4th ICOASE

International Conference on Advanced Science and Engineering

4th INTERNATIONAL CONFERENCE ON ADVANCED SCIENCE AND ENGINEERING

September 21st – 22nd, 2022

PROGRAM & ABSTRACTS BOOK

ORGANIZED BY:

UNIVERSITY OF ZAKHO

DUHOK POLYTECHNIC UNIVERSITY

NORTHERN TECHNICAL UNIVERSITY

IEEE COMMUNICATIONS SOCIETY Iraq Chapter

IEEE Computational Intelligence Society Iraq Chapter

IEEE Iraq section

Welcome Messages

Welcome to the 4th ICOASE

Welcome to the 4th International Conference on Advanced Science and Engineering 2022 (4th ICOASE). The conference is technically sponsored by IEEE which is represented by the IEEE Iraq Section.

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

4th ICOASE attracts researchers, scientists, and technologists from universities, research firms and government agencies from around the world. All submitted papers were subjected to double-blind peer review and critical evaluation by conference committees. Acceptance decisions have been taken according to paper novelty, technical depth, and relevance to the conference scope. Accepted papers will be submitted by the conference operation department to either in IEEE Xplore digital library, American Institute of Physics (AIP), Science Journal of University of Zakho, and Journal of Life and Bio-sciences Research (JLBSR) for publication and indexing.

Contents

Welcome Message from Honorary Chairman

I would like to thank everyone for participating in the Fourth International Conference on Advanced Science and Engineering (4th ICOASE). I would also like to extend a warm welcome to our guests from universities in the area and around the world. We're glad to have you at our conference.

There is an urgent need to develop and supply ideas for developing and elevating the scientific level in higher education institutions in the contemporary period. This can be accomplished by hosting scientific conferences and seminars so that researchers and leaders can discuss and disseminate the latest knowledge and experiences. So, I'm sure that researchers, academics, and decision-makers will be able to share their experiences and knowledge at this conference. This will help them develop new ideas for research and find solutions to a wide range of societal and administrative problems.

At this conference, there will be an interesting program that will give members a chance to talk about our upcoming conference, connect with old friends and make new ones, and talk about current and future research topics.

Lastly, I wish you a fruitful and enjoyable time at this very special conference, and I hope you enjoy your stay in Duhok and Zakho as well as the amazing natural beauty of Kurdistan.

Prof. Dr. Nadhim Jakhsi
University of Zakho,
President

Welcome Message from Honorary Chairman

Honorable guests, distinguished participants and attendees, a very good morning to you. On behalf of Duhok Polytechnic University, it is my very great privilege to welcome you to the 4th International conference of Advanced Science and Engineering (4th ICOASE). We are so pleased to have you all in this conference.

Universities have conferences to bring and share innovations, development and remarkable contributions of researchers from different universities and countries in conference topics. We believe through this conference you will see the constructive engagement from all attendees and researchers to have good and beneficial future research and collaborations between them.

The conference covers different up-to-date topics such as AI and Machine Learning, Cloud Computing, Energy and Sustainable power systems, 5G networks, Employment of IoT and mobile network technologies, Blockchain technology, Construction industries digitalization, Green technologies and many others published by Scopus indexed publishers IEEE and AIP with two JLSBR and SJUOZ journals for specific topics. All research manuscripts are subjected to blind review to meet the publishers and conference standard.

Organizing the conference with University of Zakho, Northern Technical University and IEEE Iraqi section and working as one team is a form of collaboration highlighting a bright sign and can be extended further to improve universities collaborations.

Finally, I would like to thank our team and colleaques at both universities and IEEE Iraq section for hard working to make this conference successful. I hope you all will have fruitful scientific event and will have nice time during the conference in Duhok and Zakho cities.

Prof. Dr. Aree Adel Abdulqader
Duhok Polytechnic University
President

Welcome Message from Honorary Chairman

It's my privilege and pleasure to welcome you to 4th International Conference on Advanced Science and Engineering (4th ICOASE). It is great to meet all of you in this large event. As such, we're very much looking forward to your broad participation from regional and international universities.

As always, ICOASE program displays the latest in technical advances within the multidisciplinary fields of engineering. The lively interaction amongst public sector, industrial and academic stakeholders are necessary to success of such a critical area to society. Therefore, we're proud to provide an international conference for discussion and presentation of peer-reviewed research, implementation and development thrusts.

4th ICOASE features with a series of manuscript presentations, workshops and keynote speakers. Our conference theme for this year is in engineering fields and science and their applications, which includes smart grids and renewable energy for sustainable cities, and reflects the driving need for advances in alternative forms of reliable energy to support the quest to reverse global climate change. We're proud of our chosen of keynote speakers who presents the rich information of this field.

I would like to thank the huge efforts of our scientific committee, organizing committee, reviewers and other volunteers who have generously donated their time and knowledge. We are also grateful to our plenary keynote speakers and paper authors for making the conference a success. A special thanks to University of Zakho and Duhok Polytechnic University for holding this conference in their universities and collaborated with our university to success this conference. Finally, a big thank you to IEEE Iraq Section, American Institute of Physics (AIP) and JLBSR (or SJUOZ) for supporting this conference.

Finally, I would humbly like to express our appreciation to all of you for being here in this conference. I hope you enjoy your stay and you spent a nice time in Mosul, Zakho and Duhok cities. I wish you will find the program enriching, enlightening and rewarding.

Prof. Dr. Alyaa Abbas Al-Attar
Northern Technical University
President

Representative of IEEE Iraq Section

Prof. Dr. Eng. Sattar B. Sadkhan is a professor in Wireless Digital Communication and Information Security, Iraq, Babylon University. He is the Honorable Chair of IEEE IRAQ Section at IEEE, Chairman of IEEE ComSoc. IRAQ Chapter, Chairman of IEEE Computational Intelligence Iraq Chapter, and Chair of URSI Iraq Committee. He is an Honorable Research Director of IRAQ for (BRCORP) Institute and Member of International Association for Cryptologic Research. Dr. Sattar has Published more than (240) papers in International Conferences, and International Journals, Supervised (160) M.Sc. and Ph.D. Postgraduates since 1984.

He is Editor in Chief of (8) International Scientific Journals (in many countries), Associate Editor in Chief of other (6) International Scientific Journals (in many countries), Member of Editing Board of (32) International Journal (in many countries), Member of International Scientific Organization more than (20), and Member of International Scientific Committees more than (250) International Conferences committees.

Prof. Sadkhan has been a Keynote Speaker in Many International Conferences in Turkey, China, India, Pakistan, Malaysia, Jordan, and many local and international conferences in IRAQ.

Conference Co-Chair

In 2007, Karwan Jacksi earned a Bachelor of Science in Computer Science from the University of Duhok, Kurdistan Region, Iraq. He earned a Master of Science in Computer Science from Uppsala University in Sweden in 2011. In 2018, he got his Ph.D. in Computer Science through a split-site program at the University of Zakho (UoZ) and Eastern Mediterranean University.

He is an assistant professor and lecturer in computer science at UoZ's department of Compute Science. He teaches graduate-level courses and oversees a number of graduate students. He has served as an assistant professor for graduate courses at the University of Duhok, Duhok Polytechnic University, Ishik University, and French Lebanese University, among others. He is the vice president for student affairs at the UoZ at now.

Dr. Jacksi was the program co-chair of the 2nd and 3rd International Conferences on Advanced Science and Engineering (ICOASE2019, ICOASE2020) and the technical chair of the International Conference on Advanced Science and Engineering (ICOASE2018), the 5th International Engineering Conference on Developments in Engineering Applications (IEC2019), the Science Journal of the University of Zakho (SJUOZ), and the Humanities Journal of the University of Zakho (HJUOZ). He is a member of numerous national and international journals, conferences, and workshops.

His research focuses on the semantic web, linked data, semantic similarity, data science, information retrieval, and search engines. He has authored or co-authored more than 50 papers published in international journals and conferences.

Dr. Jacksi's personal website, www.KarwanJacksi.net, contains further information about him.

Conference Co-Chair

Prof. Dr. Siddeeq Yousif Ameen Experienced Professor with a demonstrated history of 30 years academic working profession in teaching, research and administration.

Educated in Digital Data Communication and Processing in my Master and PhD at a leading University in UK, Loughborough University. A 2nd ranking BSc in Electrical and Electronic Engineering, from University of Technology, Baghdad, Iraq.

Since 1990, my teaching experience started till now spreading from data communication to computer networking, information and network security and information systems management and development.

Head of department, program coordinator, Deputy dean in Computer Engineering Information Technology Department, University of Technology, Baghdad, Dean of College of Engineering, Gulf University, Bahrain and Dean of Research and Graduate Studies at Applied Science University, Bahrain. Finally, now I am Research Center Director at Duhok Polytechnic University.

Many workshops related to education and quality assurance have attended especially in Bahrain arranged by the HEC, QAAET, UoB, GU, ASU and HEA UK that offer me HEA fellowship in 2016. Other workshops and certificates were also gained from international organization such as UN IIE, ABET, British Council and IREX Education.

Research skills have been gained over 30 years achieving more than 130 publications over 120 PhD and MSc thesis supervision, book's publication, patent, research awards, and promotion to Professor in 2003 at University of Technology, Baghdad.

Senior membership in IEEE, Fellow of UK Higher Education Academy, membership in IEEE Computer and Communication societies, member of Journal's editorial board, member of international conference TPCs, reviewer of scientific publications, chairing and organizing conferences

Involvement in strategic planning, quality assurance programs, NQF and accreditation projects, financial budget planning, external examiner, staff mentoring and moderator internal and external.

Conference Co-Chair

Dr. Omar Rafae Alomar is an associate professor in Mechanical Engineering and Thermal Engineering at Northern Technical University, Iraq. Mr. Alomar (born in Mosul, Iraq, 1979) received B.Sc. and M.Sc. degrees in Mechanical Engineering from the Mosul University, Mosul, Iraq, in 2001 and 2004, respectively. In 2016, he received a PhD degree in Mechanical Engineering and Thermal Engineering from Institute of Thermal Engineering, TU Freiberg, Germany.

From 2005 till date, he is working at the Mechanical Engineering Department, Northern Technical University, Mosul, Iraq. From 2011 to 2015, he received a DAAD fellowship. He is currently occupying the position of Vice president for scientific affairs at Northern Technical University.

He is interested in Multiphase flow, phase change process, porous media, convective heat transfer, CFD, Nanofluids and solar energy. Omar currently works with three projects.

More information: https://www.researchgate.net/profile/Omar-Alomar-2

Conference Co-Chair

Yaseen Taha Mustafa received the M.Sc. degree in mathematics, with a specialization in applied mathematics, from the University of Duhok, Duhok, Kurdistan Region, Iraq, in 2005, and the Ph.D. degree in applied statistics of remote sensing and GIS from the Faculty of Geo-Information Science and Earth Observation, University of Twente (ITC), Enschede, The Netherlands, in 2012. He is currently a professor of applied remote sensing and GIS with the Faculty of Science, University of Zakho, Zakho, Kurdistan Region.

Prof. Mustafa supervised several projects related to remote sensing and GIS. His research interests include spatial statistical and spatiotemporal data in remote sensing and GIS, such as monitoring data, image analysis, issues of data quality, and Bayesian networks. He serves as a reviewer for a number of national and international journals. He has been involved with the editorial boards of several journals.

Prof. Mustafa is currently occupying the position of Vice President for scientific and postgraduate affairs at the University of Zakho.

More information can be found at www.yaseenmustafa.net

Chairman of IEEE Iraq Section

Sabiha Fadhil Jawad – SMIEEE, received a Diploma in Computer Science from the University of Technology in Baghdad, Iraq in 1997, and an M.Sc. in computer science/data security from the University of AL-Mustansiryia, Baghdad, Iraq in 2004, and a PHD from Common Wealth University in London. 2022, an MSC in Business Arts and Technology from London Graduate School.

I joined IEEE in 2009, and since that time I have worked as a volunteer in many positions in IEEE Iraq, such as Secretary for (4-years), Treasurer for (4-years), and currently I am the chair of the IEEE Iraq section since 2019.

I am responsible for many scientific activities held in many Iraqi universities and conferences held since 2009. My responsibilities cover the EDAS management of all conferences and I am also a member of the scientific steering committees of all these conferences (more than 45 IEEE technically sponsored conferences). I also participated in organizing many scientific activities (for students) within many Iraqi universities under the umbrella of IEEE. I spent 37 years in two Iraqi universities: Babylon University (1991-1994), and Al-Mustansyria University (1994-2019).

I taught many classes for BSC students. I published more than 40 papers. I also participated in publishing chapters in two books published by IGI-Global. Many graduation projects (fourth class BSc) were supervised by me. I am also a member of many councils, especially of computers (in Iraq), human rights, and engineering management associations. I am a member of many scientific committees in many Iraqi universities. I am a member of the scientific reviewers for many IEEE conferences held in Iraqi universities.

Conference Secretariat

Asst. Prof. Dr. Ramadhan Jahfar Mstafa is originally from Duhok, Kurdistan Region, Iraq. He received a BSc degree in computer science from the University of Salahaddin, Erbil, Iraq in 2003 and an MSc degree in computer science from the University of Duhok, Duhok, Iraq in 2008. In 2017, Dr. Mstafa graduated with a PhD in computer science and engineering from the University of Bridgeport, Bridgeport, CT, USA.

Dr. Mstafa is head of the Computer Science department at the University of Zakho, Zakho, Kurdistan Region, Iraq. The areas of his research include image processing, wireless sensor networks, security, machine learning, watermarking, and steganography. He has published 30 papers in international journals and conferences in his areas of expertise. He also serves as a reviewer and review editor in a wide range of prestigious publishers, including IEEE Transactions, Elsevier, Springer, Springer plus, MDPI, Wiley, Frontiers, and PLOS ONE. He is a member of several technical and honorary societies, including the IEEE computer society and ACM. Additionally, he has more than 15 years of experience teaching at different universities and technical institutes in Iraq, including the supervision of MSc and PhD students. Dr. Mstafa is one of the committee members for reforming the teacher trainees' program in the Ministry of Higher Education and Scientific Research of the Kurdistan Regional Government.

Conference Secretariat

Rakan Khalil ANTAR got his B.Sc, M.Sc and Ph.D degrees from the University of Mosul, Iraq in 2002, 2005 and 2013 respectively. He has assistant prof. degree science 2019. He was a director of Higher Education Division/Technical Engineering College/ NTU from 2007 to 2008, director of Statistics Division/Studies and Planning department / NTU from 2018 to 2019, director of the Scientific Affairs department / NTU from 2019 to 2021. Now he is an assistant Dean for Administrative and Financial Affairs in the Technical Engineering college, NTU, Mosul, Iraq. He was a chairman and member of several scientific committees, member of the committees of many scientific conferences, and chairman of the Scientific Promotions Committee at the Technical College of Engineering / Mosul.

He has six months training course at the University of Northumbria/Newcastle, UK and been identified on electrical appliances in the power lab and apply many practical projects including Real-time system. He is concerned in power electronics, power quality, power converters and drives, and renewable energies. He has authored and co-authored 36 papers in national and international journals and conferences. He was supervising 4 M.Sc. students and now 3 M.Sc. and 2 Ph.D. national and international students. He joined the NTU as a staff member science 2005 in the Technical Engineering College, Mosul.

Keynotes

MODELING THE BEHAVIOR OF THE WIRELESS LINEAR SENSOR NETWORKS

Prof. Dr. Saad Talib Hasson Aljebori

Wireless sensor networks (WSNs) have been widely recognized as a promising technology that can enhance various aspects of infrastructure monitoring. WSNs are widely used in monitoring and tracking systems. Wireless sensor nodes are key technology that commonly applied in many useful real applications. WSNs applications can be created by distributing number of sensors in different deployment approaches. Most applications of wireless sensor networks require reliable and timely data communication with maximum possible network lifetime under low traffic regime. These requirements are very critical especially for the stability of wireless sensor and actuator networks.

There are special environments requires specific networks structures. In monitoring pipelines, bridges, tunnels, railways, border lines and Highways, a special class of WSN in which nodes deployed in linear structure can be proposed to form a linear wireless sensor network (LWSN) that extended to long distance area. In wireless sensor networks, node placement plays a significant role in terms of meeting design goals, such as cost effectiveness, connectivity, lifetime, and data latency. For example, in tunnel environments, the energy consumption of sensor nodes and relay nodes is imbalanced because of the long and narrow shape of tunnels.

WSNs can be deployed in different fields in order to provide online insights into the surroundings of the observed infrastructure. In some critical applications, WSN can form a linear or semi linear network topology which is called Linear Wireless sensor network (LWSN). LWSN is one of the special classes of the network topology for WSNs. In addition, LWSNs have unique features such as long distance and narrow network compared to another network topology. In LWSN, sensor nodes are distributed in linear structure with narrow region along the network with distance reaches to hundreds of kilometers. Therefore, it's not possible to communicate with the sink in single hop form. Moreover, traffic generated by far sensors from the sink will have to use other nodes to transfer their generated traffic.

Therefore, data traffic will be delivered within significant delay. The schemes for balancing energy in WSNS are not suitable for LWSN as nodes in LWSN have unique characteristic. Nodes near the sink deplete their energy quickly as they deal with heavy traffic compared with other nodes in the network. Load balancing between sensor nodes in LWSN is a challenge.

Biography – Prof. Dr. Saad Talib Hasson Aljebori

A Professor in Electrical and Electronic Engineering, and with a PhD in Network Modeling and Simulation. An expert in Simulating Vehicular Networks, Wireless Sensor Networks and Optimization. A Researchers and Post Graduate Students Supervisor in the department of Networks- College of Information Technology- University of Babylon-Iraq.

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https://scholar.google.com/citations?user=-3b98BMAAAAJ&hl

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College of Information Technology
University of Babylon
Iraq

ENGINEERING APPLICATION OF BIOENERGY SYSTEMS, DEVELOPMENTS & CHALLENGES

Assoc. Prof. Dr. Obed Majeed Ali

Bioenergy is one of the most important research fields in meeting global future energy demands. This contribution can be extended significantly in the near future, by reducing the greenhouse gas emission and saving environment, as well as improving trade balances, contributing to energy security, providing opportunities for economical development of society in rural areas. Bioenergy is the only renewable source that can replace fossil fuels in all energy markets in the production of heat, electricity, and fuels for transport. Many bioenergy principles can be used to convert biomass feedstock into final bioenergy products. A wide variety of conversion technologies are under construction, with improved competence, lower costs and improved environmental protection. However, the possible competition between raw materials for bioenergy with other biomass applications must be carefully answered. Logistics and infrastructure issues should be spoken off, and there is need for further scientific innovations leading to more competent and cleaner conversion of more assorted feedstock.

Biography – Assoc. Prof. Dr. Obed Majeed Ali

obtained Bachelor of Mechanical Engineering (Hons) in 2000 and a Master of Science in Mechanical Engineering in 2002 from the Department of Mechanical Engineering / College of Engineering at Mosul University, Iraq. Dr. Obed Majeed Ali obtained his DOCTOR OF PHILOSOPHY in Mechanical Engineering (Renewabe Energy and Alternative Fuel) in 2014 from University Malaysia Pahang, Malaysia. After finishing his PhD., he worked as a senior lecturer at Faculty of Mechanical Engineering-University Malaysia Pahang, Malaysia. He supervised many PhD and Master Students and published more than 100 technical papers in very reputable journals and international conferences in the area of Renewable energy utilization, Alternative fuel, energy efficiency, engine performance, exhaust emissions and fuel additives. Dr. Obed Majeed Ali works currently at the Northern Technical University, Iraq. His present research interests are Renewable energy utilization, Biofuel, combustion and emissions IC engines, Alternative future green fuel, Fuel additives, Environmental pollution. Dr. Obed Majeed Ali is a Chartered Engineer (CEng), Institute of Mechanical Engineers (IMechE) of UK and also registered with American Association for Science and Technology (AASCIT), USA and the Iraqi Engineers Society, Iraq. He has been listed as one of the Top 2% Scientists Worldwide Identified by Stanford University 2021.

Conference Date and Venue

Conference date and time

The conference date is September 21st to 22nd, 2022.

Venue

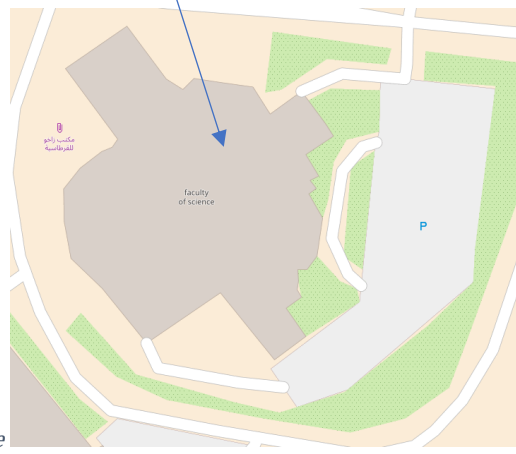
The first day of the conference will be held at conference hall at Faculty of Science of University of Zakho, Zakho City at 9:00.

The 2nd day of the conference will be held at the Technical College of Administration halls at Duhok Polytechnic University, Zirka, Duhok City at 8:30.

Maps

Locations of the first day of the conference

University of Zakho



Faculty of Science

Location of the second day of the conference

Duhok City Map

Technical sessions in DPU

Hotels

Zakho:

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

Duhok:

Dilshad Palace Hotel

Address:

Zakho Way, near Duhok Polytechnic University, Opposite to Dream City, Duhok, Kurdistan Region of Iraq

Contacts:

Website: www.dilshad.place.com

Email: info@dilshad.palace.com

Mobile: +00964627227601-9

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

Hotel Sargali

Address:

Zakho Way, Duhok 10001, Near Duhok Zoo

Contacts:

Phone: +9647514772727

Program at a glance

DAY 1

Opening Ceremony

Time	Zakho - Conference Hall
09:00-16:30	Registration
10:00-10:05	Opening Ceremony
10:05-10:15	President Speech (University of Zakho)
10:15-10:25	President Speech (Duhok Polytechnic University)
10:25-10:35	President Speech (Northern Technical University)
10:35-10:45	MHE-KRG Speech
10:45-10:50	Conference Chair Speech
10:50-11:00	IEEE Representative Speech
11:00-11:30	Modeling the Behavior of the Wireless Linear Sensor Networks
11:30-12:00	Engineering Application of Bioenergy Systems, Developments & Challenges
12:00-12:15	Photo Session
12:15-13:30	Lunch

Technical Sessions

Time	Zakho Hall S1	Zakho Hall S2	Zakho Hall S3	Zakho Hall S4	Zakho Hall S5
13:30-14:50	*Session 01*	*Session 02*	*Session 03*	*Session 04*	*Session 05*
15:00-15:30	*Coffee Break*				
15:30-16:50	*Session 06*	*Session 07*	*Session 08*	*Session 09*	*Session 10*

DAY 2

Technical Sessions

Time	Duhok Hall A1	Duhok Hall A2	Duhok Hall A3
09:00-10:20	*Session 01*	*Session 02*	*Session 03*
10:30-11:00	*Coffee Break*		
11:00-12:20	*Session 04*	*Session 05*	*Session 06*
12:30-14:00	*Lunch*		
14:00-15:20	*Session 07*	*Session 08*	

Closing Ceremony

Time	Duhok - Hall N1
16:00-16:10	*Closing Ceremony*
16:10-16:40	*Distribution of Certificates*
16:40-16:50	*Best 3 Paper Awards*
16:50-17:00	*Best 3 Reviewers' Awards*
17:00-17:30	*Conference Conclusion*
17:30-19:00	*A Trip to Zawa Mountain*

Technical Sessions

Wednesday, September 21

Wednesday, September 21 13:30 - 14:50

Session 01

Room: Zakho - Hall S1

Forecasting the Ratio of the Rural Population in Iraq Using Box-Jenkins Methodology
Qais Mustafa Abdulqader

Support Vector Machine Based on an Automated Classification for Covid-19 Using X-Ray Images
Dilovan Asaad Zebari, Dawlat Mustafaa, Shereen Saleem Sadiq, Merdin Salih and Nechirvan Zebari

Analysis and Classification of Autism Data Using Machine Learning Algorithms
Sulav Adil Taher and Masoud Muhammed Hassan

Estimating the Optimal Cluster Number for Vehicular Network Using Scott's Formula
Fady E. F. Samann and Shavan Askar

Session 02

Room: Zakho - Hall S2

Metal Free Boron Nitride QDs as Ultraviolet Driven Photocatalyst, Theoretical & Experimental Study
Shinwar Idrees, Khalid Omer and Lazgin Jamil

Synthesis and Investigation of Physicochemical Characteristics of Granulated LSX in Various Form
Kanaan R Ahmed, Irina Pavlova, Boris Kutepov and Olga Travkina

Magnetic Susceptibility of Metal Ion Loaded over Faujasite Y Zeolite
Kanaan R Ahmed, Irina Pavlova, Olga Travkina, Boris Kutepov and Arslan Akhmetov

Study of Xanthate Ligand Complexes with Transition Metal & Their Adducts with Nitrogen Base Ligands
Mohammed Molla-Babaker, Maher Ali and Saad AL-Mkhtar

Session 03

Room: Zakho - Hall S3

Flexural Retrofitting of Reinforced Concrete Bridges; Applications
Mand K Askar, Riadh Al-Mahaidi, Yaman Sami Shareef Al-Kamaki and Ayad Al-Yousuf

Influence of Particle Size Distribution in Compaction Parameters of Fine Grained Soils
Mohammed Yaseen Abdullah

Hydration and Micro-Structure of UHPC Containing Different Pozzolanic Materials: A Review
Sevar Neamat, James Haido and George Wardeh

The Contribution of Using BIM and EDMS Technique
Sabiha Fathil Jawad and Bushra Rasheed Zarzor

Session 04

Room: Zakho - Hall S4

Blockchain for Big Data Security, Issues, Challenges and Future Directions
Shimal Shukri Taher, Siddeeq Yousif Ameen and Jihan Rasool

Review on Image Segmentation Methods Using Deep Learning
Najdavan Kako, Nabeel Ali and Abdo Abdi

A Circular Dipole Nanoantenna with Improved Performance
Abdalem Rasheed and Khalil Hassan Sayidmarie

Fast Full-Search Algorithm of Fractal Image Compression for Acceleration Image Processing
Baydaa Shaheed and Hanan A. R. Akkar

Session 05

Room: Zakho - Hall S5

Energy Efficiency Parameters Evaluation for 5G Application
Fatimah H. Mohialdeen and Farhad E. Mahmood

Improved and Secured Distributed Space-Time Block Codes in Wireless Networks
Mohamed Khalid and Samaa Alsaffar

PSO Algorithm for Three Phase Induction Motor with V/F Speed Control
Qusay Hussein

Simulating the Wireless Sensor Networks Coverage Area in a Mesh Topology
Saad Talib Hasson and Zainab Mohammed Ali

Wednesday, September 21 15:30 - 16:50

Session 06

Room: Zakho - Hall S1

Smart Homes for Disabled People: A Review
Asaad Ibrahim, Masoud Muhammed Hassan and Ismael Ali

Web Towards the Semantic Web: A Review of Recent Trends in Its Domains
Ayah Ahmed and Chira Nadheef Mohammed

Semantic Clustering Documents Using Mini Batch K-Means Method
Vaman Haji, Rowaida Ibrahim and Karwan Jacksi

Investigation of Healthcare Security Using Blockchain Technology: A Review
Shimal Shukri Taher, Marya A Omer and Siddeeq Yousif Ameen

Session 07

Room: Zakho - Hall S2

A Comprehensive Survey for Cryptography Implementation Using Quantum Computing
Subhi Zeebaree and Rowaida Ibrahim

Classification of Network Data with Machine Learning Methods for Intelligent Intrusion Detection Sys
Awf Abdulrahman Ramadhan and Muhammet Baykara

Future Security Issues in Internet of Energy
Chahrazed Benrebbouh, Houssem Mansouri, Sarra Cherbal and Al-Sakib Khan Pathan

Bayesian Deep Learning Applied to LSTM Models for Predicting COVID-19 Confirmed Cases in Iraq
Dozdar Mahdi Ahmed and Masoud Muhammed Hassan

Session 08

Room: Zakho - Hall S3

Arabic Code Generation Based on Four Direction of Human Eye
Meaad M. Salih and Khalil Alsaif

2D Facial Images Attractiveness Assessment Based on Transfer Learning of DCNN
Jwan Najeeb Saeed, Adnan Brifcani and Dheyaa Ahmed Ibrahim

Predicted of Software Fault Based on Random Forest and K-Nearest Neighbor
Mustafa Zaki Mohammed and Ibrahim Ahmed Saleh

Active Fault Prediction Control Against Aircraft Actuator Performance Analysis
Wathiq Abed

Session 09

Room: Zakho - Hall S4

Real Time Control System for Wheel Chair of Disabled People Using EEG Signal
Nadhim Sayel, Salah A Albermany and Bayan Sabbar

Building a Real-Time System to Monitor Students Electronically Based on Images of Face Movement
Nagham Tharwat Saeed and Hasan M. Maher Ahmed

Improved Northern Goshawk Optimization Algorithm for Global Optimization
Haval Sadeeq and Adnan Brifcani

Diseases Diagnosis Using Machine Learning of Medical Images
Shakir Mahmood Abas and Omer Hassan

Session 10

Room: Zakho - Hall S5

Fog Computing in 5G Mobile Networks: A Review
Fady E. F. Samann, Siddeeq Yousif Ameen and Shavan Askar

Handwritten Signature Forgery Detection Using PCA and Boruta Feature Selection
Omar M. Malallah

Improving the Clustering Performance of K-Means Algorithm for Non-Linear Clusters
Abdulkadir Sengur, Adel Al-zebari and Naaman Omar

The Kurdish Language Corpus: State of the Art
Media Azzat, Karwan Jacksi and Ismael Ali

Thursday, September 22

Thursday, September 22 9:00 - 10:20

Session 01

Room: Duhok- Hall A1

Influence of Quantum Computing on IoT Using Modern Algorithms
Subhi Zeebaree and Rezgar Hasan Saeed

The Use of Toulmin's Argumentation Model in Solving the Drug Conflict Problems
Ali Hasan

Detecting Unusual Pulse Heart Rate Using Digital Twins for Human Heart
Alauddin Yousif Al-Omary

Affinity Propagation and K-Means Algorithm for Document Clustering Based on Semantic Similarity
Avan Atam Mustafa and Karwan Jacksi

Session 02

Room: Duhok- Hall A2

A Review of the Various Machine Learning Algorithms for Cloud Computing
Sandy Victor Amanoul and Ibraim Ahmed

DDoS Detection Using Active and Idle Features of Revised CICFlowMeter and Statistical Approaches
Basheer Husham Ali, Nasri Sulaiman, Syed Abdul Rahman Al Haddad, Rodziah Atan and Siti Lailatul Mohd Hassan

Combination of Stream and Block Image Encryption Algorithms in Pixel Scrambling Using Henon Map
Araz Rajab Abraham

Generating Masked Facial Datasets Using Dlib-Machine Learning Library
Waleed Ayad Mahdi, Siraj Qays Mahdi and Ali Al-Naji

Session 03

Room: Duhok- Hall A3

A Study of Gender Classification Techniques Based on Iris Images: A Deep Survey and Analysis
Basna Mohammed Salih Hasan and Ramadhan J. Mstafa

Link Prediction in Co-Authorship Networks: A Review
Hajar Hasin, Diman Hassan and Ismael Ali

Tongue Color Analysis and Disease Diagnosis Based on a Computer Vision System
Abdulghafor Khudhaer Abdullah, Ali Naji and Saleem Mohammed

Fingerprints Clustering with Unsupervised Deep Learning
Raid Al-Nima and Luluwah A.Y Al hbeti

Thursday, September 22 11:00 - 12:20

Session 04

Room: Duhok- Hall A1

Impact of Using Colored Pigments on Rigid Concrete Pavements
Ziyad N. Aldoski and Ismael Albarwary

The Influence of Horizontal Curve on Traffic Crashes: A Review
Radhwan Alzeebaree, Bakhtiyar Khawaja, Abdulbasit Muhmood and Alaa Mohammedameen

Physiochemical Assessment of Drinking Water Quality in Brifkan Village, Duhok Region, Iraq
Payman Hassan Mohammed, A.

Green Rating Systems Development and Trend Worldwide for Sustainable Built Environment
Omar Sedeeq Yousif, Rozana Zakaria, Vikneswaran Munikanan, Jam Khan, Shaza Rina Sahamir and Noraziah Wahi

Session 05

Room: Duhok- Hall A2

Salp Swarm Algorithm-Based Position Control of a BLDC Motor
Omar Mohsen Hussein

Peak to Average Power Ratio Reduction for OFDM with IM System
Bana Hassan Shekh Faraj and Abdulrahman Ikram Siddiq

Compact Reconfigurable Band-Reject/All-Pass Microstrip Filter Using U-Shaped Slot
Arqam Shareef and Khalil Hassan Sayidmarie

PV System Based Speed Control of Induction Motor by Space Vector Pulse Width Modulation
Salsabeel Hassan Taha

Session 06

Room: Duhok- Hall A3

Angle Diversity Receiver for Indoor Optical Wireless Communication Systems
Roua Moafaq Al-taee, Mahmod Ahmed Mahmod and Safwan Younus

Survey: QoE-Oriented Wireless Resources Scheduling for a Multipath Video Streaming
Huthaifa L. Mohamed and Ahlam Fadhil Mahmood

DHFogSim: Smart Real Time Traffic Management Framework for Internet of Vehicles in a Fog Computing
Dhuha Basheer Abdullah, Albazaz and Hesham Hashim Mohammed

Comparison and Assessment of PV Module Power Prediction Based on ANN for Iraq Weather
Hussain Hamdi Khalaf

Thursday, September 22 14:00 - 15:20

Session 07

Room: Duhok- Hall A1

Iraqi Construction Industry Digitalization: Trends, Opportunities and Challenges
Omar Sedeeq Yousif, Rozana Zakaria, Imran Mohsin, Eeydzah Aminudin, Jawa Gara, Loganathan Singaram and Ruzaini Khalid

Bond Strength Between the Reinforcement Rebar and Geopolymer Concrete: A Review
Alaa Yousif Hussein and Hasan Albegmprli

Using Polymers to Improve Asphalt Pavement Performance
Radhwan Alzeebaree, Jiman Hasan and Nasreen Hussein

Nuerical Simulation of Carbon Monoxide Dispersion Inside Urban Roadway Tunnels
Mokhtar Mahmoodi, Hazhir Karimi, Sevar Neamat and Borhan Riazi

Session 08

Room: Duhok- Hall A2

Meta-Analysis with Assessment of Some Phylogenetic Relationship of Entamoeba Histolytica of Iraq and
Azad Meerkhan

Preparation, Characterization and Releasing -Swelling Kinetics of Myrrh Based Hydrogel
Mohammed Khalil Younis, Alabbasi and Mohammed Ehsan Hamodi

Synthesis and Characterization of Some New Nitrone Derivatives and Screening Their Biological Activi
Jihad Haji Mohammed and Nabaz Abdulmajed Mohammad Salih

Abstracts

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570813081

Angle Diversity Receiver for Indoor Optical Wireless Communication Systems

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Abstract

Many factors, such as direct spotlights and multipath propagation, contribute to the deterioration of the optical wireless communication (OWC) system's performance in the interior environment. In this study, we look at angle diversity receiver (ADR) that can assist to mitigate these issues by rejecting direct pathways from the spotlights and allowing only reflected rays to reach the receiver. ADR also shortens the distance between the sender and the recipient, resulting in less path loss and delay spread. ADR consists of five photodetectors and each photodetector is directed in a precise direction to improve the system's performance by providing a specified field of view (FOV). Elevation angles are optimized to enhance the signal-to-noise ratio (SNR) by changing the angle in steps. Select the Best (SB) scheme is used to choose the detector with the greatest SNR. The computations are done with the help of the MATLAB program. The ADR's results are compared to the conventional diffuse system's (CDS) results, where the bit error rate (BER), and the delay spread are lowered greatly, and the 3-dB bandwidth of the channel is extended, according to the findings.

Keywords— optical wireless communication; signal to noise ratio; field of view; angle diversity receiver

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570815305

Review on Image Segmentation Methods Using Deep Learning

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Abstract

In recent years, the machine learning field has been inundated with a variety of deep learning methods. Different deep learning model types, including recurrent neural networks (RNNs), convolutional neural networks (CNNs), adversarial neural networks (ANNs), and autoencoders, are successfully tackling challenging computer vision problems including image detection and segmentation in an unconstrained environment. Although image segmentation has received a lot of interest, there have been several new deep learning methods discovered with regard to object detection and recognition. An academic review of deep learning image segmentation methods is presented in this article. In this study, the major goal is to offer a sensible comprehension of the basic approaches that have already made a substantial contribution to the domain of image segmentation throughout the years. The article describes the existing state of image segmentation, and goes on to make the argument that deep learning has revolutionized this field. Afterwards, segmentation algorithms have been scientifically classified and optimized, each with their own special contribution. With a variety of informative narratives, the reader may be able to understand the internal workings of these processes more quickly.

Keywords— Image segmentation, Deep learning, Convolutional neural networks, Encoder-decoder models, Semantic segmentation.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID:1570815322

2D Facial Images Attractiveness Assessment Based on Transfer Learning of Deep Convolutional Neural Networks

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Abstract

While beauty is subjective, it is not easy to quantify. Assessing facial beauty based on a computer perspective is an emerging research area with various applications. Different trainable models have been proposed to identify the attractiveness of facial beauty utilizing different types of features, machine learning techniques and lately, convolutional neural networks (CNNs) have proven their efficiency in image classification. The main objective of recent previous work is to enhance the performance of the existing trainable methods and make them suitable for beauty attractiveness identification. In this study, the accuracy and effectiveness of four affective pre-trained CNNs models (AlexNet, GoogleNet, ResNet-50, and VGG16) in assessing the attractiveness of human facial images using the CelebA dataset have been explored, evaluated, and analyzed. The results demonstrate that GoogleNet surpassed the investigated pre-trained networks with a performance accuracy of 82.8%.

Keywords— facial attractiveness assessment, deep learning, convolutional neural networks, transfer learning, pre-trained CNNs

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570815367

A Circular Dipole Nanoantenna with Improved Performance

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Abstract

Nanoantennas have attracted much attention because of their unique ability to collect light into subwavelength dimensions while enhancing a high electric field via localized surface plasmon resonance. Engineering the shape and size of the nanoantenna mostly focuses on improving the confined field or altering the resonance wavelength. This study focuses on regulating the absorption and scattering properties of a circular-dipole nanoantenna by inserting a circular hole into the circular part of the dipole. The proposed geometry can significantly increase absorption while also inhibiting scattering, allowing the optimal operating state to be achieved through the efficient utilization of optical gain. The scattered power of a solid circular dipole nanoantenna can be up to 85%, while the remaining 15% of the incident power is absorbed. It is shown that the absorbed coupled power in the hollow circular dipole can be increased to 55%. This property results in optimal plasmonic localization of the field in the gap of the dipole nanoantenna. This finding can be deployed in photovoltaics, thermoplastics

Keywords— Plasmonic, Nanoantennas, Absorption, Scattering, Optical, Wavelength.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570815581

Tongue Color Analysis and Disease Diagnosis Based on a Computer Vision System

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Abstract

The tongue reflects the state of the internal organs of the body and their abnormal behavior, such as problems of the heart, liver, pancreas, stomach, intestines, blood diseases, which leads to changes in some of the features and characteristics of the tongue. The most important of which is the color of the tongue, which can be adopted as a vital criterion used in computerized diagnostic systems. Quantitative diagnosis of the tongue requires some devices, including image acquisition devices such as cameras, light sources, filters, color checkers, and image analysis and processing devices by applying some algorithms or image processing and color correction programs in addition to the computer. These devices are called Tongue Diagnostic Systems. This study proposes a real-time imaging system to diagnose some diseases related to tongue color using a Webcam under specific conditions. The proposed system was designed by MATLAB environment Graphical User Interfaces, with an audio message specifying the tongue color and type of disease and sending an SMS with the result of the examination to the mobile phone of the patient or to the person providing the care for the patient. After testing the system on a data set of 50 images, the preliminary results showed that the proposed system gives diagnosis accurate rate of 94% compared to laboratory results. With ease of use and implementation and low cost. This gives impetus to further studies to apply computerized diagnosis in medical applications, to enhance the medical reality, monitor patient health, and make an accurate diagnosis.

Keywords— Tongue diagnosis; color analysis; computer vision system.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570815603

Energy Efficiency Parameters Evaluation for 5G Application

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Abstract

The deployment of mobile telecommunication networks has increased dramatically in recent decades. This increase in the number of mobile devices, and towers yields to increase in consumed energy. Hence, the need for energy efficiency (EE) has increased to reduce cost and pollution. In this paper, the following parameters are studied to enhance EE: increasing the number of base station antennas, increasing the number of user equipment (UEs), and other parameters such as channel state information (CSI). The purpose of this study is to look into how improvement might be achieved. Using the MATLAB program, this article analyzes and enhances EE using a mathematical model in the fifth generation of wireless communication (5G) massive multiple-input multiple-output (Massive-MIMO). The EE effectiveness is demonstrated through simulation results and shows how different parameter selections affect the fundamental balance between EE and spectral efficiency (SE) or only on the EE. The results show that a couple of parameters enhance the EE-SE curve, such as the number of base station antenna, transmit bandwidth, circuit power, number of users, and the availability of CSI. The increase in the number of base station antennas is considered to be a simple solution to increase the EE before the increase in circuit power. Increasing the number of antennas, also, reduces the impact of having imperfect CSI. The results show an increasing number of antennas with respect to the number of users from 4 to 10 do not increase EE, yet increase the SE by around %55.

Keywords— 5G, energy efficiency, spectral efficiency, massive MIMO.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570815822

Combination of Stream and Block Image Encryption Algorithms in Pixel Scrambling Using Henon Map

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Abstract

In recent years, sending digital photos over open networks has become a serious privacy concern. Sadly, there are a lot of privacy and security risks present despite the environment's suitability and great benefits. The novel image encryption technique proposed in this paper is based on the two-dimensional Hénon map, which is used twice to produce the random sequences required for confusion and diffusion. The 2-D Hénon map initial random sequence key is used to stream-scramble the pixels in each and every block of the image during the confusion stage. At the diffusion stage, the second random sequence key is used in a triple XOR structure to change the pixel positions and create an encrypted image. The experiments' findings show that the suggested approach fixes the problems with traditional encryption methods. The proposed method costs less to compute and performs better on many security tests. Because of its size, the key space cannot be protected from brute-force attacks. The histogram of the encrypted image differs from the original image and is evenly spaced. The results of the correlation test reveal no correlation between the adjacent pixels. The suggested algorithm is sensitive to the key value, and even small changes result in a different image. Therefore, real-time image encryption applications over open networks are appropriate for the novel approach.

Keywords— Pixel permutation, Chaotic System, Encryption, Decryption, Henon Map.

Institute of Electrical and Electronics Engineer Paper ID: 1570815823

Predicted of Software Fault Based on Random Forest and K-Nearest Neighbor

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Abstract

Software systems have gotten increasingly complicated and adaptable in today's computer world. As a result, it's critical to track down and fix software design flaws on a regular basis. Software fault prediction in early phase is useful for enhancing software quality and for reducing software testing time and expense; it's a technique for predicting problems using historical data. To anticipate software flaws from historical databases, several machine learning approaches are applied. This paper focuses on creating a predictor to predict software defects, Based on previous data. For this purpose, a supervised machine learning techniques was utilized to forecast future software failures, K-Nearest Neighbor (KNN) and Random Forest (RF) applied technique applied to the defective data set belonging to the NASA's PROMISE repository. Also, a set of performance measures such as accuracy, precision, recall and f1 measure were used to evaluate the performance of the models. This paper showed a good performance of the RF model compared to the KNN model resulting in a maximum and minimum accuracy are 99%,88% on the MC1 and KC1 responsibly. In general, the study's findings suggest that software defect metrics may be used to determine the problematic module, and that the RF model can be used to anticipate software errors.

Keywords— Defect prediction; Machine learning; Software engineering; Software fault; K -Nearest Neighbor; Random Forest.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570815917

Compact Reconfigurable Band-Reject/All-Pass Microstrip Filter Using U-Shaped Slot

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Abstract

This paper proposes a compact reconfigurable filter that uses a resonant element in the form of a folded slot. The U-shaped slot is embedded into the 50 Ohm microstrip line. Due to folding, the slot length is reduced to ¼ the effective wavelength leading to considerable miniaturization compared with the filters that use resonant elements like rings or coupled open-circuited or short-circuited stubs. The presented design example at the WLAN frequency of 2.45 GHz can be configured between a band-reject and all-pass states, by placing a PIN diode at the center of the slot. The proposed filter was investigated using the CST Studio Suite Software - 3D Electromagnetic Simulation. The obtained results showed low insertion loss in the band-pass state and high rejection in the stopband state. The tests of the fabricated prototype showed comparable results to the simulation one thus verifying the design.

Keywords— reconfigurable filters; band-reject; microstrip filters; slots; notch filters.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570816757

Simulating the Wireless Sensor Networks Coverage Area in a Mesh Topology

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Abstract

Wireless Sensor Networks (WSNs) have many crucial applications. WSNs can be created from number of deployed sensor nodes in a certain area. These nodes can be deployed randomly. Sensors are mainly utilized to track or monitor any modifications in a surrounding area. They can be used to monitor, gather information then, process and transfer the sensed data to a certain sink node. One of the main objectives of any proposed WSNs is to safely transfer the sensed data with minimum energy consumption and with reduced packet losses. The data transmissions in WSNs are affected by the network topology. The network topology in this paper is mesh topology. Each sensor in such a topology can communicate directly with its neighbors if they are located in its transmission range. The data transmission is performed through the shortest path. The problem in this work is to analyze and evaluate the effects of mesh topology on the coverage area and evaluate the cases when many sensor nodes send messages at the same time.

Keywords— WSN; Coverage area; Mesh topology.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570816763

DHFogSim: Smart Real Time Traffic Management Framework for Internet of Vehicles in a Fog Computing

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Abstract

Clouds are the most powerful computation architecture; nevertheless, some applications are delay sensitive and need real time responses. Offloading tasks from user device to the cloud will take relatively long time and consumes network bandwidth. This motivates the appearance of fog computing. In fog, computing additional layer falls between user device layer and the cloud. Offloading tasks to fog layer will be faster and save network bandwidth. Fog computing has spread widely, but it is difficult to build and test such systems in real word. This led the developers to use fog simulation frameworks to simulate and test their own systems. In this paper, we adopt fog simulation formwork, which adds smart agent layer between user device and fog layer. The framework proposes using multilevel queue instead of single queue at the Ethernet layer, these queues are scheduled according to weighted round robin and tasks dispatched to theses queues according to the value of Type of Service (ToS) bits which falls at the second byte inside the IP header. The value of ToS bits given by the smart agent layer according to take constraints. Framework behavior compared with mFogSim framework and the results shows that the proposed framework has significantly decrease the delay on both brokers and fog nodes. Moreover, packet drop count and packet error rate are slightly improved.

Keywords Vehicular Cloud Computing, Big Data, weighted round robin, Internet of Things, OMNET++

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570816769

Generating Masked Facial Datasets Using Dlib-machine Learning Library

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Abstract

In 2020, the COVID-19 pandemic spread globally, as this led to countries imposing health restrictions on people such as wearing of masks to prevent the spread of the disease. Wearing a mask leads to a significant decrease in the distinguishing power, due to its concealment of the main facial features. After the outbreak of the pandemic, the existing datasets became unsuitable because they did not contain images of people wearing masks. To address the shortage on large scale masked faces datasets, a method proposed to generate artificial masks and place them on the faces in the unmasked faces dataset to generate the masked faces dataset. Following the proposed method, masked faces are generated in two steps, first, the face is detected in the unmasked image, then the detected face image is aligned, the second step is to overlay the mask on the cropped face images using the dlib-ml library. Depending on the proposed method, two datasets of masked faces called masked-dataset-1 and masked-dataset-2 were created. Good results were obtained when they were evaluated using the Labeled Faces in the Wild (LFW) dataset and two of the state-of-the-art facial recognition systems for evaluation are FaceNet and ArcFace, where the accuracy of using the two systems was 96.1 and 97, respectively with masked-dataset-1 and 87.6 and 88.9, respectively with masked-dataset-2.

Keywords: Masked Face Datasets, Artificial Masks, COVID-19, dlib-ml library.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570816876

Real Time Control System for Wheel Chair of Disabled People Using EEG Signal

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Abstract

This paper introduces a real time control system of disabled electric wheel chair based on using electroencephalography (EEG) data and make sense of it. The main goal is increasing the accuracy rate if the brain control system by using a machine learning algorithm called back propagation (BP). There are a lot of EEG samples taken from a lot of people who all had healthy brains so that they can pick the best EEG channel that can be used as a learning input. After classification find AF3 and AF4 is the most important EEG channel in Emotiv. For directional classification, AF3 is the most important channel for left and AF4 is the most important channel for right. A microcontroller called an Arduino is used to control the movement of the wheels, and our software is used to do this. There is now a brain-controlled electric wheelchair with better and more accurate EEG classification as a result of this study.

Keywords— Electroencephalographic (EEG); back propagation (BP); Feature Extraction; Classification.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570817917

Classification of Network Data with Machine Learning Methods for Intelligent Intrusion Detection Systems

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Abstract

In information systems, it has become very important to store personal and institutional information and access it safely and quickly when necessary. To ensure the confidentiality of information against unauthorized access, institutions or organizations must protect their important data securely and take various precautions. Intrusion detection systems (IDS) are among these measures. One of the issues that should be carefully considered while creating an IDS is the dataset to be used. In terms of IDS, a dataset is the data obtained from network packets or log records that contain attack data and are necessary to identify attack patterns during the training and testing stages of the system. In this article, widely used machine learning techniques (decision tree, K-nearest neighbor, and support vector machine algorithms) are used to increase the performance of IDSs. The studies were tested on the NSL-KDD dataset, one of the most used datasets in evaluating IDSs. As a result of the tests, it was seen that the highest accuracy rate was 99.7%, and the lowest accuracy rate was 98.7%. The obtained results have shown that the proposed machine learning methods can be used with high sensitivity and accuracy to develop smart IDSs.

Keywords— Intrusion detection systems; Information security; KDD'99; Machine learning; SVM

Institute of Electrical and Electronics Engineers (IEEE) Paper ID:1570819691

Building a Real-Time System to Monitor Students Electronically Based on Images of Face Movement

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Abstract

The spread of the Corona Virus pandemic on a global scale had a great impact on the trend towards e-learning. In the virtual exams the student can take his exams online without any papers, in addition to the correction and electronic monitoring of the exams. Tests are supervised and controlled by a camera and proven cheat-checking tools. This technology has opened the doors of academic institutions for distance learning to be wide spread without any problems at all. In this paper, a proposed model was built by linking a computer network using a server/client model because it is a system that distributes tasks between the two. The proposed student face recognition system is run on each computer (client) in order to identify and verify the identity of the student. When another face is detected, the program sends a warning signal to the server. Thus, the concerned student is alerted. This mechanism helps examinees reduce cheating cases in early time. The results obtained from the face recognition showed high accuracy despite the large number of students' faces. The performance speed was in line with the test performance requirements, handling 1,081 real photos and adding 960 photos. This technology has proven a great harmony in the processing speed and the speed of fraud detection during the performance of the electronic exam, in addition to the possibility of allowing many students to take the test and rely on this technology because the work is distributed between the server and the client.

Keywords— digital images, PCA algorithm; digital video.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID:1570819998

Improved Northern Goshawk Optimization Algorithm for Global Optimization

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Abstract

Global optimization has been used in many real-world problems. Nature-inspired meta-heuristic algorithms, such as the Northern Goshawk Optimization NGO algorithm that has just been proposed, are often used to solve these kinds of optimization problems. An NGO provides satisfactory results. In this algorithm, the proposed exploration model may not provide sufficient coverage of the problem space, trapping the system in a local optimal solution. To improve the performance of NGO, a novel and efficient improved northern goshawk optimization technique named INGO is proposed in this paper. In INGO, a new concept of switching between exploration and exploitation has been developed to improve overall algorithm performance to avoid being stuck in local optima. Also, to increase search capabilities, Levy Flight is used. Twenty-three known benchmark functions were used to test the performance of the proposed INGO. The results were compared to those of an NGO and some well-known robust algorithms. Experimental data indicates that the INGO suggested in this study consistently outperforms the traditional NGO and alternative methods in a significant number of test functions.

Keywords— Global Optimization; Metaheuristics; Exploration; Exploitation; INGO.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570820058

Peak to Average Power Ratio Reduction for OFDM with IM System

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Abstract

This paper is interested in studying the Peak to Average Power Ratio (PAPR) reduction in Orthogonal Frequency Division Multiplexing with Index Modulation (OFDM-IM) system transmitter. PAPR is a common issue in multicarrier transmission techniques which is the result of adding independent multicarrier signals of different peak values on the same phases. The reduction schemes have been diversely examined for classical OFDM and the majority of them can be directly extended to OFDM-IM while some require slight changes to suit the OFDM-IM characteristics. Selective Mapping (SLM), Partial Transmit Sequence (PTS), Tone Reservation (TR), and Peak Insertion (PI) are some examples on the reduction schemes that will be investigated throughout this paper. As for PI, to the best knowledge of the authors is for the first time implemented in OFDM-IM. The system parameters effects, number of total subcarriers (N), number of subblocks (n), the active subcarriers (k), and the activation ratio (r) are studied to gain the lowest PAPR amount possible that reached (1.2 dB) at specified system parameters.

Keywords— OFDM-Index Modulation; PAPR; Selective Mapping; Partial Transmit Sequence; Peak Insertion.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570820224

Blockchain for Big Data Security, Issues, Challenges and Future Directions

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Abstract

Over the last decade, worldwide data traffic has risen at an unprecedented rate, prompting a surge in interest in "big data. manufacturing, entertainment, and media. With this interest, Blockchain Technology, appeared as a promising technology that enables the transaction record to be continuously stored, protected with the digital signature, and validated by consensus. It operates under the concept of a digital ledger that is distributed. In this article, recent growth in blockchain interest as an alternative to traditional centralized systems has been presented and considered the emerging implementations thereof. In particular, the key approaches needed for the introduction of the blockchain and security issues. This includes the general issue behind the blockchain, description of the component, and the blockchain importance and connection with the big data. Thus, the paper focuses on reviewing the research in blockchain applications in securing big data. The paper compares big data security techniques and mechanisms provided by the blockchain approach considering security attacks that might shed light on Blockchain enthusiasts and researchers. Finally, the paper evaluates the various challenges of blockchain and put some recommendations for future research.

Keywords— Blockchain; big data security; decentralized; distributed, ledger.

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Future Security Issues in Internet of Energy

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Abstract

One of the most popular new technologies today is the Internet of Energy (IoE), which utilizes the Internet for collecting, organizing, optimizing and managing network energy information from various edge devices. In this way, a distributed smart energy infrastructure is developed. As IoE is essentially linked with the Internet, the cyber security concerns for this environment are also significant. Like any other technology connected with the Internet, IoE also is vulnerable to various kinds of attacks and threats. In this paper, we investigate the security issues in Internet of Energy. We study various security techniques proposed or developed for this environment during the recent years and discuss what to expect in the future.

Keywords— Internet of Energy (IoE), Security, Privacy, Cyber Security, Cyber Attacks.

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Arabic Code Generation Based on Four Direction of Human Eye

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Abstract

In this paper, we built a Desktop Application for a new encoding method presented to help disabled Arabic-speaking people. The proposed encoding method depends on the direction of the pupil of the eye so that the most frequently used letters have the shortest codes. The language characters are converted into a sign of the direction of movement of the human eye's pupil. The proposed system is a text entry system consisting of three parts. The first part included a CNN-based algorithm for evaluating the direction of the eye pupil, and the second part was an algorithm for building an encoding triple tree to generate the symbol for Arabic letters, while the third part involved Translate codes to its corresponding letter. The system was tested by a number of well-trained participants. The accuracy of the system goes up to 99.3% while the system's sensitivity reached 88.5% and total specificity 99.6%. also SCR and MSD metrics are computed.

Keywords— CNN; Eye pupil direction; SCR; Encoding triple tree; Morse Code.

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Diseases Diagnosis Using Machine Learning of Medical Images

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Abstract

Recently, the various diseases are infecting the humans due to their living environmental and the changes of the environmental. It is much important to identification and prediction of such diseases at earlier stagesv to prevent the outbreak these diseases. The identification of these diseases manually by the doctors is difficult. There are many of the chronic diseases that affect human. One of these diseases is the brain tumors that arise by the abnormal growth and division of brain cells which leads to brain cancer. The computer vision plays important role in human health field which gives accurate results that helps the human to tack the true decision. In addition, traditional technics are time consuming, expensive and addressed problem requires expert knowledge. This research aims to focus on the using simple deep learning architecture with accurate results. Moreover, the Convolution Neural Network (CNN) algorithm is used for reliable Classification of the brain tumor Image. The proposed models is showed very good results and reached almost 96.4% accuracy on Brain MRI Images for Brain Tumor Detection1 datasets.

Keywords— Brain tumor; Machine learning; MRI.

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Investigation of Cloud Computing Security Based on Machine Learning Algorithms

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Abstract

Cloud computing (CC) provides network services on request, especially data storage and processing capacity, without users' specific and direct management. CC recently became a collection of public and private data centers that provide the customer a shared Internet network. Edge Computing is an emerging computing and knowledge storage model that puts end-users closer together to increase reaction times and save communication power. However, CC and edge computing, face protection issues, including customer risk and corporate recognition that hinder the swift implementation of computing modeling. One solution to this problem because of complexity and severity is Machine Learning (ML) that consists of researching computational algorithms and naturally advance knowledge. The problem and solution issues are raised by the overview article that analyzes CC safety risks, problems, and solutions that use one or more ML algorithms. Study various ML algorithms, such as controlled, unmonitored, semi-supervised, and enforced training, to solve cloud protection problems. The paper assesses each technique's efficiency based on its characteristics, advantages, and drawbacks. In addition, it will have potential study guidance on safeguarding CC usages and applications.

Keywords— cloud computing; cloud security; cybersecurity.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID: 1570820992

Support Vector Machine based on an Automated Classification for Covid-19 Using X-ray Images

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Abstract

COVID-19 is now believed to be the most serious and lethal disease induced by a novel coronavirus in the human body. In December of 2019, the coronavirus is believed to have originated in Wuhan, China, and is responsible for a significant number of deaths. Earlier discovery of COVID-19 through precise diagnosis, particularly in instances with no evident symptoms, may reduce the mortality rate of patients. Chest X-ray images are the primary diagnostic tool for this condition. Patients exhibiting COVID-19 symptoms are causing hospitals to become overcrowded, which is becoming a big concern. The contribution that machine learning has made to big data medical research has been very helpful, opening up new ways to diagnose diseases. This study has developed a machine vision method to identify COVID-19 using X-ray images. The preprocessing stage has been applied to resize images and enhance the quality of X-ray images. The Gray-level co-occurrence matrix (GLCM) and Gray-Level Run Length Matrix (GLRLM) are then used to extract features from the X-ray images, and these features are combined to develop the performance classification via training by Support Vector Machine (SVM). The testing phase evaluated the model's performance using generalized data. This developed feature combination utilizing the GLCM and GLRLM algorithms assured a satisfactory evaluation performance based on COVID-19 detection compared to the immediate, single feature with a testing accuracy of 96.65%, a specificity of 99.54%, and sensitivity of 97.98%.

Keywords— COVID-19; X-ray images; Feature extraction; Feature combination; Classification.

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Estimating the Optimal Cluster Number for Vehicular Network Using Scott's Formula

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Abstract

Selecting the correct cluster number for K-Clustering algorithms such as K-Medoids is essential for optimal output. The Elbow method is usually used to select the optimal K number for clustering. However, the high computational complexity makes these methods inefficient in Vehicular Network (VN) environment. Thus, an efficient K selecting technique is essential for an effective VN clustering scheme. K-medoids algorithm is a Machine Learning clustering algorithm usually implemented by the road infrastructure in the VN. The algorithm selects cluster medoids that minimize the sum of dissimilarities between cluster members and their respective medoids. This paper proposes using Scott's histogram formula for bin numbers to calculate the optimal K number. Estimating the underlying probability density function of the data can give a good approximation of the K number for the K-Medoids algorithm. The clustering algorithm is simulated using OMNET++ and Veins simulators in a VN environment. Using Scott's formula, picking the optimal K number is evaluated against the Elbow method in different traffic flow and vehicular speed scenarios. Scott's formula gave a close estimate of the K number when implemented using vehicle coordinates.

Keywords— Scott's Formula; K-Clustering; Vehicular Network.

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Fog Computing in 5G Mobile Networks: A Review

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Abstract

The existing Internet infrastructure cannot meet the demands of the exponential growth in data users need to access. Therefore, Fog Computing (FC), Internet of Things (IoT) and 5G are upgrading conventional data transfer with innovative solutions and intelligently processing data to provide improved performance. Fog computing is considered to be a central component in the growth of the new 5G networks and the Internet of Things. These advanced technologies allow the Internet to provide enhanced services through sensors, continually monitoring a wide range of information. The paper focuses on reviewing the most recent studies implemented fog computing in 5G environment by defining the essential services and network-oriented functionality. Moreover, the surveyed study is also discussed and assessed through sum-up tables with general remarks about the followed trends. The mentioned studies presented legitimate solutions for issues in the Vehicular Ad-hoc Network and improved upon the current network architecture.

Keywords— 5G; Fog Computing; IoT; SDN; VANET

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DDoS Detection Using Active and Idle Features of Revised CICFlowMeter and Statistical Approaches

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Abstract

Distributed Denial of services (DDoS) attack is one of the most dangerous attacks that targeted servers. The main consequence of this attack is to prevent users from getting their legitimate services by bringing down targeted victim. CICFlowMeter tool generates bi-directional flows from packets. Each flow generates 83 of different features. The research focuses on 8 features which are active min (f1), active mean (f2), active max (f3), active std (f4), idle min (f5), idle mean (f6), idle max (f7), and idle std (f8). CICFlowMeter tool has several problems that affected on the detection accuracy of DDoS attacks. The idle and active based feature of Shannon entropy and sequential probability ratio test (SE-SPRT) approach was implemented in this research. The problems of original CICFlowMeter were presented, and the differences between original and revised version of CICFlowMeter tool were explored. The DARPA database and confusion matrix were used to evaluate the detection technique and present the comparison between two versions of CICFlowMeter. The detection method detected neptune and smurf attacks and had higher accuracy, f1-score, sensitivity, specificity, and precision when revised version of CICFlowMeter used to generate flows. However, the detection method failed to detect neptune attack and had higher miss-rate, lower accuracy, lower f1-score, and lower specificity, and lower precision when original version used in generating flows.

Keywords— Sequential probability ratio test, Shannon Entropy, Confusion Matrix, CICFlowMeter, DDoS

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Comparison and Assessment of PV Module Power Prediction Based on ANN for Iraq Weather

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Abstract

An artificial neural network (ANN) with backward-propagation technique was used to predict the power generation of PV module in sunny and cloudy weathers of Baghdad city-Iraq. Experiment tests were investigated in winter and summer days to get the best sunny and cloudy days. Three weather parameters were measured including: solar irradiance, ambient temperature and wind speed. In addition, the output electrical characteristics of PV module (voltage, current, power) and module temperature were measured. Therefore, the dataset of ANN system consists of four input and one output. Furthermore, the structure of ANN includes single and double hidden layers with backward propagation technique. Besides, number of neurons were optimized in training process. The evaluation of the ANN model were depended on determination coefficient (R) and Mean Squared Error (MSE). The obtained results show that the architecture of ANNs is appropriated for predicting the power generated from PV module. The two developed ANN models have good accuracy and the sunny model is relatively more accurate than the cloudy model. Where, the MSE is 0.002062 at epoch 6 in sunny model and 0.0087085 at epoch 9 in cloudy model. Furthermore, the R is recorded 0.993 and 0.982 in validation process for sunny and cloudy model respectively. In addition, the optimization number of neurons in hidden layer gave sufficient accuracy without referring to choice the neurons by trial and error.

Keywords— ANN, PV module, power generation, neurons.

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Handwritten Signature Forgery Detection Using PCA and Boruta Feature Selection

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Abstract

Despite the development of identity detection using biometrics in the field of financial transactions, the handwritten signature remains the most commonly used to this day. The main challenge is that each person's signature may be distinctive, on the other hand, many difficulties aroused because two signatures created by the same individual may appear to be extremely identical. This similarity allows the imposters to claim a forged identity. In this paper, an off-line handwritten forgery detection method is introduced using traditional machine learning rather than deep learning methods to fulfill the need for a simpler model for saving both computation time and computation resources. The proposed method uses Histogram of Gradients (HOG) as a feature extraction method and Principal Component Analysis (PCA) to reduce the large extracted features number and Support Vector Machine (SVM) as a classifier. Another approach has been used by using Boruta feature selection for further reduction of feature numbers. CEDAR dataset has been used in this paper and the results were 99.24 % and 98.79 % in terms of accuracy for the two proposed methods respectively.

Keywords— forgery, imposter, signature, feature extraction, feature selection, classification, HOG, PCA, Boruta, SVM

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PSO Algorithm for Three Phase Induction Motor with V/F Speed Control

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Abstract

Because induction motors are used in most industries, IM control is more essential, Optimization is used approaches are becoming more common for improving Three - Phase induction motor (TIM). In addition, the Volt/Hz (V/f) control is utilized to minimize the harmonics level of other control and modulation approaches. This study is about tuning the PI controller parameters for utilization in TIM. To optimize the speed response performance of the TIM, the Particle Swarm Optimization (PSO) algorithm is used to adjust each parameter of the PI speed controller. Kp and Ki of the PI speed controller parameters are optimized for TIM operation with V/f Control by designing an appropriate PSO algorithm. The PI speed controller's performance on the TIM is measured by measuring changes in speed and torque under-speed response events. In PSO, the PI controller performs well in terms of overshoot, settling time, and steady-state error.

Keywords—three-phase induction motor TIM, VSI, V/f controller, Proportional integral (PI) controller, particle swarm optimization PSO.

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Investigation of Healthcare Security using Blockchain Technology: A review

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Abstract

Telemedicine and telehealth care system show the revolutionary and modern way to deal with the coronavirus 2019 pandemic. However, such systems are facing increased security risks. As a result, healthcare providers and academic institutions must be well-informed, safe, and prepared to respond to any cyber-attack. The aim of this paper is to conduct a review of healthcare information systems together with how security can be provided for such systems. The paper main focus is on the adoption of blockchain technology to support the security of the healthcare system. This adoption has been investigated and assessed to show its benefits compared with other conventional technologies. Finally, a recommendation was pointed out for the security of healthcare with the usage of blockchain technology.

Keywords— healthcare security, cyberattacks, blockchain, e-healthcare.

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PV System Based Speed Control of Induction Motor by Space Vector Pulse Width Modulation

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Abstract

This work uses green energy to solve the problem of lacking electrical energy in agricultural areas. Thus, it suggests using photovoltaic systems to supply the engines used in irrigation in these areas where the load is variable. In addition, this work uses a three-phase inverter to achieve the lowest possible total harmonic distortion. Furthermore, the motor's torque is fixed at all speeds, while the volt-to-hertz ratio speed control of the induction motor is discussed in this paper. By varying the modulation index of the space-vector-pulse-width, the stator voltage of the induction motor can differ correspondingly. The time duration of gate pulses is changed to maintain the constant voltage-to-hertz ratio. Space-vector-pulse-width-modulation technique delivers the simulation and theoretical analysis. Moreover, PV cells drive the induction motors with a wide speed range. Simulation results were validated with practical outcomes.

Keywords— Space Vector Pulse Width Modulation, total harmonic distortion, voltage to hertz ratio.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID:1570821507

Active Fault Prediction Control Against Aircraft Actuator Performance Analysis

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Abstract

Aircraft flight control system appears to use Electromechanical Actuators (EMAs), so that aircraft actuator condition monitoring is more critical under various environmental and operating conditions. This paper introduces an approach for monitoring the roughness of surfaces of aircraft actuators. The proposed technique begins with the signal of current and vibration as an indication of fault. Dual tree complex wavelet transformation (DTCWT) have been introduced to derive the useful features. The real time monitoring of motor operating conditions is an advanced technique that presents the real performance so that the Time Delay Neural Network (TDNN) was introduced to classify faults and predict their severity. The results obtained from simulation demonstrate the ability of the present method to successfully diagnose the different types of faults.

Keywords— Actuator condition monitoring, Soft computing, Dual tree complex wavelet transformation.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID:1570821509

Improving the clustering performance of the K-means algorithm for non-linear clusters

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Abstract

K-means clustering is known to be the most traditional approach in machine learning. It's been put to a lot of different uses. However, it has difficulty with initialization and performs poorly for non-linear clusters. Several approaches have been offered in the literature to circumvent these restrictions. Kernel K-means (KK-M) is a type of K-means that falls under this group. In this paper, a two-stepped approach is developed to increase the clustering performance of the K-means algorithm. A transformation procedure is applied in the first step where the low-dimensional input space is transferred to a high-dimensional feature space. To this end, the hidden layer of a Radial basis function (RBF) network is used. The typical K-means method is used in the second part of our approach. We offer experimental results comparing the KK-M on simulated data sets to assess the correctness of the suggested approach. The results of the experiments show the efficiency of the proposed method. The clustering accuracy attained is higher than that of the KK-M algorithm.

Keywords— K-means clustering, non-linear clusters, domain adaptation, radial bases networks.

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Salp Swarm algorithm-based position control of a BLDC motor

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Abstract

The best P and PI controller parameters of the cascade control of the BLDC system are determined using a new artificial intelligence-based optimization method called the slap swarm algorithm (SSA) in this paper. The algorithm's simplicity allows for precise tuning of optimal P and PI controller values. The integral time absolute error (ITAE) was chosen as the fitness function to optimize the controller parameters. Compared with the classical control technique (PID), the SSA approach was found to have good tuning and obtained less rise time, also less (Approximately zero) overshoot, and is more efficient in increasing the step response of the BLDC system, according to the transient response study.

Keywords—Slap Swarm algorithm (SSA), Cascade PID controller, BLDC Motor, 3-phase inverter.

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Influence of Quantum Computing on IoT Using Modern Algorithms

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Abstract

The Internet of Things (IoT) plays an important part in our daily lives, and it has the potential to expand in significance and transform our future. However, current communication technologies have several security concerns that must be addressed to enable safe end-to-end connectivity between services. The IoT will play a significant role in the future. It will become a part of our daily lives in the next years. Sensor-based networks will identify it as a direct service provider in our environment. It will help us in a number of ways as value-added services via cellular systems, even if just indirectly. It is, nevertheless, highly vulnerable to a variety of security risks. For IoT applications in the future, the existing degree of security is inadequate. The IoT requires a safe cryptosystem. here has been a boom in interest in quantum-based security approaches in recent years. This solution now supports additional quantum key distribution implementations and network services. The unparalleled security level of quantum cryptography is the basis for its rising popularity: all eavesdroppers may be discovered using physical principles. To begin with, quantum physics demands that every measurement must alter the state of the quantum bit being communicated. This alteration is obvious to both the sender and the receiver. As a result, listening passively is no longer an option. Using protocols like BB84, users can send a string of bits encoded by polarized photons. Then, using a variety of key distillation methods, they may create secure cryptographic keys across an insecure channel.

Keywords— Quantum Computing, IoT, Security, Communication.

Institute of Electrical and Electronics Engineers (IEEE) Paper ID:1570821846

The Use of Toulmin's Argumentation Model in Solving the Drug Conflict Problems

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Abstract

The field of argumentation in Artificial Intelligence (AI) has witnessed a great increase resulting in a practical working group. The drugs conflict problem is considered to be one of the most challenging aspects in the field of medicine the world. This paper makes use of Toulmin's argumentation model to deal with conflicting problems within the medicine field. In addition, inference rules were used for associating a patient's symptoms with drug use, eventually leading to pharmacological diagnosis (claims). After that, several drug features are used to compete for support and attack for each drug component. A decision is made during the qualification phase in Toulmin's model about whether or not the drug should be used based on the height of value. The dataset consists of 200 patients as samples for two heart diseases (hypertension, angina pectoris). It is collected from the Iraqi educational hospitals, annotated by a team of experts working in the medical field. The accuracy rates achieved in hypertension and angina pectoris were 83% and 78%, respectively, using the confusion matrix method.

Keywords— Argumentation, Artificial Intelligence, Confusion matrix, Drugs conflicting problem, Toulmin's Model.

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Detecting Unusual Pulse Heart Rate Using Digital Twins for Human Heart

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Abstract

The main reason for deaths globally is heart diseases where 17.9 million people die from heart disease annually, representing 32% of all deaths in the world each year. Therefore, monitoring pulse heart rate regularly specially for patients with heart disease history is very important. Since measuring only pulse heart rate by a patient is almost useless; creating a digital twin for human heart (DTHH) is one of the solutions to reduce the complications of the unusual pulse heart rate and the number of deaths. DTHH means creating a virtual copy of human heart and analyzing cases of previous heart attack to predict what will happen to the patient in the future based on the current measured pulse heart rate. The main objective of this project was to design digital twin for human heart using Microsoft Azure. The proposed DTHH consists of Raspberry Pi 3, Arduino UNO and pulse heart sensor and built software that connect these components to Microsoft Azure cloud. The proposed DTHH is found to be very useful for people with chronic diseases, especially those related to the heart, the elderly, and the rest of the people in general so that they can monitor their heart health periodically. This idea is feasible in view of the continuous technological development, which opened the door to innovative solutions that would improve people's lives and reduce the effort related to doctors in monitoring many cases at the same time and play an important role in saving many people from death because the case can be detected in early time.

Keywords— Digital Twin for Human Heart (DTHH), AI, Microsoft Azure

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Metal Free Boron Nitride Quantum Dots (BNQDs) as Ultraviolet Driven Photo-catalyst For Organic wasteremoval, Theoretical Calculations and Experimental Study

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Abstract

This work is aimed to synthesize nanostructured boron nitride quantum dots that act as photo-catalyst under UV irradiation. The photocatalyst was used to remove organic wastes. BNQDs were characterized using XRD, SEM-EDX, FTIR and UV-Vis spectrophotometry. it has the energy gap close to 3.79eV. The results show that the obtained band gap value and band edges position are higher than the value of free energy for photo degradation at conduction and valance bands, this proves that the BNQDs is thermodynamically suitable to drive super oxide and hydroxyl radical production. Kinetics was studied as well as, the result shows that the degradation of Amlodipine and tetracycline at peak 367nm and 375nm are the second order and first order kinetic in case of Congo red and toluidine blue. Reactive oxygen species (ROS) trapping experiments was performed to determine the active species in photo-catalysis mechanism. We can conclude that active species h+, e-, O2-• and •OH have a significant effect on degradation yield. Regarding computational stimulation, the crystal and electronic structures of the BNQDs have been calculated. The lattice parameters were measured with the Perdew-Burke-Ernzerhof (PBE) functional, and the energy gap (Eg) were calculated applying hybrid functionals including (Becke-3 Parameter-Lee-Yang-Parr) B3LYP and (Heyd-Scuseria-Ernzerhof) exchange-correlation functional HSE06. B3LYP provided better results and closer to the experimental data, given that 2eV as an indirect band gap and thus, B3LYP exchange function was utilized to analyze the band structures and density of states.

Keywords— boron nitride quantum dots, DFT, photo catalysts and photo degradation.

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Synthesis and Investigation of Physicochemical Characteristics of Granulated LSX in Various Forms

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Abstract

Using the methods of XRF, XRD, and low-temperature adsorption-desorption of nitrogen, the physicochemical characteristics of granular LSX zeolites in various cation-exchange forms were studied. A comparative analysis of their adsorption properties in static and dynamic modes with an industrial imported analogue was carried out. It is shown that the adsorption characteristics for nitrogen, CO2, water vapor and benzene of the synthesized granular LSX zeolite in the Li-form and the imported analogue are close. In this work proposed a method for synthesis of granular zeolite LSX in lithium form, involving synthesis of highly dispersed zeolite NaK-LSX; its blending and granulation with clay mineral from Troshkovsky region; drying in air atmosphere at the temperature of 120-140 °C for 4-6 hours and calcining at 600-650 °C for 4-6 hours; treatment in a sodium hydroxide solution with a concentration of C(NaOH) = 70 g/l at 70 °C for 3 hours, followed by a three-fold ion exchange in a Lithium chloride solution.

Keywords— zeolite LSX; granules, ion-exchange forms; cation; crystal; cavity.

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Magnetic Susceptibility of Metal Ion Loaded over Faujasite Y Zeolite

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Abstract

In this work, one of the most important types of zeolite in the petroleum refinery industry faujasite Y like zeolite was used as a raw material. The magnetic measurements of this sort of zeolites were studied once without the ion exchange process and another by ion exchange and loading metal such as copper, iron, and nickel using the ion exchange process and impregnation from the solution. The remarkable thing in this work is that the faujasite-like zeolite with nickel-metal ion after ion exchange showed unexpected since a very high magnetic moment value μeff B.M. equal to 5.71966 B.M was obtained. Depending on the data obtained from this work and from the magnetism data, and since the expected shapes of nickel complexes are NiL5 (Square pyramidal) and NiL5 (trigonal bipyramidal). it is expected that there is a mixture of Square pyramidal (μeff= 2.87) and trigonal bipyramidal (μeff= 2.87) Nickel II complexes. The sum of the magnetic moment of the mixed complexes is μeff= 5.74 B.M.All faujasite Y zeolitic samples and catalysts were characterized using Magnetic Susceptibility Balance (M.S.B), X-ray diffraction (XRD) analysis techniques, adsorption efficiencies, and elemental analysis.

Keywords— Magnetic Measurements; faujasite Y; μeff B.M; Susceptibility; Petroleum Chemistry.

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Fingerprints Clustering with Unsupervised Deep Learning

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Abstract

Fingerprint is a prior and most famous biometric characteristic. It is employed in many fields such as forensic, security, recognition and classification. This paper focuses on clustering fingerprint images into original and fake. Unsupervised Deep Leaning (UDL) is proposed, it exploits the Self-Organization Maps (SOM) to provide such clustering. It consists of two internal processing parts. The first part is for the feature extraction. The second part is for the unsupervised clustering of the SOM. Without cooperation of the ATVS-FakeFinger print Data Base (ATVS-FFpDB) is exploited in our work. Accuracy result of 92.86% is achieved by the suggested UDL network, where fingerprint images could be clustered into original and fake categories.

Keywords— Unsupervised; Deep Learning; Clustering; Fingerprints; Self-Organization Maps.

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Study of Xanthate Ligand Complexes with Transition Metal & Their Adducts with Nitrogen Base Ligands

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Abstract

New complexes and adducts of xanthate of the general formula [M(2-MeOEtXant)2] and [M(2-MeOEtXant)2.nL] Where M= Mn(II) Fe(II), Co(II), Ni(II), Cu(II) and Zn(II), and (2-MeoEtXant)=2-Methoxyethylxanthate, and when n=2 L= Pyridine, Piperidine & Quinoline when n=1, L= ethylenediamine, (1,10)-phenanthroline, have been prepared and characterized on the basis of their physical properties by using spectral methods 1H-NMR, 13C-NMR, FTIR, XRD, metal analysis, electronic spectra and magnetic properties. Based on effective magnetic moment and electronic spectra, the complexes of the type[M(2-MeOEtXant)2] indicate a tetrahedral geometry while the complexes of the type[M(2-MeOEtxant)2.nL] have an octahedral geometry. The density functional theory (DFT) calculations of ligand and their complexes were performed by the DFT/B3LYP/6-311++G(d, p) method to obtain the optimized molecular geometry, the highest occupied molecular orbital (HOMO), the lowest unoccupied molecular orbital (LUMO), thermodynamic parameters and other various electronic properties.

Keywords— Complexes of [Manganese (II), Iron (II), Cobalt (II), Nickel; Four-coordinate complexes; Xanthate complexes.

American Institute of Physics (AIP) Paper ID:1570816423

Analysis and Classification of Autism Data Using Supervised Learning Algorithms

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Abstract

Autism is a neurodevelopment disorder that affects children worldwide between the ages of 2 and 8. Autistic children have difficulties with social contact and communication, and the current standardised clinical diagnosis of autism is still based mostly on behavior-based tests. The rapidly increasing number of Autistic patients in Kurdistan Region of Iraq necessitates the collection of behavioural characteristic data and analysis. Such data, however, are scarce, making extensive evaluations of the autism screening procedures more difficult. For this purpose, the use of machine learning algorithms for this disease was investigated to assist health practitioners and advise individuals on whether formal clinical diagnosis should be pursued. Data of 515 patients were gathered in Duhok city related to toddler autism screening that includes influential factors which are utilised to analyse and diagnose autistic symptoms. Three classification algorithms were applied, namely Decision Tree (DT), K-Nearest Neighbours (KNN), and Artificial Neural Networks (ANN), to diagnose and predict autistic disorder using various evaluation metrics. Before applying the above classifiers, the newly obtained dataset undergoes with different data preprocessing methods. As our data is imbalanced with high dimension, we propose combining SMOTE (Synthetic Minority Oversampling Technique) and PCA (Principal Component Analysis) to further improve the performance of the classification models. Experimental results revealed that the combination of PCA and SMOTE methods improved the classification performances. Moreover, the ANN surpassed other models in terms of accuracy and F1 score, indicating that these classification methods could be employed for autism diagnosis in the future.

Keywords— Autism; Classification; Artificial Neural Networks; PCA; SMOTE.

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QoE-Oriented Wireless Resources Scheduling for a Multipath Video Streaming: Survey

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Abstract

Global mobile video traffic is expected to grow exponentially, and high-definition video streaming applications are becoming increasingly widespread. Multipath video streaming, which uses mobile devices' multicast capabilities, improves high-definition video streaming across diverse wireless access networks. According to the higher data rate of the video stream, and its variable delay depending on different suppliers, wireless network transmission exposes many severe challenges to guaranteeing the quality of experience (QoE). The multiplicity of transport paths with a variety of scheduling algorithms for moving between paths and how to rearrange packets at the receiving end of the methods that have been adopted to improve QoE. This study offers survey scheduling methods and multipath transmission with its relevance to scheduling algorithms. We highlight unresolved difficulties and future possibilities for multipath transport research.

Keywords— Video Streaming; Scheduling; Multipath; QoE.

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Bond Strength between the Reinforcement Rebar and Geopolymer Concrete: A Review

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Abstract

This study adopted a review of bond strength and discussed the research in geopolymer concrete. Studies and research on the structural properties of geopolymer concrete are relatively limited in comparison to ordinary concrete. As a result, this review covers the majority of the research on the Bond Strength of geopolymer concrete, cementitious materials and curing regimes. Many investigations on several researchers have worked on geopolymer concrete. Geopolymer Concrete has the advantage of using extra cementitious materials in conjunction with alkali-activated solutions to substitute cement (The reaction of geopolymer concrete materials is activates by it). After doing a study on previous researches, the output of reviewed papers explained that the pozzolanic materials and curing conditions are affected in the clear for the bond strength; it has been discovered that geopolymeric concrete made from fly ash performs better than Conventional Concrete based on Portland cement in terms of mechanical properties, withstanding high temperature, and preservation of fundamental physical characteristics including permeability and water absorption. Whereas few studies exanimated the effect of fiber on bond strength.

Keywords— Geopolymer Concrete; Cementitious materials; Alkali activator solution; Bond Strength; Curing.

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FLEXURAL RETROFITTING OF REINFORCED CONCRETE BRIDGES; Applications

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Abstract

With the rising in reinforced concrete (RC) bridges that suffer from deterioration due to structural or maintenance reasons, the rehabilitation of these types of structures using composite material offers an excellent solution for the rehabilitation. In this paper, five case studies were investigated. The cases where bridges suffer from deterioration due to their life and virtually without any maintenance. These bridges are; The Little River Bridge Australia, The Tenthhill Creek Bridge Australia, The East Church Street Bridge United States, Wynantskill Creek Bridge United States, and the Rail Over Bridge of Karal junction India. The authority for each rehabilitation did a comparison between available methods of retrofitting and then the rehabilitation using composite Carbon Fiber Reinforced Polymer (CFRP) was the preferred solution for all three bridges. The Little River Bridge's flexural strengthening results showed that the CFRP composite system is an effective and feasible method for strengthening concrete beams. The Tenthill Bridge can be strengthened to provide more flexural and shear capacities by using CFRP laminate and CFRP wrapping. The East Church Street Bridge's retrofit methodology turned out to be a more affordable alternative to traditional maintenance techniques. Installation of the system was comparatively simple, and it barely affected traffic. These crucial characteristics make it appealing to bridge owners, particularly for comparable uses in densely populated urban regions. The Wynantskill Creek Bridge Strengthening Project used an FRP laminate system to show how cost-effective these technologies are in strengthening applications with little to no traffic disruption. The strengthening of the Rail Over Bridge demonstrated the many advantages of FRP materials, including their high strength, lightweight, and non-corrosive attributes. Additionally, installing these products is simpler, more affordable, and causes the least amount of traffic disturbance than traditional refurbishment methods. In general, the outcome of the strengthening restored the bridges to their original structural functionality and enhanced their carrying capacity.

Keywords— Strengthening; CFRP; Flexural; Shear; RC Bridge.

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Impact of Using Colored Pigments on Rigid Concrete Pavements

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Abstract

Concrete is one of the leading construction materials known for its strength and durability. However, it is an aesthetically unfriendly and somewhat boring material due to its dull gray color that should be covered or painted. Recently, there has been a growing use of colored concrete materials by adding colored pigments to the mixture. In the Kurdistan Region of Iraq (KRI), there is a need to incorporate full-depth colored concrete into streets and roadways projects, especially for road ramps, cycle lanes, pedestrian crosswalks, sidewalks, and car parking spaces for disabled people, etc. This research aims to manufacture colored concrete pavement that might provide more durable, longer-lasting colored concrete features by adding a suitable pigment amount. This study examined concrete's compressive and tensile strength for M2O grade concrete colored with (0, 3, 5, 7, and 9) percent of red iron oxide pigment. The dosage of added coloring is referenced to the weight of the binder (cement). Test results show that adding color pigment to the concrete does not significantly affect its mechanical properties, and the colored concrete can be used for structural purposes. It is concluded that the optimal dosages of color pigment for the concrete are 5% in the fresh state and 7% in the hardened condition. Finally, using colored concrete in road facilities planning will be a safe, convenient, and economical way to control traffic conflicts.

Keywords— Compressive Strength, Tensile Strength, Color Pigment, Concrete Pavement.

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Correlation of Grain Size Distribution with the Compaction Parameters for Fine-Grained Soils

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Abstract

The grain-size distribution (GSD) curve is done by using Sieve analysis and Hydrometer analysis, then it is used to determine basic soil properties such as optimum moisture content (OMC), and maximum dry density (MDD), the suggested model is dependent on the retaining percent of soil from the (GSD) curve as independent variables. In this research, appropriate steps techniques were employed to find the OMC and MDD of the soil. The data analysis is done by the SPSS program by minimizing the sums of difference squares and increasing the square of Pearson product correlation coefficient R2 of given data to predict the aim. The analysis strategy is done by Six-stages, which depend on:- the retaining percent of soil at different points on the GSD curve, increasing the points on the GSD curve in each step, and replacement between clay size fractions<0.002mm with clay size fractions< 0.005mm. Test results shows that useful functional relationships exist between the compaction parameters from Particle-Size Analysis routine testing of soil. It is concluded that the Square of Pearson product correlation coefficient R2 for the correlation between MDD, and OMC increases when increasing the number of grain sizes in the model. It also concluded that the OMC, and MDD can be predicting efficiently from grain size analysis only without depending on any other physical or chemical property of soil.

Keywords— Compaction, Maximum Dry Density, Optimum Moisture Content, Grain Size Distribution Curve.

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Improved and Secured Distributed Space-Time Block Codes in Wireless Network

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Abstract

The innovation of the space-time block codes that which applied to wireless networks enhance the performance of communication with respect to bit error rate and the reliability of the link. When a set of geographically distributed relays are cooperated to treat the information that is transmitted from the source and for miles to the destination so the signal that is received at the destination node will be such as space-time block code. This code will be known as distributed space-time block code. In this paper, the aim is to increase the quality of the transmission between the source and destination nodes by using a group of relays, at the relays, a set of orthogonal space-time block codes will be generated, the code is selected from a set of orthogonal codes based on a random number which generated at the relay and destination nodes in the same manner. Also, the relay nodes involved in the communication between the source and destination nodes are selected based on the selected criteria. The results show that the performance of the system is improved at the destination node in terms of bit error rate and data rate. The simulation results show that all the sets of the adopted codes have the same function and can give one performance, by using these codes which are generated randomly give some security to the whole system.

Keywords— Space-time, cooperative system, power consumption, relay selection.

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Using Polymers to Improve Asphalt Pavement Performance

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Abstract

Pavement structures are subjected to high traffic loads, which deteriorates the pavement over time. In recent years, various techniques for improving the performance of asphalt pavements have gained popularity. One of these technologies is polymer-modified-binders (PMB) in asphalt mixtures. As a result, this paper provides a relative assessment of the recycled polymers utmost recently addressed as bitumen modifiers to enable their selection and cover the utilization of bitumen. The melting point of the polymer, the mixing environments, and the maximum amount of polymer supplemented are all studied. The findings of this paper will be useful to the local road construction industry in determining the properties of locally available asphalts and modified versions. A case study of the performance of 3 polymer forms in asphalt paving mixtures is provided; namely Polystyrene-Polymer, Polyvinyl-chloride (PVC), and Phenol-resin. These modified asphalt mixtures were made with asphalt cement that had been modified previously with 2%, 4%, and 6% with weight of asphalt polymer. Two separate measuring temperatures (25°C and 45°C) are used to evaluate the behavior of the mixture due to the change in the temperature. According to the findings of a case study, using a small percentage of polystyrene polymer lead to an increase in tensile strength, permitting polystyrene modified asphalt mixtures to be used in cold climates. The test results also revealed that offering phenol resin in modified asphalt mixes can increase deformation resistance and strength, allowing it to be used in hot climates.

Keywords— Asphalt pavement; Asphalt binder; Polymers; Bitumen; Viscosity-Temperature Susceptibility; Polymeric waste; case study.

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The Influence of Horizontal Curve on Traffic Crashes: A Review

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Abstract

Due to the catastrophic ramifications of road accidents on nations' socioeconomic and human lives, the issue of traffic accidents has attracted worldwide attention. Horizontal curves are associated with an extremely high frequency of severe accidents. Several recommendations have been made to reduce traffic accidents and fatalities on horizontal curves. Crash statistics show that horizontal curves are the most probable of accidents. The desired state of the pavement surface is one strategy for preventing major accidents on horizontal curves. Understanding the factors that contribute to traffic accidents is an important aspect of road safety research. This study presents a review of the influence of horizontal curves on traffic crashes. Several factors, including speed, congestion, and road horizontal curvature, were discovered to have mixed effects on road safety and need additional investigation. In Erbil, Iraq, roughly 80% of the fatalities and injuries were male, while just around 20% of the fatalities were female. The crash modification factors (CMF) developed in this study may be utilized to evaluate the safety performance of an interest curve and the potential safety benefit of installing a high friction surface treatment.

Keywords— Accident Frequency, Horizontal Curve, Crash Modification Factors, Curve Radius.

American Institute of Physics (AIP) Paper ID:1570821457

Green Rating Systems Development and Trend Worldwide for Sustainable Built Environment: A Comparative Review

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Abstract

Sustainability has been increasing its popularity in construction development and evaluating the sustainability of a project has become a necessity. The construction industry has a serious impact on the environment. Sustainability rating systems have been established and deployed across the construction industry over the last decade to tackle and mitigate the environmental implications of construction projects. However, during the last few years, several organizations have begun to establish sustainable rating systems for construction projects. Various rating tools, on the other hand, use varied methodologies for measuring sustainability and place different emphasis on different sustainability issues. As a result, a review of existing rating tools is required so that industry participants are aware of their functionalities as well as their sustainability initiatives. In this paper, a comparison of the 52 most prominent emerging sustainability green rating systems worldwide from 1990 to 2019 has been reviewed. The analysis indicates that all systems have a lot in common. Each rating system considers elements relating to the use and management of water, energy, and materials in particular. The procedure and execution requirements, as well as how weights are assigned among grading criteria, are the main differences. The comparison shows the benefits and drawbacks, as well as the aspects, applications, and goals of various approaches, and encourages further study into green rating systems for developing sustainable construction projects worldwide.

Keywords— Climate Change, Construction Industry, Green Rating System, Sustainable Development, Worldwide.

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Bayesian Deep Learning Applied to LSTM Models for Predicting COVID-19 Confirmed Cases in Iraq

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Abstract

The COVID-19 pandemic has had a huge impact on populations around the world and has caused critical problems to medical systems. With the increasing number of COVID-19 infections, research has focused on forecasting the confirmed cases to make the right medical decisions. Despite the huge number of studies conducted to forecast the COVID-19 patients, the use of Deep Learning (DL) and Bayesian DL models are limited in this field in Iraq. Therefore, this research aims to predict the confirmed cases of COVID-19 in Iraq using classical DL models such as, Long-Short-Term-Memory (LSTM) and Bayesian LSTM models. In this study, Bayesian Deep Learning (BDL) using LSTM models was used to predict COVID-19 confirmed cases in Iraq. The motivation behind using BDL models is that they are capable to quantify model uncertainty and provide better results without overfitting or underfitting. A Monte Carlo (MC) Dropout, which is an approximation method, is added to the Bayesian-LSTM to create numerous predictions for each instance and evaluate epistemic uncertainty. To evaluate the performance of our proposed models, four evaluation measures (MSE, RMSE, R2, MAE) were used. Experimental results showed that the proposed models were efficient and provided an R2 of 0.93 and 0.92, for vanilla LSTM and Bayesian-LSTM, respectively. Furthermore, the two proposed models were optimized using ADAM and SGD optimizers, with the results revealing that optimizing with ADAM provided more accurate results. Thus, we believe that these models may assist the government in making critical decisions based on short-term predictions of confirmed cases in Iraq.

Keywords— Deep learning, Bayesian Neural Networks, LSTM, Time-series data, forecasting, MC dropout

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Iraqi Construction Industry Digitalization: Trends, Opportunities and Challenges

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Abstract

The construction industry in Iraq and indeed in the world is facing a rejuvenation for the new reality of digitalization. The world is gearing toward sustainable development practices and initiatives as well as adopting modern and smart information technologies to keep pace with global paces in other industries. Parallel to the 4th Industrial Revolution, the Iraqi construction industry needs to take measures to accelerate the digitization of the construction industry, which is responsive to the planet, people, and prosperity by increasing efficiency and quality and reducing costs and risks value in its supply chain. The construction industry copes with vast amounts of heterogeneous data, which is projected to grow dramatically as emerging technologies become more widely used. This study examines the level of implementation of digital technologies in the Iraqi construction industry by conducting a comprehensive review of the literature. The implementation of these technologies in the Iraqi industry is still in its initial stages, lagging behind widespread adoption in other industries. Using data technologies, the construction industry is increasing its productivity. As a result, a comprehensive study is required in this domain. There is a need to study the effects of adoption and the role of the industry digitization process in raising the awareness of construction companies while improving performance. This study bridges the gap by comprehending the literature and review. The discussion covered the current state of use, issues as well as the challenges that come with implementation.

Keywords— Construction, Data Management, Digitalization, Industrial Revolution 4.0, Iraq.

American Institute of Physics (AIP) Paper ID: 1570821505

Smart Homes for Disabled People: A Review

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Abstract

The field of smart homes has gained notable attention from both academia and industry. The majority of the work has been directed at regular users, and less attention has been placed on users with special needs, particularly those with mobility problems or quadriplegia. Brain computer interface has started the mission of helping people with special needs in smart homes by developing an environment that allows them to make more independent decisions. This study investigates the efforts made in the literature for smart homes that have been established to manage and control home components by disabled people and makes a comparison between the reviewed papers, in terms of the controlled devices, the central controller, the people with disabilities the system is meant for, whether or not machine learning was used in the system, and the system's command method. In the field of machine learning-based smart homes for disabled people, the limitations have been pointed out and talked about. Current challenges and possible future directions for further progress have also been given.

Keywords— Smart Home, Disabled People, EEG, Machine Learning, IoT, Brain Computer Interface.

American Institute of Physics (AIP) Paper ID: 1570821604

Physiochemical Assessment of Drinking Water Quality in Brifkan Village, Duhok Region, Iraq

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Abstract

Evaluating water quality for drinking purposes has significant importance to avoid the impact of pollutants that exist in water. This study aimed to assess the quality of drinking water in Brifkan Village, Duhok region, Iraq, by studying some physicochemical properties. To achieve this goal, 20 samples from two main wells and tab water were collected, followed by assessing some parameters including pH, EC, temperature, cations (Ca, Mg, Na and K), anions (Cl, NO3, and SO4), total hardness (T.H), total alkalinity and TDS). The desired properties were selected depending on their suitability for drinking and human consumption and then subjected to standard analysis methods. The collected data were then compared to standards based by the World Health Organization (WHO). The results obtained showed that: (pH 6.9-7.36, electrical conductivity (EC) 418- 662 µS/cm, Dissolved Solids(TDS) 267- 424.8 mg/l, total hardness 260-400, Cl 14-48, SO4 15-44.4, NO3 2.4- 6.3, Na 3.1- 29.2, Ca 52.8-99.2, Mg 15.6- 48.8, K 0.5- 2.6) indicated that the water samples are considered to be high in quality, except for total alkalinity were almost more than 200 mg/l, calcium carbonate (CaCO3), which is leached from rocks and soil, accounts for the majority of alkalinity in water. However, the quality of both wells was in good condition for human consumption and many different uses. Periodic testing for the wells should be done to maintain the quality of the region's water to avoid pollution from the surrounding

Keywords— Water quality; physiochemical parameters; groundwater

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A Comprehensive Survey for Cryptography Implementation Using Quantum Computing

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Abstract

Information is divided into two types: classical and quantum. Quantum computing, quantum cryptography, and quantum teleportation are just a few of the miracles they can do when working together. Some of the uses range from assisting in the prevention of spies reading private messages to assisting in the prevention of spies reading private communications. Quantum purification and quantum error correction are examples of techniques that will make their implementation easier. Although some of these concepts are still beyond present technological capabilities, quantum cryptography has been established. The possibilities for small-scale quantum computer device prototypes by the end of the millennium are promising. This paper is focusing on addressing the depended approaches which deal with implementation cryptography based on quantum computing. Remembering that cryptography is a method of encryption that uses the naturally occurring properties of quantum mechanics to secure and transmit data in a way that cannot be hacked. Cryptography is the process of encrypting and protecting data so that only the person who has the right secret key can decrypt it. For decades now, quantum computing has been hailed as one of the next big revolutions. Quantum computing is not just faster than traditional computing methods, but a fundamentally different approach to solve seemingly intractable problems. The mathematical operations that most traditional cryptographic algorithms rely on could be cracked with a sufficiently strong quantum computer. This paper aims to explain how quantum computing affects current cryptography and expose readers to fundamental post-quantum methods. Quantum computing's influence on IT professionals is becoming increasingly important. As a result, we provide a straightforward introduction to post-quantum cryptography, including quantum-resistant algorithms and quantum key distribution.

Keywords— Cryptography, Quantum Computing, Security, Communication Technology.

American Institute of Physics (AIP) Paper ID:1570825279

Hydration and Micro-Structure of UHPC Containing Different Pozzolanic Materials: A Review

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Abstract

Ultra-high performance (UHPC) is a contemporary cement-based substance that has sparked interest worldwide since its introduction in the early 1990s. Hydration, microstructure, mechanical characteristics, and dimensional stability were all discussed in this review. Finally, some future UHPC research needs are mentioned. The portlandite content of UHPC is meaningfully less than that of ordinary concrete. When the temperature was over 250 c°, heat curing promoted minor hydration between mineral admixtures and Ca(OH)2, so xonotlite was produced. The porosity of UHPC is quite low, especially after heat curing. UHPC offers great strength, stiffness, and durability, among other characteristics.

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Keywords— UHPC, Hydration, Microstructure, Mechanic properties, Dimensional dependability.

American Institute of Physics (AIP) Paper ID:1570825906

Using BIM And EDMS Technique to Eliminate the Lack of Information Flow in Construction Projects

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Abstract

Communication management is still a challenge for the project managers, so they are always keen to use the most impactful and up-to-date communication techniques in their work. In the meantime, they must ensure that their team is properly utilizing this technology. Accordingly, the aim of this study is to identify the effect of using BIM (Building Information Modeling) technique to manage the technical information and EDMS (Electronic Documents Management System) as a documentation system (provided by a specialized company) to eliminate the lack of information flow among project participants. This will help the project managers to discover the factors affecting the performance of their team while they are using this technology and to overcome all the limitations that may reduce the efficiency of the information flow system. To achieve the aim of this study a sequential four-step methodology was implemented, starting with a review of the existing literature on the benefits of communication management and the use the of BIM and EDMS technique in projects. The second step was to prepare a survey questionnaire to confirm the advantages (obtained from the literature review) of using this technique and discover its flaws or limitations in the current construction industry and then collect data and analyze the results. 20 participants with good experience in using this technique responded a questionnaire to highlight the challenges they are facing during their work. Four types of questions were used in this study; closed-ended questions, open-ended questions, rating questions, and multiple-choice questions. As the authors practice in the existing construction industry the samples were selected through extensive communications with their colleagues in the same industry and their LinkedIn contacts. The snowball approach was considered to select some nominated samples. As a conclusion of the analysis for the collected data, the authors discovered that using BIM and EDMS technology will improve the project communication. Nevertheless, the participants stated some occasional limitations they encountered while using these systems. BIM is still unfamiliar to some stakeholders of project, and this makes them unable to properly utilize the features of this system. There are some disadvantages in using EDMS such as the system cost, file ownership, and limited capacity of the system to save large files.

Keywords—Communication management, communication techniques, (BIM) Building Information Modeling, (EDMS) Electronic Documents Management System, questionnaire, Data collection, Qualitative analysis.

American Institute of Physics (AIP) Paper ID:1570826352

Numerical Simulation of Carbon Monoxide Dispersion Inside Urban Roadway Tunnels

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Abstract

Urban underground road tunnels are featured with high frequent traffic congestion and thus a suitable ventilation system should be designed to supply fresh air for diluting vehicle pollutants. This study employed the computational fluid dynamic technique to simulate the dispersion of carbon monoxide (CO) and evaluate the efficiency of ventilation systems inside an urban roadway tunnel. The tunnel was designed with a length of 10 m and two floors with three vehicles per row. Three-dimensional carbon monoxide dispersion was modeled based on the geometry of the tunnel, vehicles' speed, ventilation systems, and fuel type for the scenarios of vehicle movement, vehicles stopping, and fans off/on. The simulated results showed that the maximum CO concentration at the top and bottom floors in the state of vehicle movement and reasonable ventilation system were 47.13ppm and 42.47ppm respectively, which do not exceed the 8-hour standard level. However, the simulation indicated that CO concentration exceeded the standard level in the scenarios of fans-off and vehicle stop. Thus, ventilation fans should be added to supply fresh air and minimize pollutant concentration. The results of this study can provide beneficial suggestions for ventilation system design and pollutants simulation for urban road tunnels.

Keywords—Carbon monoxide, Numerical simulation, Air pollutant, CFD.

American Institute of Physics (AIP) Paper ID:1570827404

Web Towards the Semantic Web: A Review of Recent Trends in Its Domains

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Abstract

After the establishment of the Semantic Web concept by Tim Berners-Lee in 2001, there has been a lot of work and study to understand the goals of the Semantic Web. According to initial perceptions and strategy declarations, the Semantic Web will perform as an addition to the present Web, which is largely understandable by humans. Semantic Web is also called Web 3.0, Which enables World Wide Web information, databases, and other structured resources to be presented in a consistent structure that other applications can use. The review paper begins by examining the nature of the Semantic Web and the difference between the traditional Web and the Semantic Web. Moreover, the paper includes a brief overview of the Semantic Web and its technologies and discusses seven of the domains that the Semantic Web has been used. In addition, the paper describes the position of the Semantic Web nowadays. As a result, a researcher who is not familiar with the Semantic Web should find this paper a beneficial tutorial.

Keywords— Semantic Web; Ontology; OWL; RDF; SPARQL

American Institute of Physics (AIP) Paper ID:1570827408

Semantic Clustering Documents Using Mini Batch K-Means Method

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Abstract

The Internet's continued growth has resulted in a significant rise in the amount of electronic text documents. Grouping these documents into meaningful collections has become very important issue. Previously, documents are grouped based on statistical characteristics and the classification was relying on syntactic notions rather than semantic concepts. This made a problem of not classifying documents that are semantically related. To have this problem solved, semantic similarity techniques are applied. In this article, a unique approach for classifying text-based documents semantically is introduced. The work is performed by extracting document synopses from Wikipedia and IMDB databases grouped together, then NLTK is employed to generate them. Following that, a vector space is modeled using TFIDF and converted to TFIDF matrix as a numerical form. Eventually, the Mini Batch K-means method is used for clustering. The results are compared with previous work using several datasets with different sizes, and various evaluation metrics have been applied to determine the best approach among them.

Keywords— Semantic Similarity, Text Clustering, Mini Batch K-means Algorithm, TFIDF.

The Kurdish Language Corpus: State of the Art

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Abstract

The growth of the digital communities and different online news streams led to the growing availability of online natural language content. However not all natural languages have the enough attention of being made readable and comprehendible to machines. Among these less paid attention languages is the Kurdish Language. Creating the machine-readable text is the first step toward applications of text mining and semantic web, such as translation, information retrieval and recommendation systems. To enable the mentioned applications and more for Kurdish content online, this review paper investigates the textual corpora in the Kurdish language and its dialects and the existence challenges, open problems and future directions.

Keywords—Kurdish language, Text Corpus, Text Mining, Natural Language Processing.

American Institute of Physics (AIP) Paper ID:1570843425

A Study of Gender Classification Techniques Based on Iris Images: A Deep Survey and Analysis

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Abstract

Gender classification is attractive in a range of applications, including surveillance and monitoring, corporate profiling, and human-computer interaction. Individuals' identities may be gleaned from information about their gender, which is a kind of soft biometric. Over the years, several methods for determining a person's gender have been devised. Some of the most well-known ones are based on physical characteristics like face, fingerprint, palmprint, DNA, ears, gait, and iris. On the other hand, face features account for the vast majority of gender classification methods. Also, the iris is a significant biometric trait, because the iris, according to research, remains basically constant during an individual's life. Besides that, the iris is externally visible and is non-invasive to the user, which is important for practical applications. Furthermore, there are already high-quality methods for segmenting and encoding iris images, and the current methods facilitate selecting and extracting attribute vectors from iris textures. This literature review discusses several approaches to determining gender. The previous works of literature are briefly reviewed. Additionally, there are a variety of methodologies for different steps of gender classification. This study provides researchers with knowledge and analysis of the existing gender classification approaches. Also, it will assist researchers who are interested in this specific area, as well as highlight the gaps and challenges in the field, and finally provide suggestions and future paths for improvement.

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Keywords—Gender Classification, Machine Vision, Iris Biometrics, Machine Learning, Deep Learning.

American Institute of Physics (AIP) Paper ID:1570844059

Link Prediction in Co-authorship Networks: A Review

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Abstract

Besides social network analysis, the Link-Prediction (LP) problem has useful applications in information retrieval, bioinformatics, telecommunications, microbiology and e-commerce as a forecast of future links in a given context to find what possible connection are based on local and global statistical analysis of the given graph data. This study investigates the problem of LP in academic social networks to forecast the upcoming co-authorships among researchers. In a systematic approach, this review presents, analyzes and compares the primary main taxonomies of topological-based, content-based and hybrid-based approaches, which are used for computing similarity scores for each pair of unconnected nodes. Then this study ends with findings on challenges and open problems for the community to work on for further development of the LP problem of scholarly social networks.

Keywords—Link Prediction, Co-authorship Networks, topological-based measures, Content-based measures.

Science Journal of University of Zakho (SJUOZ) Paper ID:1570807764

Preparation, Characterization and Releasing -Swelling Kinetics of Myrrh Based Hydrogel

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Abstract

In this work, Myrrh gum was used with sodium alginate (SA) to create novel Myrrh-Alginate beads composite. These beads were produced utilizing the ionotropic gelation technique. Methylene blue (MB) was employed as a drug model to evaluate the kinetics of drug release and the capacity of the synthesized beads to function as a drug delivery system. The molecular interaction between sodium alginate and myrrh was confirmed by FTIR spectroscopy. The physical characteristics of the Myrrh-Alginate beads, including drug content, particle size, thermal properties, equilibrium water content (EWC), swelling behavior, and equilibrium swelling ratio (ESR), were studied to establish the hydrogel's response type, as well as the releasing kinetics at 37°C and in Phosphate buffer solution (PBS) at pH = 6.8 and 10. All beads (loaded and unloaded) were analyzed by Differential scanning calorimetry, Scanning electron microscopy (SEM) and X-ray diffraction analysis (XRD). The drug content percentages of the Myrrh-Alginate beads increased with a moderate fraction (5%) of Myrrh but dropped with a higher Myrrh percentage. The Myrrh-Alginate beads absorbed more water and swelled more than the pure calcium alginate beads (S2) in pH 6.8 and 10 of (PBS). In a pH 6.8 of (PBS), the Myrrh-Alginate beads demonstrated a controlled and regulated style of releasing and demonstrated a high match with the Korsmeyer-Peppas model as they had the maximum values of the correlation factor (R2) in this model.

Keywords—hydrogel, drug delivery, Myrrh, swelling, releasing kinetics, methylene blue.

Science Journal of University of Zakho (SJUOZ) Paper ID:1570812671

SYNTHESIS AND CHARACTERIZATION OF SOME NEW NITRONE DERIVATIVES AND SCREENING THEIR BIOLOGICAL ACTIVITIES

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Abstract

Synthetic approached towards the synthesis of some novel nitrone derivatives have been started with reduction of nitrobenzene derivatives as starting material bearing electron withdrawing and electron donating groups to corresponding phenylhydroxylamine in presence of zinc dust as reducing agent in aqueous solution of ammonium chloride (NH_4Cl). The prepared phenylhydroxylamine derivatives were reacted with different substituted benzaldehydes to give the target derivatives of nitrone. The structures of the synthesized nitrones were characterized by spectroscopic methods FT-IR, ^{1}H-NMR and ^{13}C NMR. Finally the newly synthesized compounds were screened for their microorganism activities at different concentration, and inhibited growth of *Escherichia coli* (*E. coli*) Gram negative, *Staphylococcus aureus* (*S. aureus*) Gram positive, and fungi (*candida albicans*).

Keywords—Nitro Compound Derivatives, Phenylhydroxylamines, Electron Withdrawing Groups, Electron Donating Groups, Nitrones, Biological active compounds.

Science Journal of University of Zakho (SJUOZ) Paper ID:1570812744

FORECASTING THE RATIO OF THE RURAL POPULATION IN IRAQ USING BOX-JENKINS METHODOLOGY

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Abstract

In this paper, the Box-Jenkins methodology has been applied and used to forecast the ratio of Iraq's rural population. A sample size of (60) observations has been taken of the annually rural population of Iraq from 1960 to 2019. A combination of some adequate time series models has been prepared and obtained and some statistical criteria have been used for comparison and model selection. Results of the study concluded that the ARIMA (0,2,1) is an adequate and best model to be used for forecasting the annual ratio of rural population data in Iraq. During the period 2020 to 2030, the ratio of the rural population will keep decreasing gradually, and the percentage of the rural population of Iraq in 2030 will be (27.732).

Keywords—Forecasting, Box-Jenkins, Rural population, Statistical Criteria, ARIMA.

Science Journal of University of Zakho (SJUOZ) Paper ID:1570818964

Fast Full-Search Algorithm of Fractal Image Compression for Acceleration Image Processing

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Abstract

A new processing algorithm based on fractal image compression is proposed for image processing efficiency. An image will partition into non-overlapping blocks called range blocks and overlapping blocks called domain blocks, with the domain blocks generally bigger than the range blocks, to achieve a rapid encoding time. This research introduced a new fast full-search algorithm approach that starts the search for the best matching domain in the range block from the closest points in the range blocks and expands the search until an acceptable match is found or the search is completed to save even more encoding time. The proposed fast full-search approach, despite its simplicity, is more efficient than the standard search method. The search reduction, peak signal to noise ratio, compression ratio, and encoding time of the suggested approach are all examined. The proposed method can encode a 512x512 grayscale Lena image in 0.36 seconds, with a total search reduction of 87% according to experimental results.

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Keywords—Image Processing, FIC, Iteration Function System (IFS), Acceleration of Image, deep data learning, Signal Processing.

Science Journal of University of Zakho (SJUOZ) Paper ID:1570826469

Affinity Propagation and K-Means Algorithm for Document Clustering based on Semantic Similarity

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Abstract

clustering text documents is the process of dividing textual material into groups or clusters. Due to the large volume of text documents in electronic forms that have been made with the development of internet technology, document clustering has gained considerable attention. Data mining methods for grouping these texts into meaningful clusters are becoming a critical method. Clustering is a branch of data mining that is a blind process used to group data by a similarity known as a cluster. However, the clustering should be based on semantic similarity rather than using syntactic notions, which means the documents should be clustered according to their meaning rather than keywords. This article presents a novel strategy for categorizing articles based on semantic similarity. This is achieved by extracting document descriptions from the IMDB and Wikipedia databases. The vector space is then formed using TFIDF, and clustering is accomplished using the Affinity propagation and K-means methods. The findings are computed and presented on an interactive website.

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Keywords— *Text clustering, semantic similarity; document clustering; Affinity Propagation; K-means; Data mining.*

Journal of Life and Bio-Sciences Research (JLBSR) Paper ID:1570811699

Meta-analysis with assessment of some Phylogenetic Relationship of Entamoeba histolytica of Iraq and Iran

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Abstract

Protozoans of Entamoeba spp. are globally distributed protozoan parasites that infect diverse hosts (human and animals) causing amebiasis with various symptoms ranging from abdominal discomfort, indigestion, diarrhoea, bloody diarrhoea, and even death. Entamoeba histolytica infection may be influenced by different strains which are already existing in our population. A meta-analysis was performed to evaluate the sequence comparison and geneflow of E. histolytica in Iraq and Iran. For this purpose, all reference sequences recorded from the aforementioned countries and deposited in the National Centre for Biology Information (NCBI) database of the mentioned countries (133 reference sequences, 110 from Iraq and 23 from Iran) were included in this study. After aligning and blasting all these sequences and considering the shared regions, eight unique sequences were obtained. According to the Codon-based Z-test of selections, they vary in degree of difference (p-value 0.05). Some records from the study area approached each other 100% which means that geneflow has occurred in the areas under investigation. Outstanding phylogenetic relationship of Entamoeba histolytica of both Iraq and Iran strains are related together and that is important in the molecular epidemiology aspect of amebiasis as it may influence the clinical and pharmacological orientation of the disease in both countries. Current meta-analysis was done for the first time in that approach in the place this study.

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Keywords— ***Meta-analysis, Entamoeba histolytica, Molecular epidemiology, Phylogenetic, Amoebiasis.***

About us

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 up to 7717 students with 408 academic staffs and about 600 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.

NORTHERN TECHNICAL UNIVERSITY

Northern Technical University (NTU) is one of four public technical universities distributed over Iraq except Kurdistan region that has another three Technical Universities. NTU was established in 2014 after restructured the foundation of technical education to four technical universities with the aims to develop students' scientific productive skills.

NTU is a specialized university that keeps on markets' needs and renewable requirements. NTU qualifies thousands of students and rises their scientific productive skills. NTU has several scientific departments and branches like (Engineering, Agriculture, Administrative and Medical). Consequently, it is grants different technical qualifications including diploma, bachelor, master and doctoral degrees. The university covers study requirements for both theoretical and practical sides with supervision of professional technical lecturers and staff from university technicians and engineers. NTU focuses on technical and practical training and puts them on the top of its priorities. In addition, NTU seeks to develop the scientific researcher's skills through establishing relationships with international university by MOUs, where NTU has in place several agreements with both Arabic and international universities to acquire the knowledge and experience. Finally, the university embraces five specialized Colleges and five technical institutes distributed in three provinces in the north of Iraq, specifically provinces of Nineveh, Kirkuk and Salahaddin

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