surely transmits the data via the unsecured channel, many approaches appear to attempt to maintain the secret information generally and speech information specially. From this approach that is the most recently the chaotic maps that provide the perfect way for the security of data, and is used widely in speech scrambling. The chaotic maps used successfully for encryption of large-scale media such as video, audio, and image data because of its perfect properties as pseudo-randomness, sensitivity to parameters of the system and initial conditions and periodicity. In our proposed system we use a new combination of chaotic maps that depend on Arnold and Lucas maps, Arnold-Lucas map performs the scrambling process in a good way and give good results. The proposed system evaluated using SNR, PSNR, and correlation measures and the results of our proposed system were better compared with Arnold cat map and Fibonacci map.

Keywords— Arnold cat map, Arnold-Lucas, Descrambling, Fibonacci map, Scrambling.

Boost Secure Sockets Layer against Man-in-the-Middle Sniffing Attack via SCPK

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Abstract

Recently, variety purposes of Internet used present a demand to embody highest levels of security in every network-connected device. This proposal strives to address a secure network connection via Secure Certificate Public Key (SCPK) to resist the Man-in-the-Middle Sniffing attack on SSL. The model aims to encrypt Certificate Public Key and authenticate between clients and servers. Drawing on our simulation, proposed key is secure, efficient and safely monitor.

Keywords— Web Security, SSL, Man-in-the-Middle attack, Sniffing MITM, HTTPS.

A DNA-Sticker Algorithm for Cryptanalysis LFSRs and NLFSRs Based Stream Cipher

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Abstract

In this paper, We propose DNA sticker model based algorithm, a computability model, which is a simulation of the parallel computations using the Molecular computing as in Adelman's DNA computing experiment, it demonstrates how to use a sticker-based model to design a simple DNA-based algorithm for attacking a linear and a non-linear feedback shift register (FSR) based stream cipher. The algorithm first construct the TEST TUBE contains all overall solution space of memory complexes for the cipher and initials of registers via the sticker-based model. Then, with biological operations, separate and combine, we remove those which encode illegal plain and key stream from the TEST TUBE of memory complexes, the decision based on verifying a key stream bit this bit represented by output of LFSRs equation. The model anticipates two basic groups of single stranded DNA molecules in its representation one of a genetic bases and second of a bit string, it invests parallel search into the space of solutions through the possibilities of DNA computing and makes use of the method of cryptanalysis of algebraic code as a decision technique to accept the solution or not, and their operations are repeated until one solution or limited group of solutions is reached .The main advantages of the suggested algorithm are limited number of cipher characters , and finding one exact solution The present work concentrates on showing the applicability of DNA computing concepts as a powerful tool in breaking cryptographic systems.

Keywords— Sticker-Model, DNA Cryptanalysis, Stream Cipher, LFSR, NLFSR.

***A Proposed Security Evaluator for Cryptosystem Based on Information Theory and
Triangular Game***

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Abstract

The purpose of this research is to propose a new mathematical model, designed to evaluate the security of cryptosystems. This model is a mixture of ideas from two basic mathematical theories, information theory and game theory. The role of information theory is assigning the model with security criteria of the cryptosystems. The role of game theory was to produce the value of the game which is representing the outcome of these criteria, which finally refers to cryptosystem's security. The proposed model support an accurate and mathematical way to evaluate the security of cryptosystems by unifying the criteria resulted from information theory and produce a unique reasonable value.

Keywords— Information Theory; Game Theory; Security Evaluation; Cryptosystem

Multi-Level of DNA Encryption Technique Based on DNA Arithmetic and Biological Operations

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Abstract

Networks have evolved very rapidly, which allow secret data transformation speedily through the Internet. However, the security of secret data has posed a serious threat due to openness of these networks. Thus, researchers draw their attention on cryptography field for this reason. Due to the traditional cryptographic techniques which are vulnerable to intruders nowadays. Deoxyribonucleic Acid (DNA) considered as a promising technology for cryptography field due to extraordinary data density and vast parallelism. With the help of the various DNA arithmetic and biological operations are also Blum Blum Shub (BBS) generator, a multi-level of DNA encryption algorithm is proposed here. The algorithm first uses the dynamic key generation to encrypt sensitive information as a first level; second, it uses BBS generator to generate a random DNA sequence; third, the BBS-DNA sequence spliced with a DNA Gen Bank reference to produce a new DNA reference. Then, substitution, permutation, and dynamic key are used to scramble the new DNA reference nucleotides locations. Finally, for further enhanced security, an injective mapping is established to combine encrypted information with encrypted DNA reference using Knight tour movement in Hadamard matrix. The National Institute of Standard and Technology (NIST) tests have been used to test the proposed algorithm. The results of the tests demonstrate that they effectively passed all the randomness tests of NIST which means they can effectively resist attack operations.

Keywords— DNA Cryptography, Blum Blum Shub generator, Hadamard Matrix, Knight Tour, Randomness.

Fuzzy Logic for Performance Analysis of AES and Lightweight AES

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Abstract

The Internet of Things is being more and more adopted for applications in almost every application of today's business. The ability to integrate the features of the web to the features of Internet of Things systems has led to more flexibility in managing data from almost any location and almost any device platform. The need to secure the exchanged data has made users have some hesitation towards comfortably adopting these echnologies, so developers enhanced security measures through encryption, and creating some "lightweight" version of efficient cryptosystems. Having a decision system that guides the user on the best version of a ciphering algorithm means having a more efficient IoT based secured system. The proposed system uses fuzzy logic to provide indications to which variation of the algorithm to use for the exchanges messages, with certainty levels that would assist the user in choosing the most suitable ciphering algorithm.

Keywords— Advanced Encryption Standard (AES), Lightweight AES, Entropy, Correlation, Hamming Distance, Fuzzy Logic

A Proposed Security Evaluation Method for Bluetooth E0 based on Fuzzy Logic

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Abstract

The security level is very important in Bluetooth, because the network or devices using secure communication, are susceptible to many attacks against the transmitted data received through eavesdropping. The cryptosystem designers needs to know the complexity of the designed Bluetooth E0. And what the advantages given by any development performed on any known Bluetooth E0 Encryption method. The most important criteria can be used in evaluation method is considered as an important aspect. This paper introduce a proposed fuzzy logic technique to evaluate the complexity of Bluetooth E0 Encryption system by choosing two parameters, which are entropy and correlation rate , as inputs to proposed fuzzy logic based Evaluator, which can be applied with MATLAB system.

Keywords— Bluetooth, E0, Fuzzy Logic, Correlation, Entropy

Analysis on the Soft Bench Points

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Abstract

We introduce and discuss the properties of the soft bench point. Which reinforcing the theoretical found to soft ideal topological spaces. We introduce several new types of soft ideal. We study the relationship between the types of soft idea which are \mathcal{C} _soft ideal, $2^{\tilde{\mathcal{X}}}$ _soft ideal, \mathcal{S} _soft ideal and \mathcal{B} _soft ideal with soft bench points. We also study the relationship between the soft bench points and soft turning points with soft compactness.

Keywords— soft set; soft ideal; soft compact; soft bench point; types of soft ideal compactness.

Characterization of black nickel solar absorber coatings on brass substrates

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Abstract

Solar Selective coatings have radiative characteristics which vary with wavelength. They are characterized by their high absorbance (α) in the visible region and low thermal emittance (ϵ) (or high reflection) beyond the visible region of the sun spectra. These coatings materials are of very great importance in the field of renewable energy sources (solar energy applications). In the present study, the influence of process parameters like the current density, concentration of particles, time of deposition, the thickness of the electrodeposited nickel (Ni), etc. was investigated. The objective of the research is to study solar selective coatings used in solar thermal collectors. i.e. black nickel (B-N) coatings, electrodeposited (ED) over brass substrates. Preparation and characterization of B-N coatings over brass substrates was performed. Low-cost solar selective absorbers (ED of B-N on brass) have been obtained. Trial to get rid of some structures or materials which are harm to the environment. (i.e. car batteries, by using lead sheets from recycled car battery as an anode during ED of B-N coating) was achieved. Reflectance measurements were used to evaluate both, (α) and (ϵ) of the coatings. The measurements of total or diffuse reflectance of samples were performed with instruments equipped with integrating spheres. Electrodeposited (ED) of black nickel BN on brass substrate has a moderate selectivity ($\alpha / \epsilon = 2.63$, when $\alpha = 0.95$). The durability tests were carried out in the form of elevated temperature exposure in air (250 C^o), temperature cycling (30-100 C^o), and humidity tests (up to 90 % RH). The coatings have been re-characterized after ageing tests, using spectrophotometry and other techniques, such as X-ray techniques. Durability testing of the ED B-N coatings indicates that they are sensitive to humidity testing. However, efficient absorbers were obtained by using low-cost technique. Durability testing of the ED B-N coatings indicates that they are sensitive to humidity testing.

Keywords— Electro-deposition, Black nickel coating; Solar selective coating.

On Soft Separation Axioms in Fuzzifying Soft Topological Spaces

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Abstract

By applying a new approach to concepts of both soft belonging which is called soft element and two distinct soft elements, we success to introduce and study the concepts of $T_0(X, \tilde{\tau}, A)$, $T_1(X, \tilde{\tau}, A)$, $T_2(X, \tilde{\tau}, A)$ (soft hausdorff), $T_3(X, \tilde{\tau}, A)$ (soft regularity), $T_4(X, \tilde{\tau}, A)$ (soft normality) soft separation axioms in fuzzifying soft topology, and give some of their equivalentents as well as the relation with each other of the five axioms.

Keywords— Soft Set Theory, Fuzzifying soft topology, Soft separation axioms.

Convergence Theorems of a Finite-Step Iteration Algorithm Under Two Finite Families of Total Asymptotically Quasi-Nonexpansive Maps

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Abstract

In this paper, an iteration algorithm for two finite families of total asymptotically quasi-nonexpansive maps in Banach space is introduced. Weak and strong convergence theorems of this algorithm for approximation common fixed points are proved by using suitable conditions. As well as, numerical example by using Mat-lab is given.

Keywords— Banach space, total asymptotically quasi-nonexpansive map, weak convergence, strong convergence, common fixed points.

Manufacturing Procedure of a Hybrid Design of Solar Collector (Sterilization and Water Heating) by Solar and Electrical Energy

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Abstract

The purpose of the research is to design a hybrid solar collector, called (L1). This Collector operates by solar energy during daylight hours, which is approximately (12) hours, the work of the solar collector (L1) continues during night by using electrical power. Solar collector was tested during the period of December - 2017 to May – 2018. The results were excellent where it's records high temperature during the period from March - May 2018. Temperature recorded more than 100 Co. The outlet water from the solar collector (L1) was sterilized due to the high heating degree of the water, it reached boiling degree. The design of (L1) is suitable for a lot of environment or weather conditions, because it depends on the collection of the solar radiation in a small surface area; in addition, it works in low electrical power. Tests for (L1) were conducted in Basra city, southern Iraq, on latitude 30.5°N and longitude 47.8°E. Manufacturing of this solar collector is very easy with low cost. It can be used it in houses, scientific and health institutions.

Keywords— Solar energy, Renewable energy, solar collector, Water heating, Hybrid, sterilization.

Determination of The Influence Forces Affecting the Surface Layers of the Rotating Magnetic Neutron Stars

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Abstract

This work aims to study the physical properties of Neutron stars. The effect of magnetic forces and the ratio of accelerations on surface layers are determined. Goldreich and Julian model is considered. The magnetic field evolution within light cylinder can contribute to explain the physical mechanism generating the electromagnetic forces with other forces like gravitation and centrifugal acceleration. The ratio between them will be determined for $r \gg R$. The centrifugal and gravitation terms can be neglected. The centrifugal and electromagnetic forces would become comparable at $r \sim 10^4 R$, the gravitational term is negligible. The results showed that the electric forces would pull out charged particles from surface, unless the work function and cohesive forces are unrealistically large. The calculations estimated that a vacuum space regions surrounding Neutron stars implies a huge forces acting on the surface layers. The typical number density of particles (N_{gj}) quickly decreases with distance due to the magnetic field dependence ($B \sim 10^{-3}$). The magnetic field is distorted beyond light cylinder limits.

Keywords— Magnetic fields, plasma space, Neutron stars, Electromagnetic forces.

Bayesian Sensitivity Analysis to Quantifying Uncertainty in a Dendroclimatology Model

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Abstract

A nonlinear forward model named VSLite is used to simulate tree ring-width growth from climate data. There is always uncertainty in such data inputs, which might influence the uncertainty of the model outputs. The present work performs a Bayesian sensitivity analysis (BSA) to the VSLite model using a Gaussian process emulator. BSA aims to understand and quantify the uncertainty of the model's outputs due to a change in its inputs. The model was successfully implemented at different geographical locations around the world. To examine the accuracy of the model, we first compared real tree-ring data at different locations with those simulated from VSLite. The variability in the model output was then explored and quantified via BSA. Results show that BSA has successfully classified model parameters in terms of their influences on the model output variation.

Keywords— Bayesian Statistics, Sensitivity Analysis, Gaussian Process, Tree-ring, Dendroclimatology, VSLite model.

A Numerical Approach of Fornberg-Whitham Equation Using Residual Power Series Method

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Abstract

In this paper, a modern and approach method called residual power series technique has been applied to find numerical solution for an important equation in optical communication systems and optical fibers called Fornberg-Whitham equation. In addition to that, the technique has been used in regard of the effectiveness of time. The present results have been used to compare it with the exact solution and have been shown graphically to demonstrate the effectiveness and suitability of RPS method. Furthermore, the steadiness and the action of time of the Fornberg-Whitham equation and the modified Fornberg-Whitham equation have been discussed and came to the conclusion that the RPSM method is an influential and beneficial one to solve strong nonlinear partial differential equations.

Keywords— Numerical method; Residual power series method; Time Fornberg-Whitham equation.

Construction and Nullity of Some Classes of Smith Graphs

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Abstract

For the adjacency matrix A of a graph G , a number λ is an eigenvalue of G if for some non zero vector X , $AX = \lambda X$. The vector X is called the eigenvector corresponding to λ . The eigenvalues are exactly those numbers λ that make the matrix $A - \lambda I$ to be singular. All eigenvectors corresponding to λ forms a subspace V_λ ; the dimension of V_λ is equal to the multiplicity of λ . A graph G is a Smith graph if 2 is an eigenvalue of the adjacency matrix A of G , a λ -weighting technique is introduced and applied to characterize some classes of Smith graphs as well as to study their nullities and the nullity of vertex identification of such graphs. We also have proved that under certain conditions the vertex identification of some Smith graphs is a Smith graph.

Keywords— Smith graphs, high zero sum weighting, adjacency matrix, nullity, corona product.

Development a QSAR Model of 1, 3, 4 - triazole derivatives for antioxidant activity prediction

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Abstract

Antioxidants can control the generation of free radical by terminating the reaction chain. QSAR is method that used to explain the relationship between biological activity and the structure of chemical compounds. The aim of this study to develop QSAR model between antioxidant activity and molecular structure of 1, 3, 4-Triazole derivatives using interval partial least squares (iPLS) as a variable selection method, and PLS as a regression method. After selection methods, six descriptors were selected to build the model. The model with six descriptors can explain 95% variance of antioxidant. The developed QSAR models have been confirmed by r^2_{cal} , r^2_{cv} , r^2_{pre} , RMSEC, RMSECV and RMSEP. The result shows that TDB05s, E2u and H7u are the most significant descriptors in the model which are related to antioxidant activity. These three are 3D descriptors and indicated that 3D descriptors very impotent to antioxidant activities. The final QSAR model can be used as a guide to predict free radical scavenger activities of new synthesized 1, 3, 4-Triazol compounds.

Keywords— QSAR, 1, 3, 4-Triazole, antioxidant and PLS regression.

**Photo-catalytic Degradation of Toluidine Blue Dye in aqueous medium Under
Fluorescent Light**

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Abstract

The photo-catalytic degradation of Toluidine Blue dye (TB) in aqueous suspension solution has been studied utilizing fluorescence light and using Zinc oxide (ZnO) as a semiconductor at variety working factors. The studied parameters were concentration of dye, semiconductor dose and the influence of pH. The result shows that expanding of ZnO dose from 20 to 60 mg/L increases the removal rate of TB dye. On the other hand, the adding of concentration from 5 to 15 mg/L show negative effect on the rate of photo-degradation. It has been denoted that the percentage of dye degradation come to the peak value at high acidic medium. 11 % of TB dye was adsorbed, in dark condition, by ZnO. In addition, the kinetics of degradation has been examined and the degradation was found to take after pseudo-first order kinetic model.

Keywords— Photo-degradation, Photo-catalyst, ZnO.

Optimization of Congo-red Photo-Catalytic Degradation by Central Composite Design

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Abstract

The photo catalytic degradation of Congo red by oxidant's and semiconductors in suspension aqueous solution of ZnO, H₂O₂ has been studied. This work has been done by assist of RSM (surface response methodology) for design of experiments and statistical calculations. All photochemical experiments have been carried out in quartz photo cell and the solvent used for all experiment was distilled water (D. W). The influence of hydrogen peroxide H₂O₂, zinc oxide and dye concentration has been studied by statistical analysis. The instrument used for experiments in this work is spectrophotometer in order to find the calculated and then predicted percentage of degradation, ANOVA analysis and other statistical parameters also has been measured. The result shows that the P-values are higher than 0.05 confidence level in all experiments this means that the parameter of this work does not make a sense on percentage of degradation. This is may be due to that the hydrogen peroxide (H₂O₂) may work as oxygen provider to accelerate the photo degradation process. Meanwhile, Excess amount of H₂O₂, Could act as hydroxyl radical capture in the mineralization system. On the other hand; the best result was 19% degradation in case of 10ppm Congo red concentration, 5% H₂O₂ and 0.1g/L ZnO.

Keywords— Photo-catalytic degradation, effect of oxidant, design of experiment.

Flow- Injection Spectrophotometric Determination of Calcium Using PAN as a Color Agent

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Abstract

A spectrophotometric method for determination of Ca in aqueous solution using 1-(2-pyridylazo)-2-naphthol (PAN) as color reagent based on the formation of Ca-PAN Complex at pH 12 and measuring absorbance at 550nm, with molar absorptivity of $1.70 \times 10^4 \text{ L.mol}^{-1}\text{cm}^{-1}$ has been modified to a flow injection-spectrophotometric (FI) method. The modified FI method is rapid, accurate, precise, and with low operation cost. The linear range of 1-8ppm was obtained with average recovery of 103.46 and precision of 1.5-3.4%. The proposed FI method using PAN as a color reagent was applied satisfactorily for the assay of Ca in natural water, milk, yogurt and human serum.

Keywords— Calcium, 1-(2-pyridylazo)-2-naphthol (PAN), Flow injection analysis, and spectrophotometry.

**Evaluation of Environmental Risk Index for Heavy Metals in Some Sedimentary Soils
Pollution of Babylon Governorate**

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Abstract

This research included study of some sedimentary soils pollution from the Babylon Governorate by As, Cu, Ni and Pb estimated with XRF spectra. The locations determined via GPS between longitude $^{\circ}32\ 08\ '757''$ - $^{\circ}32\ 99\ '861''$ N and Latitude $^{\circ}44\ 09\ '220''$ - $^{\circ}44\ 99\ '928''$ E. Soil total of As, Cu and Ni were high, as As recorded the highest values 24.5mg kg^{-1} in surface horizon of soil sample Ss5. While Cu and Ni: $70.2, 372.5\text{ mg kg}^{-1}$ respectively in lower horizon of soil sample Ss2. Pb was below the limits allowed by the World Health Organization (WHO). The highest single pollution index (PI) for As: 3.31, Cu: 1.54, Ni: 1.55 recorded the highest values in the surface horizon of the soil sample Ss5, and Pb: 1.87 in the lower horizon of the same sample. Newmerow integrated pollution index (NIPI), also follows the same pattern in mentioned samples: 2.78, 1.45, 1.45 and 1.65 respectively. For the results of the potential ecological risk index(Er) the highest values of As: 33.1, Cu: 7.70 and Ni 7.75; Pb: 9.35 recorded in both mentioned two horizon. Thereby, the highest total comprehensive ecological risk index (RI) for the heavy metals group was 55.70 in the surface horizon of soil sample Ss5.

Keywords— risk index; soils of Babylon, pollution, heavy metals.

Standard potential of the silver-silver chloride electrode in X% ethylene glycol - water mixtures at different temperatures

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Abstract

The physical properties (density, viscosity, and dielectric constant) of five different compositions (0, 10, 20, 30, and 40%) of ethylene glycol-water mixtures have been measured at nine temperatures from (278.15 to 318.15 K) which were utilized to calculate the standard potentials of the Silver-Silver Chloride electrode and the mean activity coefficient of ten different concentration of HCl ranged from (0.01-0.1m). The modeling of the investigated system was made based on an extended Debye-Hückel equation, using Galvanic cell without liquid junction $\text{Pt, H}_2(\text{g}, 1 \text{ atm}) \mid \text{HCl}(\text{m}), \text{EG} + \text{water} \mid \text{AgCl}(\text{s}), \text{Ag}$. The standard potential at different temperatures were utilized to calculate the standard thermodynamic quantities ΔG° , ΔH° , and ΔS° for the cell reaction. The results discussed in concerning with acid-base properties, solute-solvent interactions and the breakdown of the water structure on the addition of ethylene glycol.

Keywords— Electromotive force measurements; Ethylene glycol; Silver-Silver Chloride electrode; Standard electrode potential.

Investigate the Carbon distribution and Structural Group Composition of Two Kurdistan Crude Oils (T-21A & PF2) and Their Fractions

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Abstract

For the first time, a determination of the total content of oil fractions in KRG was made using two samples of Kurdistan crude oils on the basis of the n-d-M method. To determine the structural-group composition of crude oil, it was proposed to use Tawke T-21A and Shekhan PF2 Crude oils. This paper is devoted to the study structural group of crude oil of different deposited differs from each other in physical and chemical properties. Since the properties of the oil determine the direction and application in petroleum refinery of it's processing, to assess the quality of oil n-d-M method.

Keywords— Structural group analysis, n-d-m method, physicochemical petroleum fraction, hydrocarbon groups, petroleum fraction.

Mechanism and Thermodynamic Parameters of Paternò-Büchi Reaction of Benzene and Furan: DFT Study

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Abstract

The Paternò-Büchi reaction of benzene with benzaldehyde and furan with furfural were studied theoretically. The mechanism was investigated using Density Functional Theory (DFT). It was found that the final product of the benzene reaction is oxetane 3, while in the case of furan the oxetane 6 is unstable and goes through oxetane ring opening. The target of this article was to study the reaction mechanism and calculate the thermodynamic parameters of the reactions. The oxetane 3 formed was found to be stable with reaction energy of -120 kcal/mol. However, the oxetane 6 was found to be less stable with reaction energy 21 kcal/mol which tends to produce more stable product 7 through the oxetane ring opening. In addition, the molecular orbitals were calculated and analyzed for all the intermediates, oxetanes and final products.

Keywords— Paternò-Büchi, DFT, thermodynamic parameters, mechanism, benzene, furan, Oxetane.

Simple Environmental Treatments for Heat Transfer of Building Ceilings

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Abstract

The increase of global warming in the world and in Iraq especially because of various environmental phenomena, as a result of the increasing demand for energy, there was a need to find the means to save energy and achieve sustainability while ensuring the needs of the individual. In this research, the thermal behavior of a building in a pre-built Baghdad area was examined, specifically in a room on the third floor to ensure that the sun is not blocked by surrounding buildings. Two cases were selected to cover the roof of the building, the first is the use of the 50 mm thick American thistle with spraying and the second is the water spray with the same amount of water used to irrigation the thistle. All aspects of the study were designed to ensure that only temperature changes were focused on the ceiling. The thermal insulation of the walls of the room was also used and also provided with a 1 ton air conditioner to provide standard thermal conditions. The temperature of the external and internal surfaces for the roof of the concrete building for the three cases has been measured (without cover, covered with American thistle, covered with water) from 6 am to 6 pm during the months of high temperature in June, July, August and September, with a reading rate of one every two hours. The study showed that the use of green areas will provide electricity equivalent to 54% of the ordinary ceiling without cover, while the water areas will save 41% for the same conditions, that the green areas have shown a higher efficiency to provide energy with better available technologies thus achieving the basic aspects of sustainable environment.

Keywords— thermal, energy, thistle, sustainable.

Estimation and Mapping of Dates Palm Using Landsat-8 Images: A Case Study in Baghdad City

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Abstract

Date palm (*Phoenix dactylifera* L.) is one of the most important and the oldest crops in Iraq. It is suffered from degradation due to various economical and numerous military conflicts. In this paper, a different method based on the Landsat-8 images has presented which is used to map the region of interest and to estimate dates palm trees. This method based on a Least Square Model (LSM) for statistical relations between different spectral indices (NDVI, EVI, NDMI) and tasselled cap parameters with in situ data. As a result, the best developed model was produced using fourth component of tasselled cap transformation with a correlation of $R^2 = 0.95$ with in situ data. Thus, the results show that the Landsat-8 images are useful to estimate and monitor date palm area with high accuracy. This result is encouraging to estimate other parameters that concerned to the date palm.

Keywords— Date palm, Landsat-8, Least square model, Spectral index, Tasseled cap transformation.

Mapping Environmental Sounds Using Google Map (Acoustic Maps)

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Abstract

Modern lives are dominated by what people see, and so there are many travel guides described wonderful places to visit. However, the sounds of these places are part of the experience. In some cases, what people hear is more important and interesting than what they see. This paper presents a new technique that gives an approach to combine map locations with their environmental sounds. It identifies places with unique sounds and encourages people to become interested in what they hear. The system is a collaborative data input, which allows public contribution in recording and archiving. Users are allowed to participate and upload their own sounds onto an efficient mapping system (Google map). The idea is to develop an audio map application; it is a great way to encourage people to gather audio and plot sounds to locations. The system is equivalent to Google Street View but with embedding audio will be Audio Street View.

Keywords— Environmental Sounds; GIS; Remote Sensing; Google map

Estimating and Mapping Aboveground Biomass of Natural Quercus Aegilops Using WorldView-3 Imagery

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Abstract

Biomass estimation is a tool for assessing the amount of carbon stores in trees. An approach is presented to estimate aboveground biomass (AGB) of the scattered individual *Quercus aegilops* using very high resolution satellite imagery, WorldView-3 (WV3). First, an in-situ allometric model at tree level was developed, and AGB was estimated using the Diameter at Breast Height (DBH). Next, the allometric relationship between Tree Crown Area (TCA) derived from WV3 data and estimated in-situ AGB was investigated and used in the resulting model to estimate AGB (remote sensing derived). As a result, the developed allometric model in-situ produced a correlation of $R^2 = 0.99$, and the developed allometric model remote sensing produced a correlation of $R^2 = 0.94$. Tree AGB estimated from WV3 data was a good technique with a 1.24 bias and a root mean square error (RMSE) of 80.17. This approach can be used to accurately estimate and map AGB of scattered individual trees.

Keywords— Aboveground Biomass, Allometric Model, Remote Sensing, WorldView-3 Data.

Spatio-Temporal Estimation of Surface Water Area in Dohuk Governorate Using Remote Sensing & GIS

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Abstract

Surface Water area (SWA) extraction is an important part of water resource management and has been the hottest topic in the remote sensing of water resource sector for over two decades. An approach is presented to estimate the change of area of surface water over 15 year period (2003 - 2018) using a time series of Landsat images. Twelve Landsat scenes were used to spatially and temporally cover Duhok Governorate, Kurdistan region-Iraq. A modified normalized different water index (MNDWI) were employed to quantitatively estimate the SWA and coincidentally analyzed with the temporal change of precipitation and temperature data. Results show that the considerable decrement of SWA is observed from 2003 to 2008 with reduction of 51%. This is also was confirmed by metrological used data. Moreover, an increment of SWA is noticed from 2008 to 2013. However, a slight increment was realized between 2013 and 2018. In addition, during the studied period a climate conditions (temperature and precipitation) in Duhok Governorate have been changed significantly. These changes could have affected the SWA, but so also could external human interference.

Keywords— Water Surface, Meteorological Data, Climate Change, Satellite Images.

An Investigation of Pixel-Based and Object-Based Image Classification in Remote Sensing

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Abstract

This research evaluates pixel-based and object-based image classification techniques for extracting three land-use categories (buildings, roads, and vegetation areas) from six satellite images. The performance of eight supervised machine learning classifiers with 5-fold cross validation are also compared. Experimental validation found that using 'Bagged Tree' for object-based classification algorithms provides maximum overall accuracy when tested on 10,000 objects produced by the SLIC segmentation method, and improves upon an existing RGB-based approach. Our aforementioned proposed approach takes about 12 times less total runtime than the pixel-based method, demonstrating the power of the combined approach.

Keywords— machine learning, image classification, image segmentation, Pareto Analysis, remote sensing.

Experimental and Numerical Investigation of Factors That Affecting in Frictional Welding of Mild Steel and Al alloy A356

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Abstract

Friction welding is one of the most advanced welding techniques in the world today, due to the ability of this technique to find weld specimens with high performance specifications. The present study deals with friction welding of similar metals (mild steel) and similar metals (aluminum alloy A356) for solid and hollow specimen, also the results were studied analytically methods using ANSYS (16) software program. The fracture force of standard specimens was 576.33 MPa and 105.41 MPa, while this force of welded specimens were 463.64 MPa and 69.04 MPa for mild steel and Al-A356 respectively with reduction about (30%) in equivalent stress values. The hardness was increased at the weld region as a result of the friction pressure and oxidation process and the differences in these values due to the metals nature and its crystal construction. The temperatures distribution in both practical and theoretical methods refers to the symmetrical distribution along the weld region. The fatigue sensitivity of two metals were showed that the minimum life in mild steel was (8523 cycle) while the minimum life in Al-A356 was (1713 cycle) under same load condition.

Keywords— friction welding, Thermal Analysis, Al A356, strain distribution

Dissimilar Welding of AISI 309 Stainless Steel to AISI 1020 Carbon Steel Using Arc Stud Welding

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Abstract

In present work, AISI 309 stainless steel studs were joined to AISI 1020 carbon steel sheets by arc stud welding technique. A range of welding currents and times were applied to investigate the effect of welding parameters on microstructure and mechanical properties of the weldments. The microstructure observation revealed that increasing of welding current and time encourages martensitic transformation in heat affected zone of carbon steel and gives a high possibility to the formation of sigma phase in fusion zone of stainless steel. Microhardness test showed highest hardness of 575HV in fusion zone at 800A welding current and 0.35s welding time because of hard and brittle sigma phase. The strength of the joints was evaluated using torque test. Maximum torque strength of 60N.m was registered with 400A and 0.35s that also showed the best weld integrity. A crack was detected in the fusion zone at 800A welding current due to the difference in thermal expansion coefficient between stainless steel and carbon steel.

Keywords— Arc Stud Welding, Dissimilar welding, Solidification mode, Martensitic transformation, Sigma phase.

Effects of Different Biodiesel on Diesel-Engine Performance and Emissions

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Abstract

In this paper, the emissions characteristics and performance of a direct four-stroke diesel engine fueled by three different kinds of biodiesel oils and normal diesel oil (DF) has been experimentally investigated. Biodiesel fuels of Palm, Coconut and Sunflower have been separately used as an alternative fuels and the results obtained have been compared with that results obtained using DF at the same operating conditions. The results indicated that a higher Brake Thermal Efficiency (BTE) has been obtained when using the Coconut fuel. For moderate engine speed, the use of biodiesel produces high Brake Specific Fuel Consumption (BSFC) up to 22% in comparison with that obtained using normal DF. The BSFC of sunflower fuel at the maximum torque has been observed to be 10% higher than when using normal diesel oil. For moderate engine speed, the measured amount of carbon monoxide (CO) emissions when using either Sunflower, Palm or Coconut as a biodiesel fuel have been found to be lower than that obtained by using the DF. For low engine speed, the emissions of NO_x for all three kinds of biodiesel fuels is lower than when using normal DF. Most importantly, the results indicated that the biodiesel fuels have significant impact on the emissions characteristics and performance of engine and hence biodiesel fuel can be directly used for normal engine system. Therefore, adequate care must be taken while selecting such a biodiesel fuel in order to meet the process requirement of the environment.

Keywords— biodiesel, performance and emissions, fuel consumption, diesel engine.

Heat Flux in Friction Clutch with Time Dependent Torque and Angular Velocity

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Abstract

When a body slides over another body, the major part of the work done against the frictional force which resists the motion will appear as a heat at the interface between the contact surfaces of the bodies. Consequently, the temperatures of that interface will increase to high values and may cause a high thermal stresses enough to produce large thermal deformations and thermal cracks in the contact surfaces. The present paper presents an analytical solution to calculate the total heat generated between the rubbing surfaces for the dry friction clutch, the analytical solution was determined using the equations of motion of two-inertia system assuming a uniform pressure distribution over the surfaces of contact where in this case the heat flux will increase linearly with disc radius. The torque and angular sliding speed are dependent of time. The variation of torque and angular sliding speed with time were discussed through the first period of engagement ($0 \leq t \leq t_s$). The results showed that the values of the heat generated (heat flux) increases with disc radius where the maximum value appeared at the outer radius of the clutch disc. The maximum heat flux occurred at the mid time of slipping period ($t=0.2s$). In this research paper, it was assumed that the values of the relative angular speed decrease linearly with time of engagement.

Keywords— Dry Friction Clutch, Uniform Pressure, Heat Dissipation.

Graph-Based Efficiency Analysis of Simpson Gear Train

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Abstract

The power that flows through the links of a split–power gear train are formulated in terms of velocity ratios and local efficiencies. The power flow directions are deduced by nomograph method. The power losses are deduced by potential power method. The two methods are used to complement each other to study the efficiency of the Simpson gear train. A single equation is derived for the overall efficiency. Despite the simplicity and clarity of the current method, its results are consistent with what is available in scientific literature. The effect of the number of teeth, gear ratios, and overall speed ratio on the overall efficiency are also studied.

Keywords— automatic transmission, planetary gear train, efficiency analysis, nomographs, simpson gear train, speed ratio.

Institutional Framework Sustainable Transportation for Iraq

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Abstract

One of the most important pillars of sustainable development in all sectors is governance and decision-making. The transport sector in Iraq suffers from inefficiency and efficiency in its performance and development of other sectors. It is considered the biggest source of environmental pollution and the deterioration of the local and regional climate of Iraq because of traditional transport and traffic plans. The need for role of governance and decision-making in the Iraqi transport sector and make it sustainable need to develop an institutional framework through which the roles of different institutions and stakeholders in terms of financial management and decision-making, as well as adoption of the labor market approach that encourages the work of the private sector. The research concluded that governance and decision-making should be activated in all sectors; the transport sector is part of the overall system. The research recommended that the proposed framework be adopted as the starting point for a sustainable transport system to be applied in all Iraqi cities.

Keywords— Framework, sustainability, transportation, Institutional.

Planning and Design of Highways According to AASHTO Standards Using Remote Sensing Technology (Samarra City as a Case Study)

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Abstract

The design of highways linking urban areas represents the largest economic cost to the municipality, in addition to the time, effort and high cost in providing field surveys and data needed for design and implementation purposes. Therefore, this research focused on proposing a path and design for a highway linking two urban areas within the city of Samarra, in the Salah Al-Din Governorate, northern Iraq. The first area is Qadisiyah neighborhood, which meets the highways that enter the city of Samarra. The second area is the Old City, which is characterized by a large number of historic and archeological sites, and need a highway connecting them with the Qadisiya neighborhood to facilitate the arrival of visitors and residents to their archaeological sites. The route and design of the highway have been proposed according to AASHTO's international design standards, with a high capacity and level of service. It achieves easy arrival between the two areas and their associated regions by choosing the best path for this road, taking into consideration the geometric design of the road that represents the shortest path, the lowest junctions (two junctions), the lowest number of horizontal and vertical curves. The research was based on remote sensing techniques for design purposes, using modern satellite images for the city of Samarra, in addition to the specialized programs in road design (GIS & Civil 3D Land Desktop), thus its main outcome was planning a route according to AASHTO standard and hierarchy of transport levels to reducing the time, effort and cost of data collection purposes that pertain to the design, and outputs with accurate results ready for implementation.

Keywords— Planning of highways, Design of highways, Remote sensing, GIS, AASHTO.

Creating A Bathymetric Contour Map of Small Earth Dams in Duhok Governorate: A Comparative Study

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Abstract

The accumulation of sediment in the bottom of the dam is one of the major causes contributed to dam failure. This in turn creates risks of flooding for villages and cities below it. The aim of this research is to investigate the output of the bathymetric contour map of the bed of small Earth dams in Duhok at three different locations (Kashkan, Zawita and Skreen) as well as to determine the volume of accumulated sediment for each one at different periods of establishment. In addition, a comparison between the current statuses and the design life of each one was achieved. Both vertical depth and horizontal position measurements are implemented using two methods. The first one is the manual and direct method using lead line rope, weight, total station and DGPS for data collection in Zawita and Kashkan reservoir. While, the second method used the Acoustic Doppler Current Profiler (ADCP) integrated with the Global Positioning System (GPS) to record both vertical depth and horizontal position measurements automatically in Skreen dam. The ADCP was calibrated for adjusting the axes (heading, roll and pitch) before collecting data. The data of ADCP were processed and analyzed using River Surveyor Line software and the bathymetric contour map of the selected reservoir's bed was created using AutoCAD civil 3D software. Also, the volume of sedimentations of each selected Earth dam was calculated from the difference between the created topographic surface of the reservoir bed and its original one. The results show that the volume of the sedimentation in kashkan reservoir is about 13810 m³ for the period of 2009 to 2018, Zawita reservoir is about 4449 m³ for the period 2010 to 2018, Skreen reservoir is about 4608 m³ for the period 2009 to 2018, and the design life of each one estimated by state was approximately similar to the finding of this research.

Keywords— Manual and ADCP system, total station and DGPS, bathymetric contour map, volume of sediment.

Low frequency filters design based on frequency dependent negative resistance (FDNR)

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Abstract

In this paper, they study of the difficulties of designing a low frequency filters in using inductors and capacitors. The problems of using this component is the large size, weight and cost. The proposed design is to use a frequency dependent negative resistance (FDNR) as active filter alternative to inductors with a 100Hz cutoff frequency which is suitable in medical and other low frequency applications. The proposed design electronic circuits show that the frequency response of low pass filter is high quality and acceptable results compared with traditional filters.

Keywords— Active filter, FDNR, GIC, LPF.

Impact of Inverter-Fed Power Supply on Copper and Iron Losses of a Three-Phase Induction Motor

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Abstract

The present work proposed a methodology to estimate the iron and copper losses of a three - phase, squirrel cage induction motor for both sinusoidal and inverter-fed power supply, based on two - dimensional finite element analysis software (Maxwell 2D – V16). The three dimensional effect of stator end winding, rotor end ring, and rotor bars skewing were included by coupling with RMXprt software. The inverter simulation was done by Simulink. The modeling was done based on the design documents of a 2.2 kW, 2 pole test motor. The values of iron and copper losses estimated by Maxwell 2D at full load condition , sinusoidal power supply were compared with that extracted from solving the motor equivalent circuit parameters, and that taken from RMXprt with a good agreement. Both copper and iron losses were increased when motor operated with an inverter-fed power supply with respect to sinusoidal power supply. Also, these losses were decreased with increasing of inverter carrier frequency. The loss results will make a good roadmap for the motor designers, and operators to achieve the goal of an efficient inverter-fed induction motor operation.

Keywords— Three-phase induction motor, copper losses, iron losses, finite element method, Maxwell 2D, inverter-fed power supply.

Tunable Plasmonic Resonances Below Schottky Diode Band-Gap Based on Elliptical Nanoantennas

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Abstract

Nanoantennas are suitable components for detection of optical radiation at energies below the bandgap energy of the semiconductor and higher than Schottky barrier of metal/semiconductor interface in photodetectors. Elliptical nanodisk antennas (ENAs) on a Gallium Arsenide (GaAs) substrate are studied to tune the optical response across the near-infrared band. The resonance wavelength, normal field enhancement, and bandwidth of plasmonic resonance are tailored by controlling the size and elliptical aspect ratio. The results are compared with circular nanodisk antennas (CNAs) and ring nanoparticle antennas (RNAs). Silver and gold metal types for nanoantennas are also studied for electric field enhancement, where the Drude model of metals are considered. The surfaces plasmon is proven by comparing with the perfect electric conductor of silver and gold nanoantennas. The obtained results prove that the designed nanoantennas can be used to enhance the operation of photodetectors and solar cells.

Keywords— plasmonic, nanoantennas, Schottky, optical metals, photodetector.

Design and Implementation of a Wireless Robotic Human Hand Motion-controlled Using Arduino

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Abstract

This work involves the design and implementation of a robotic hand controlled wirelessly to emulate human hand fingers motion. The design includes two circuits: transmitting and receiving. A glove and flex sensors are placed at the transmitting side while a robotic hand is sitting at the receiving side. Motion control signals are being exchanged wirelessly between the transmitting and receiving circuits via Bluetooth modules. Also, Arduino cards are implemented on both sides to control the servomotor of each robot finger. The robotic hand consists of five fingers designed using three-dimension 3D printer. Each finger has three degree of freedom (3-DOF) and it is controlled by one servomotor for actuating with angle of rotation from 0° to 180° . The forward and inverse kinematics for the index figure is derived mathematically for 3-DOF robot finger, and the third order polynomial trajectory motion is simulated to test the robot kinematics by using MATLAB Simulink. The physical tests show that the hand motion serves concisely for catching objects with a maximum distance range for connection of 37 meters. Also, the simulation results show exact inverse kinematic using the equations derived from the forward kinematic. This robotic hand can be applied in the areas where the intervention of humans may cause danger on their health due to chemical, biological and radiological nature.

Keywords— Robotic human hand, Arduino card, Flex sensor.

Semi Cylindrical Non-Tactile Capacitive Sensor: equipotential contour and Electrical Field Analysis

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Abstract

The use of Non-Tactile Semi Cylindrical Capacitive Sensors is quite common in petroleum applications. While these devices are comparatively inexpensive and effective way of measurements in horizontal pipes, they lack the required accuracy in vertical pipes applications. The measurements have shown a drift of up to 35%, when 500 ml water is used as a test sample, due to spatial variation of the electric field inside the sensor. In order to analyse the situation, a two-dimensional mapping of the electric field and equipotential lines inside the sensor has been numerically calculated by employing finite difference method model using MATLAB programming environment. The electric field diversifies spatially across the cross-sectional area of the pipe and a non-homogeneous distribution has been shown by the results. This compromises the accuracy of semi cylindrical sensors in vertical pipes application.

Keywords— Capacitive Sensors, Semi Cylindrical Capacitive Sensor, Finite Difference Method, Multiphase Flow, Electric Field, Equipotential Contours, Vertical Pipe Flow.

Keynotes

Impact of Higher Education Institutions on Stability, Social Peace and Security in Kurdistan Region - IRAQ

Prof. Dr. Idris Hadi Salih (Ishik University)

The Kurdistan Regional Government (KRG) set the new policy and strategic plan for education and higher education adopting democracy, human rights and freedom side by side to meet the principles and standards of UNESCO after the establishment of KRG in 1992. According to the planned strategies, the number of institutions and universities (public and private) increased along with the quality to meet the needs of society. The curriculum for the higher education institutions was developed using the latest technology, knowledge, and science to emphasize the culture of forgiveness, human rights, and democracy. The curriculum followed in institutions arranged in a way that be satisfactory to cover the demand of the labor market, suitable to the role of higher education and in spreading peace co-existence and mutual respect. Also, promoting the diversity in society toward stability and living together regardless of different ethics in the Kurdistan region between Muslims, Christians, Yazidi, and others. At the same time, the number of crime and violations against women has been reduced in the community. These institutions increased the productive serving sectors and highly decreased the percentage of robbery, public beggary and another adverse phenomenon in the society. This led to creating a modern and peaceful society in the region with parallel progress in all sectors. These institutions played a great role in preserving the ethics of people that reflected apparently in the clear decline in the ratio of crime. This paper focuses on three-time intervals: the period before 1991, years between 1991 - 2003 and the period after 2003.

Biography



Head of Board of Trustees and the President of Ishik University, Erbil, Iraq. He has taken several ministerial positions in Iraq and Kurdistan Region. He is a former Minister of Higher Education and Scientific Research in the Kurdistan Regional Government (KRG) (2006-2009), former Minister of Labor and Social Affairs in Iraq (2005-2006), former Deputy Minister of Higher Education and Scientific Research in Iraq (2004-2005), former Minister of Municipalities and Tourism in KRG (1998), former Minister of Industry and Energy in KRG (1996) and former Minister of Transportation and Communication in KRG (1992-1996). Dr. Idris also hold the position of president of Salahaddin University in Erbil, Iraq during

1999-2000, and head of Electrical Engineering Department, College of Engineering at Salahaddin University during 1985-1990. He speaks Kurdish, Arabic, English, Russian and some Turkish.

Idris Hadi Salih earned his bachelor's degree in physics from Sulaimani University, Iraq in 1976. He then traveled to Russia and earned his master's degree in Communication Engineering at Leningrad University, Saint Petersburg, Russia in 1982. He also got a PhD Degree in Communication Engineering (Technical Science) at Leningrad University, Saint Petersburg, Russia in 1985.

Conference Organizers

University of Zakho



The University of Zakho (UoZ) dates back to the year 2005 and within the framework of the directives and concerns of his excellency Masoud Barzani, president of the Kurdistan Regional Government (KRG), and Mr. Nechirvan Barzani, prime minister of the KRG, made a decision to lay the foundation stone of the College of Education and the College of Commerce in a university campus in Zakho city. On 8th of July 2010, a formal order was issued to establish a university in Zakho by the presidency of the council of ministers in KRG. Currently, UoZ has three faculties and four colleges, and has more than 5000 students with 400 academic staffs and about 500 employees.

UoZ is interested in the development and provision of all the scientific requirements of each department in addition to the application of the scientific quality assurance. UoZ formed a program to help raise the scientific level according to international standards through the development of the program, the implementation of health instruction and to sustain the application of science and quality assurance. UoZ, since its establishment, tries to have an effective role in the service of the society and improve the quality of the education so that it could become one of the leading universities in Kurdistan Region. Accordingly; in the academic year (2017-2018), the university adopted a new system of education using European Credit Transfer and Accumulation System (ECTS) that is so called “Bologna Process (BP)”. This process contains pioneering lessons which can be utilized by the university to have more benefits for the students.

Duhok Polytechnic University



Duhok Polytechnic University (DPU) is a public university which was established in 2012, and descended from the oldest Technical Institute in Duhok with more than 19558 graduates. It is one of the three polytechnic universities of Kurdistan Region Government following the instructions of Minister of Higher Education and Scientific Researches. The university continued to grow and now it is made up with six colleges and eight institutes in seven different campuses.

DUP offers a wide range of curricula leading to Diplomas (Associate Degrees) and Bachelor of Science Degrees. The course syllabi are set and developed under the oversight of Quality Assurance. DPU has unwavering commitment to academic improvement. Therefore, it has established relationships with international universities through MOU's and international partnership with many effective worldwide known programs that enhance university academic level. A very crucial step is now in progress which is practicing European Credit Transfer and Accumulation System (ECTS) for the upcoming study year 2019-2020, this system helps to make learning more student-centered.

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