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PROGRAMME

14TH INTERNATIONAL CONFERENCE
ON
DEVELOPMENTS in eSYSTEMS ENGINEERING

2021

Sharjah, UAE
7TH-10TH DECEMBER

● SHARJAH, 2021



eSystems Engineering
Society



IEEE

IEEE
computer
society

Foreword



Now in its Fourteenth year, the Developments in eSystems Engineering (DeSE) series of conferences has firmly established an exciting, stimulating, and essential forum for the exchange and advancement of ideas in e- Systems. The establishment of this conference series has brought about an ever widening scope of cross- disciplinary participation, bringing eSystems developers, from all fields, into a common research area. DeSE 2021 is sponsored by the Institute of Electrical and Electronics Engineers (IEEE) and organized by University of Sharjah in collaboration with a number of national and international partners. The conference series was established by a consortium of UK universities in 2008 as a forum for the development, analysis, and future guidance on the burgeoning number of e-system projects and applications.

DeSE 2021 returns to UAE and this time in Sharjah, building upon the success and dissemination of research of previous conference iterations (China 2020, Russia 2019, Cambridge 2018, Paris 2017, Liverpool and Leeds 2016, Dubai 2015, Cyprus 2014, Abu Dhabi 2013, Bucharest 2012, Dubai 2011, London 2010, Abu Dhabi 2009 and Liverpool 2008), furthering the ideas of eSystems development. Currently, there is a vast quantity of interest in the field of eSystems, resulting in a wide array of research being conducted in order to transfer services and facilities into state-of-the-art electronic technologies. This year's conference presents a multitude of topics aimed at addressing current research issues and trends in the design, engineering, and adoption of eSystems. This year's conference outlines so many research tracks, which are: eSystem Engineering, Sensor Technologies and AI in Education, AI in Law and Digital Health, Computational Intelligence and Machine Learning in Emerging Applications of Health, Science, and Engineering.

We also welcome four keynote speakers, covering a range of relevant, innovative topics that promise to be exciting and thoroughly engaging.

The standard and breadth of this year's accepted papers is exceptional, validating the importance of the continual availability of DeSE as a major event and forum for the promotion and discussion of eSystems development. Presentations will be delivered by delegates from a number of countries worldwide over the 4 days period on various modes including face to face and online due to the current health and safety related to the Pandemic COVID-19. We would like to thank the speakers and session chairs for their time and effort, and the authors for their contribution to an excellent programme. We hope that you enjoy DeSE 2021 and benefit from the current research, techniques and technologies those to be presented throughout the conference. We hope that you will establish a strong collaborative partnership and see you next year in DeSE 2022.

Finally, we would like to thank the Local Organizing Committee and the Technical Programme Committee for all their hard work and commitment in helping to make this event a success.



Developments in eSystems Engineering Conference Series

Developments of eSystems Engineering (DeSE) has been established in recognition of the escalating importance and relevance of electronic media, applications and devices in our everyday work, home and commercial environments.

These systems have often arisen as solutions to domain specific problems, addressing areas of social science, business studies, engineering, auto, health studies, computer science, communications, geo-systems and most other academic and vocational subject areas. Accordingly, developments and innovations in eSystems engineering have appeared through sources appropriate to their subject area with little heed paid to the actual underlying science of engineering an e-system. Therefore, it is the intention of DeSE to provide the increasingly essential forum dedicated to discussing and reporting on developments in the field of eSystems engineering; including all relevant research and practical advancements.

The areas of interest will, by the nature of the subject, be very wide: The science behind eSystems engineering will be advanced through the integrated approach of specifically considering eSystems development with the added advantage of transferable experience and knowledge across all individual subject areas. As the technology advances and users become more familiar with eSystems the impact of these systems is likely to be felt in many areas:

- In education there is vast scope for the introduction of advanced eLearning tools allowing students/pupils an improved level of independent learning.
- eSystems are often based on or are required to exhibit some form of Artificial Intelligence (AI). AI techniques based on paradigms such as neural nets or expert systems will thus be relevant to and impact upon research into e-systems development.
- In eBusiness there is already a significant uptake of eSystems by eCommerce websites, which can only increase in future years with developments in ePayment systems and newly developed models of commerce. Issues of trust, security and database design are typically studied within this area.
- eServices are becoming an important part of Web based computing with Service Oriented Architectures (SOA) and Software as a Service (SaS) seen as the future of computing.

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Keynote Speakers

“Automation & Computing”



Prof. Kamal Youcef-Toumi

Mechanical Engineering at MIT

Massachusetts Institute of Technology

Cambridge, Massachusetts 02139

<https://meche.mit.edu/people/faculty/YOUCEF@MIT.EDU>

Kamal Youcef-Toumi is a Professor of Mechanical Engineering at MIT. He is Co-Director of the Center for Complex Engineering Systems at King Abdulaziz City for Science and Technology (KACST) Saudi Arabia and MIT, Director of the Ibn Khaldun Fellowship Program for Saudi Women, and Director of the MIT Mechatronics Research Laboratory. His M.S. and Sc.D. degrees are from MIT. Youcef-Toumi’s research has focused primarily on modeling, design, control theory, and their applications to dynamic systems. In particular, he explores the development of control techniques with fast adaptation. Applications have included robotics, automation, metrology, and nanoscale video imaging. He made significant contributions to MIT’s international research and education collaborations, including Qatar, Saudi Arabia, Russia and Singapore. Youcef-Toumi is the recipient of the National Science Foundation Presidential Young Investigator award from President Ronald Reagan. He served on many professional committees and as a consultant for several multinationals. He is an IEEE Senior member and an ASME Fellow. He served as Editor of several symposia/conference proceedings. He authored over 340 publications and holds about

50 registered/pending patents. Professor Youcef-Toumi has been an invited lecturer at over 200 seminars at companies, research centers and universities throughout the world.

Abstract:

Smart connected environments where appropriate information is collected, processed and used for operating and managing assets in an integrated intelligent way. This includes monitoring, diagnosing, predicting and controlling with confidence. For the purpose of achieving and maintaining high performance system's operation, appropriate methods and combination of control and system's intelligence are vital. In particular, systems and applications of primary focus are those with high speed and real time requirements.

The presentation first emphasizes the importance of computing and its impact in different sectors. Then, it introduces some methods for precise feature detection, action recognition by demonstration, and prediction. They cover frameworks, training predictive algorithms, data-driven models, graph theory in the learning process, loss functions in addition to a general model validation and testing tool. Illustration applications include robotics and selective recycling of cell phones.

Such developments are efforts towards strengthening the link between the digital and the physical worlds. The methods and tools will make modeling, design, control and management of complex, highly integrated systems more efficient and effective.

“AI at the Edge”



Professor. Omar Rana

College Dean of International
Professor of Performance Engineering,

CARDIFF UNIVERSITY, UK

Omar Rana is a Professor of Performance Engineering and the Dean of International for the Physical Sciences and Engineering College at Cardiff University. He has research interests in high performance distributed computing (particularly cloud and edge computing) and intelligent systems. He is a visitor professor at the Department of Computer Science and Engineering at Shanghai Jiao Tong University (China) and was previously a visiting professor at Princess Noura University in Riyadh (Saudi Arabia). He is a fellow of Cardiff University’s multi-disciplinary “Data Innovation” Research Institute and previously the deputy director of the Welsh eScience Centre.

Rana has contributed to specification and standardisation activities via the Open Grid Forum and worked as a software developer with London-based Marshall Bio-Technology Limited prior to joining Cardiff University, where he developed specialist software to support biotech instrumentation. He also contributed to public understanding of science, via the Wellcome Trust funded “Science Line”, in collaboration with BBC and Channel 4. Rana holds a PhD in “Neural Computing and Parallel Architectures” from Imperial College (London University, UK), an MSc in Microelectronics (University of Southampton, UK) and a BEng in Information Systems Eng. from Imperial College (London University, UK).

Abstract:

Internet of Things (IoT) applications today involve data capture from sensors and devices that are close to the phenomenon being measured, with such data subsequently being transmitted to Cloud data centre for storage, analysis and visualisation. Currently devices used for data capture often differ from those that are used to subsequently carry out analysis on such data. Increasing availability of storage and processing devices closer to the data capture device, perhaps over a

one-hop network connection or even directly connected to the IoT device itself, requires more efficient allocation of processing across such edge devices and data centres. Supporting machine learning directly on edge devices also enables support for distributed (federated) learning, enabling user devices to be used directly in the inference or learning process. Scalability in this context needs to consider both cloud resources, data distribution and initial processing on edge resources closer to the user. This talk considers whether a data comms. network can be enhanced using edge resources, and whether a combined use of edge, in-network (in-transit) and cloud data centre resources provide an efficient infrastructure for machine learning and AI. The following questions are addressed in this talk:

1. How do we partition machine learning algorithms across Edge-Network-Cloud resources — based on constraints such as privacy capacity and resilience?
2. Can machine learning algorithms be adapted based on the characteristics of devices on which they are hosted? What does this mean for stability/ convergence vs. performance?

“Edge Intelligence – Engineering the New Fabric of IoT, Edge, and Cloud”



Professor Schahram Dustdar

Head of the Research Division of Distributed Systems at the TU Wien, Austria

Schahram Dustdar is Full Professor of Computer Science heading the Research Division of Distributed Systems at the TU Wien, Austria. He has an H-index of 78 with some 36,000 citations. He holds several honorary positions: University of California (USC) Los Angeles; Monash University in Melbourne, Shanghai University, Macquarie University in Sydney, University Pompeu Fabra, Barcelona, Spain. From Dec 2016 until Jan 2017 he was a Visiting Professor at the University of Sevilla, Spain and from January until June 2017 he was a Visiting Professor at UC Berkeley, USA.

From 1999 – 2007 he worked as the co-founder and chief scientist of Caramba Labs Software AG in Vienna (acquired by Engineering NetWorld AG), a venture capital co-funded software company focused on software for collaborative processes in teams. Caramba Labs was nominated for several (international and national) awards: World Technology Award in the category of Software (2001); Top-Startup companies in Austria (CapGemini Ernst & Young) (2002); MERCUR Innovation award of the Austrian Chamber of Commerce (2002).

He is founding co-Editor-in-Chief of ACM Transactions on Internet of Things (ACM TIoT) as well as Editor-in-Chief of Computing (Springer). He is an Associate Editor of IEEE Transactions on Services Computing, IEEE Transactions on Cloud Computing, ACM Computing Surveys, ACM Transactions on the Web, and ACM Transactions on Internet Technology, as well as on the editorial board of IEEE Internet Computing and IEEE Computer. Dustdar is recipient of multiple awards: IEEE TCSVC Outstanding Leadership Award (2018), IEEE TCSC Award for Excellence in Scalable

Computing (2019), ACM Distinguished Scientist (2009), ACM Distinguished Speaker (2021), IBM Faculty Award (2012). He is an elected member of the Academia Europaea: The Academy of Europe, where he is chairman of the Informatics Section, as well as an IEEE Fellow (2016) and an Asia-Pacific Artificial Intelligence Association (AAIA) Fellow (2021).

Abstract:

As humans, things, software and AI continue to become the entangled fabric of distributed systems, systems engineers and researchers are facing novel challenges. In this talk, we analyze the role of IoT, Edge, Cloud, and Human-based Computing as well as AI in the co-evolution of distributed systems for the new decade. We identify challenges and discuss a roadmap that these new distributed systems have to address. We take a closer look at how a cyber-physical fabric will be complemented by AI operationalization to enable seamless end-to-end distributed systems.

“AI and Future of Plastic Surgery”



Mr. Damir Kosutic

Consultant Plastic and Reconstructive Surgeon

The Christie NHS Foundation Trust
Wilmslow Road
Manchester
M20 4BX
United Kingdom

Mr Kosutic is internationally acclaimed Plastic and Reconstructive Surgeon, with subspecialty interest in complex microvascular reconstruction following cancer resections or trauma—particularly Breast reconstruction, Lymphoedema microsurgery as well as Sarcoma/Limb and Face Reconstruction. Mr Kosutic is one of the UK-leading lymphoedema and breast reconstructive surgeons, based at The Christie Hospital in Manchester, one of the largest European Cancer centres. Mr Kosutic has further developed and promoted various Lymphoedema surgical techniques in UK, in particular simultaneous microsurgical breast and microsurgical/super-microsurgical lymphoedema reconstructions for breast cancer patients—an area of his specific expertise. He has completed microsurgical fellowships at Imperial College NHS Trust – Charing Cross Hospital London and Sant Pau Hospital, Barcelona (Microvascular Breast Reconstruction and Perforator flaps), upon completion of comprehensive plastic surgery training in Ljubljana, Slovenia, under the mentorship of famous Marko Godina’s colleagues. He has PhD and Masters Degree in Biomedical Sciences and has published over 50 scientific papers in top international peer-reviewed plastic surgery journals, which have been cited over 280x in scientific literature. He has successfully implemented a number of innovative techniques in plastic surgical practice internationally, that improved the quality of reconstruction.

He is frequently an invited speaker at top international conferences where he chairs panels on different topics (EUROMICRO, EURAPS etc), courses and reputable institutions, lecturing on complex cancer reconstructive surgery, microsurgical breast and lymphoedema reconstruction and sarcoma reconstructions worldwide. Mr Kosutic is active member of European Association of Plastic Surgeons (EURAPS) where he is also sits at Hans Anderl Award Committee, active member of World Society for Reconstructive Microsurgery (WSRM), Fellow of European Board of Plastic and Reconstructive Surgery and Royal College of Surgeons of England. In 2011, he was awarded EURAPS Young Plastic Surgeon Scholarship and HCA Travelling Scholarship. He was also Assistant Professor at the University of Maribor, School of Medicine, Slovenia, EU.

In addition to teaching, Mr. Kosutic has been a faculty mentor for number of medical students, trainees and senior clinical/microsurgical fellows, including recently established Womens Microsurgery Group at ASRM (American Society for Reconstructive Microsurgery). He is on editorial board and reviewer for several plastic surgery journals including JPRAS for many years. Mr Kosutic is keen to promote Reconstructive Surgery in Dubai and UAE and create links with its hospital systems.

Abstract:

Plastic and Reconstructive Surgery has seen some significant changes over the past 20 years, as a result of developments in modern technology. Better understanding of vascular and particularly micro-vascular anatomy coupled with technological advances in operating microscopes, microsurgical instrumentation and pre-operative planning via advanced imaging, allows functional and aesthetic restoration of any radical cancer or trauma related defect from head to toe. As reconstruction has practically lost its technical boundaries, resectional surgery (to remove the cancer) can be executed without compromising on surgical margins, thus reducing rates of local recurrences and metastatic spread. Furthermore, modern technology allows so called super-microsurgical procedures for lymphoedema after breast cancer, thus greatly improving quality of life after cancer has been treated utilizing ICG technology that visualizes lymphatic channels in real time, which was unimaginable not so long ago. Advances in preoperative planning utilizing CT and MRI scans can help predict degree of resectability and tailor further treatments including radiotherapy accordingly. From the reconstructive point of view, these techniques provide a road-map to select best blood supply for the transplanted flap thereby reducing complication and increasing success rates. Focus of reconstructive surgery has therefore shifted from pure cancer clearance and flap survival, to a high degree of functional and aesthetic restoration of human body.

DeSE 2021 Programme

DAY 1 – TUESDAY, 7TH DECEMBER 2021

CONFERENCE OPENING

THIS WILL BE BROADCAST LIVE



<https://sharjah-ac-ae.zoom.us/j/97986101059>

UNIVERSITY OF SHARJAH (UoS)

AL-BAYRONI /LECTURE THEATRE
M9 BUILDING

UAE NATIONAL ANTHEM

PROF. ABIR HUSSAIN, WELCOME

QURAN CITATION

THE UNIVERSITY OF SHARJAH (UoS), CHANCELLOR WELCOME SPEECH

**THE UNIVERSITY OF SHARJAH, VICE CHANCELLOR OF RESEARCH AND GRADUATE
STUDIES-RESEARCH AT UOS**

**PROF. JAMILA MUSTIFINA, DESE INTERNATIONAL CONFERENCE ORGANIZER (HISTORY OF
DESE)**

PROF. AHMED AL-SHAMMA'A (DESE 14TH)

1ST KEYNOTE SPEAKER

(PROF. KAMAL YUCEF-TOUMI), MIT

AUTOMATION & COMPUTING



1:00 pm – 2:30pm
(UAE Time)



9:00am – 10:30am
GMT Time

2:30 pm – 2:45pm
(UAE Time)

10:30am – 10:45am
GMT Time

COFFEE BREAK

TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE

<p style="text-align: center;">SESSION A1 - VIRTUAL eSystem Engineering (Main Track)</p> <p>Session Chair – Prof. Jamila Mustifina</p> <p>Session Co-Chair – Dr. Jade Hind</p>  <p>Video link: https://ljmu.zoom.us/j/89537767474?pwd=VjFjUkFQWlJoUldCVFBHSWN0UDhQZz09</p>	<p style="text-align: center;">SESSION B1 - VIRTUAL Sensor Technologies and AI in Education</p> <p>Session Chair –Dr. Sahar AL-Sudani</p> <p>Session Co-Chair – Dr. Mohamed Mahyoub</p>  <p>Video link: https://ljmu.zoom.us/j/88468246175?pwd=cVdnWVcvWnJhSDdBZjJ4RzZ2MjFWUjT09</p>	<p style="text-align: center;">2:45 pm – 5:00pm (UAE Time)</p> <p style="text-align: center;">10:45am – 1:00pm GMT Time</p>
<ul style="list-style-type: none"> • “Students Personality Assessment Using Deep Learning From University Admission Statement of Purpose” Seemab Latif (National University of Science and Technology, Pakistan); Salma Kulsoom (National University of Sciences and Technology (NUST), Pakistan); Rabia Latif (Prince Sultan University, Saudi Arabia) [1570732418] • “Quality Monitoring of Abu Dhabi Drinking Water Using Machine Learning Classifiers” Ali Hasan (University of Johannesburg, South Africa); Khawla Alhammadi (Higher Colleges of Technology, United Arab Emirates) [1570738769] • “Review on Augmented Reality Technology” Shiva Asadianfam (Islamic Azad University & Qom University of Technology, Iran); Hoshang Kolivand (Dep CS LJMU, United Kingdom (Great Britain)) [1570743926] • “A Fitness App to Fit Everybody's Schedule” Shiva Asadianfam (Islamic Azad University & Qom University of Technology, Iran); Hoshang Kolivand (Dep CS LJMU, United Kingdom (Great Britain)) [1570743954] • “ElecPlus: A Universal Smart Hub for Mitigating the Environmental Impacts of Electrical Appliances”Sathiapriya Ramiah (Asia Pacific University of Technology & Innovation, Malaysia) [1570745984] • “Data Analytics in Improved Bankruptcy Prediction with Industrial Risk” Sonia Mann (Asia Pacific University of Technology and Innovation, Malaysia); Rajasvaran Logeswaran (Asia Pacific University of Technology & Innovation (APU) [1570746269] • “Online Media Management Booking System” Daniel Vistro (Asia Pacific University, Malaysia) [1570746381] 	<ul style="list-style-type: none"> • “The Integration of the Multi-Source Data for Multi-Temporal Investigation of Cultural Heritage Objects” Jakub Markiewicz (Warsaw University of Technology, Poland); Agnieszka Bochenska (The Royal Castle in Warsaw, Poland); Patryk Kot (Liverpool John Moores University, United Kingdom (Great Britain)); Sławomir Lapinski (Warsaw University of Technology, Poland); Magomed Muradov (Liverpool John Moores University, United Kingdom (Great Britain)) [1570744574] • “Proposed Design and Implementation Guidelines for Energy Efficient Smart Street Lighting: A Malaysian Perspective” Richson Ngu and Kamalanathan Shanmugam (Asia Pacific University of Technology & Innovation (APU), Malaysia); Muhammad Ehsan Rana (Asia Pacific University [1570745973] • “Punching Shear Assessments of Two-Way Reinforced Concrete Slabs Strengthened by FRP Strips: A Parametric Study” Aleaa Radi (University of Anbar, Iraq); Akram S. Mahmoud (University of Anbar & Engineering College, Iraq) [1570755592] • “The Java Starter: An Ontology-Based Tutoring System for Java Beginners” Miruna I Pirvulescu and Sahar Al-Sudani (King's College London, United Kingdom (Great Britain)) [1570745730] • “A Study of Machine Learning Based Approaches to Extract Personality Information from Curriculum Vitae” Leong Dickmond, Vazeerudeen Abdul Hameed and Muhammad Ehsan Rana (Asia Pacific University of Technology and Innovation, Malaysia) [1570745972] 	

SESSION C1 – ONSITE

UNIVERSITY OF SHARJAH
AL-BAYRONI /LECTURE THEATRE
e-Systems Engineering (Main track)



<https://sharjah-ac-ae.zoom.us/j/91474521974>

Session Chair – Prof. Hissam Tawfik

Session Co-Chair – Dr. Sohaib Majzoub

- **“A Spatio-Temporal Framework Based on Geographic Information System (GIS) to Evaluate the CO2 Emissions”** Fatma El-Zahraa Hosny (University of Sharjah, United Arab Emirates); Saleh Abu Dabous (Civil Engineering, United Arab Emirates); Abdallah Shanableh and Rami Al-Ruzouq (University of Sharjah, United Arab Emirates) [1570762728]
- **“Energy Performance Labeling: Impact on Rental Values Across Regional Offices Within the GMT”** Aseel Hussien and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates); Nusrat Jannat and Shafayat Bin Ali (LJMU, United Kingdom (Great Britain)) [1570771543]
- **“Evaluation of Cement Manufacturing Methods Using Multi Criteria Decision Analysis (MCDA)”** Nivin Ghaboun (Near East University, United Arab Emirates); Dilber Uzun Ozsahin (University of Sharjah, Sharjah, UAE & Near East University, Nicosia, North Cyprus, United Arab Emirates); Huseyin Gokcekus and Berna Uzun (Near East University, Turkey) [1570773068]
- **“Investigating Water Consumption Patterns Through Time Series Clustering”** Omnia Abu Waraga, Abdulrahman Abdeljaber, Manar Abu Talib and Mohamed Abdallah (University of Sharjah, United Arab Emirates) [1570774906]
- **“The Effects of Weather Conditions on COVID-19 Forecasting, the United Arab Emirates as a Reliable Study Case”** Dana I. Abu-Abdoun and Sameh Al-Shihabi (University of Sharjah, United Arab Emirates) [1570774745]

2:45 pm – 5:00pm
(UAE Time)

10:45am – 1:00pm
GMT Time

COFFEE BREAK

TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE

5:00 pm – 5:15pm
(UAE Time)

1:00pm – 1:15am
GMT Time

**SESSION D1 - VIRTUAL
eSystem Engineering (Main Track)**

Session Chair – Dr. Wasiaq Khan

Session Co-Chair – Ms Jan Lunn



Video link:

<https://ljam.zoom.us/j/83674893624?pwd=ejBoeHdhSG1CNXI0cmkxWUpNYkdFQT09>

**SESSION E1 - VIRTUAL
AI in Law and Digital Health**

Session Chair – Dr. Hoshang Kolivand

Session Co-Chair – Prof. Abir Hussain



Video link:

<https://ljam.zoom.us/j/89635614556?pwd=RWg1VXZMckF1WUdNclA3RGdSbEtQZz09>

5:15 pm – 7:00pm
(UAE Time)

1:15pm – 3:00pm
GMT Time

- **“Botnet as a Service Towards National Defense and Security”** Nor Azlina Abd Rahman (Asia Pacific University of Technology & Innovation, Malaysia); Tan Yock Khang (Asia Pacific University of Technology and Innovation, Malaysia) [1570746873]
- **“Ransomware as a Service (RaaS) and Methods to Mitigate the Attack”** Nor Azlina Abd Rahman (Asia Pacific University of Technology & Innovation, Malaysia); Ali Ahmed Mohammed Ali Alwashali (Asia Pacific University of Technology and Innovation, Yemen); Noris Ismail (Asia Pacific University of Technology and Innovation, Malaysia) [1570746878]
- **“EAGLE: GUI Penetration Testing Tool for Scanning and Enumeration”** Yusnita Yusof and Ammrish Singh Beker Singh (Asia Pacific University of Technology and Innovation, Malaysia); Yogeswaran Nathan (Asia Pacific University & Technology Park Bukit Jalil KL, Malaysia) [1570746895]
- **“Stock Market Price Movement Forecasting on BURSA Malaysia Using Machine Learning Approach”** Leong Jia Ling and Seetha Letchumy M. Belaidan (Asia Pacific University of Technology & Innovation, Malaysia) [1570747522]
- **“An Intelligent Hydrocephalus Shunt: A New Concept”** Osman Salih, Marco Messina and Dhiya Al-Jumeily (Liverpool John Moores University, United Kingdom (Great Britain)) [1570747955]
- **“A Gamification Design Framework for Supporting ASD Children Social Skills”** Siti Azreena Mubin, Matthew Wee Ann Poh, Rizawati Rohizan, Aida Zamnah Zainal Abidin and Wong Chung Wei (Asia Pacific University of Technology & Innovation (APU), Malaysia) [1570749447]

- **“A Question Answering Based Information Retrieval System for Legal Domain”** Sahar Arshad (SEECs National University of Sciences and Technology (NUST) & Bahria University, Pakistan); Saeed Ullah (FUUAST, Pakistan); Iqra Basharat and Iqra Javed (Bahria University, Pakistan) [1570743813]
- **“Extracting Catchy Phrases From Legal Documents Using Deep Learning”** Iqra Basharat (SEECs National University of Sciences and Technology, Pakistan); Seemab Latif (National University of Science and Technology, Pakistan); Rabia Latif (Prince Sultan University, Saudi Arabia) [1570744144]
- **“A Review on Smart Healthcare System Using Blockchain Technology”** Daniel Vistro (Asia Pacific University, Malaysia) [1570745437]
- **“AlzBot- Mobile App Chatbot for Alzheimer's Patient to Be Active With Their Minds”** Zailan Arabee Abdul Salam (Asia Pacific University of Technology & Innovation, Malaysia); Le Xin Teng (School of Computing and Technology, Asia Pacific University of Technology, and Innovation, Malaysia); Amad Arshad (Asia Pacific University of Technology & Innovation, Malaysia) [1570746305]
- **“VMS - Visitation Management System”** Amad Arshad (Asia Pacific University of Technology & Innovation, Malaysia) [1570746313]
- **“Adopting Smart Home Healthcare via IoT Technology”** Nor Azlina Abd Rahman (Asia Pacific University of Technology & Innovation, Malaysia); Noris Ismail and Amina Ibrahim Doualeh (Asia Pacific University of Technology and Innovation, Malaysia) [1570746869]
- **“Image Registration Techniques and Applications: Comparative Study on Remote Sensing Imagery”** Mohamed Ihmeida and Hong Wei (University of Reading, United Kingdom (Great Britain)) [1570755744]
- **“Roles of Caregivers in Physiological Data Collection Experiments With People With Dementia and Mitigating the Impacts of COVID-19”** Matthew L Harper and Fawaz Ghali (Liverpool John Moores University, United Kingdom (Great Britain)) [1570756168]
- **“Application of Virtual Reality and Electrodermal Activity for the Detection of Cognitive Impairments”** Rebecca Patient, (Liverpool & Liverpool John Moores University, United Kingdom (Great Britain)); Fawaz Ghali (Liverpool John Moores University, United Kingdom (Great Britain)); Hoshang Kolivand (Dep CS LJMU, United Kingdom (Great Britain)); William Hurst (Information Technology Group, The Netherlands); Nigel W. John (University of Ceste, United Kingdom (Great Britain)) [1570756659]

- ***“Diagnosis of Breast Cancer on Imbalanced Dataset Using Various Sampling Techniques and Machine Learning Models”*** Ruchita Gupta (Liverpool John Moores University, United Kingdom, United Kingdom (Great Britain)); Rupal Bhargava (UpGrad Education Pvt. Ltd., India); Manoj Jayabalan (Liverpool John Moores University, United Kingdom (Great Britain)) [1570767353]
- ***“The Implementation of AI in Health and Medicine: Electronic Health Records Web Based on Integration of Logistic Regression Model for Diabetes Type 2 Prediction”*** Rania Boudjemadi, RBdj (John Moores University, United Kingdom (Great Britain)); Jamila Mustafina (Kazan Federal University, Russia); Jan Lunn (Liverpool John Moores University, United Kingdom (Great Britain)); Wael N Aljumaili (University of mosul, Iraq) [1570771706]

END OF FIRST DAY

DAY 2 – WEDNESDAY, 8TH DECEMBER 2021

KEYNOTE SPEAKER

“AI AND FUTURE OF PLASTIC SURGERY”

MR. DAMIR KOSUTIC,

CONSULTANT PLASTIC AND RECONSTRUCTIVE SURGEON
THE CHRISTIE NHS FOUNDATION TRUST, UNITED KINGDOM



SESSION CHAIR: PROF ABIR HUSSAIN



<https://ljmu.zoom.us/j/89645564560?pwd=NFh6T2lxT1RoYWo4VzQ3YUFtdzB0UT09>

12:30 pm – 1:30pm
(UAE Time)

8:30am – 9:30am
GMT Time

COFFEE BREAK

TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE

1:30 pm – 2:00pm
(UAE Time)

9:30am – 10:00am
GMT Time

SESSION A2 – ONSITE

**UNIVERSITY OF SHARJAH
AL-BAYRONI /LECTURE THEATRE**

eSystem Engineering (Main Track)



<https://sharjah-ac-ae.zoom.us/j/91825438011>

Session Chair – Prof. Khalil Abdelrazek Khalil Abdelmawgoud

Session Co-Chair – Prof. Mohamad Maalej

- **“Multi Sensing Platform for Real Time Water Monitoring Using Electromagnetic Sensor”** Omar Emad Omar Alshaltone, Nida Nasir, Feras Barneih, E'qab Almajali and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570743027]
- **“Control of Quadcopter Drone Based on Fractional Active Disturbances Rejection Control”** Amal Al Ali (University of Sharjah, United Arab Emirates); Raouf Fareh (University of Sharjah Electrical Engineering, United Arab Emirates); Saif Sinan and Maamar Bettayeb (University of Sharjah, United Arab Emirates) [1570743607]
- **“Tracking Control of Quadcopter Based on Multiple Manifold of Synergetic Control Strategy”** Mohammad Alfuqaha (University of Sharjah, United Arab Emirates); Raouf Fareh (University of Sharjah Electrical Engineering, United Arab Emirates); Saif Sinan and Maamar Bettayeb (University of Sharjah, United Arab Emirates) [1570743609]
- **“Fractional-Order PID Controller Design Using PSO and GA”** Mohannad Nasir (Graduate Research Assistant, United Arab Emirates); Sofiane Khadraoui (University of Sharjah, United Arab Emirates) [1570743747]
- **“5G Ring Antenna for Internet of Medical Things (IoMT) Applications”** Feras Barneih, E'qab Almajali, Omar Emad Omar Alshaltone, Nida Nasir and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570744092]
- **“Performance Ranking of Diagnostic SARS-CoV-2 IgG Antibody Tests by Using Multi-Criteria Decision-Making Theory”** Dilber Uzun Ozsahin (University of Sharjah, Sharjah, UAE & Near East University, Nicosia, North Cyprus, United Arab Emirates); Ayse Arikan (Near East University, United Arab Emirates); Tamer Şanlıdağ (Near East University); Murat Sayan (Kocaeli University & Near East University, Turkey); Berna Uzun (Near East University, Turkey) [1570774580]

02:00 pm – 4:00pm
(UAE Time)

10:00am – 12:00am
GMT Time

COFFEE BREAK

TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE

4:00 pm – 5:00pm
(UAE Time)

12:00pm – 1:00pm
GMT Time

SESSION B2 - ONSITE

THE UNIVERSITY OF SHARJAH
AL-BAYRONI /LECTURE THEATRE
eSystem Engineering (Main Track)



<https://sharjah-ac-ae.zoom.us/j/93348466873>

Session Chair – Prof. Soliman Mahmoud
Session Co-Chair – Prof. Abbas Elmualim

SESSION C2 - VIRTUAL
Computational Intelligence and Machine Learning in Emerging Applications of Health, Science, and Engineering

Session Chair – Prof. Dhiya Al-Jumeily

Session Co-Chair – Dr. Wasiq Khan



<https://ljmu.zoom.us/j/89354511350?pwd=RC9iUUJhSFdkZWVkMVhldEtFZm1zQT09>

Meeting ID: 893 5451 1350



Passcode: 035344

5:00 pm – 7:00pm
(UAE Time)

1:00pm – 3:00pm
GMT Time

- **“Real-Time Monitoring and Performance Harvesting for Grid-Connected PV System - A Case in Sharjah”** Mena Maurice Farag (University of Sharjah, United Arab Emirates); Fahad Faraz Ahamd (Research Institute of Sciences and Engineering, University of Sharjah, United Arab Emirates); Abdul-Kadir Hamid, Chaouki Ghenai and Maamar Bettayeb (University of Sharjah, United Arab Emirates) [1570772024]
- **“A Distributed Fog-Based Vehicular Navigation System for Efficient Transportation”** Naveed Ahmed, Thar Baker and Zaher Al Aghbari (University of Sharjah, United Arab Emirates); Ahmed Khedr (UOS, United Arab Emirates) [1570773083]
- **“Optimal Placement of Grid-Connected Solar Photovoltaic Systems Using Artificial Intelligence Methods”** Sam Ansari, Abdul-Kadir Hamid and Noor Ahmad Al Hindawi (University of Sharjah, United Arab Emirates) [1570773122]
- **“Does a Novel Game-Based Arm Rehabilitation Device, the ArmAble™, Improve Upper Limb Function in People With Stroke?”** Senthil Kumaran D, Swathi GA, Riya Raja, Ali A Sulfikar and Nirmala Nayak (Manipal Academy of Higher Education, India); Ashokan Arumugam (University of Sharjah, United Arab Emirates) [1570773258]
- **“Sleep Apnea Detecting and Monitoring System (SADMS)”** Razan A Alhamad, Sara Mohammed, Meiaad Abdullah, Fatima Mohammed and Talal Bonny (University of Sharjah, United Arab Emirates) [1570773789]
- **“The Exploitation of Multiple Feature Extraction Techniques for Speaker Identification in Emotional States Under Disguised Voices”** Noor Ahmad Al Hindawi, Ismaill M. Shahin and Ali Bou Nassif (University of Sharjah, United Arab Emirates) [1570773997]
- **“Arctic Ice Thickness Prediction Using Artificial Neural Networks”** Tarek Zaatari and Ali Cheaitou (University of Sharjah, United Arab Emirates); Olivier Faury (EM Normandie, France) [1570774268]

- **“Question Classification Using Universal Sentence Encoder and Deep Contextualized Transformer”** Najam Arif (National University of Sciences and Technology (NUST), Pakistan); Seemab Latif (National University of Science and Technology, Pakistan); Rabia Latif (Prince Sultan University, Saudi Arabia) [1570746915]
- **“Monte Carlo Simulation Prediction of Stock Prices”** Shubashini Rathina velu and Sotirios Zygiaris (Prince Mohammad Bin Fahd University, Saudi Arabia); Jeremy Ng Phak Xiang (Asia Pacific University of Technology & Innovation (APU), Malaysia) [1570753209]
- **“The Impact of Data Aggregation Strategy on a Performance of Wireless Sensor Networks (WSNs)”** Ahmed Subhi Abdalkafor (University of Anbar, Iraq); Salah A. Aliesawi (University of Anbar, Iraq) [1570754023]
- **“A Review Study on Measurement and Evaluation of Prosthesis Testing Platform During Gait Cycle Within Sagittal Plane”** Saif Mohammed Haider (Al-Nahrain University, Iraq) [1570755630]
- **“Features Extraction of Fingerprints Based Bat Algorithms”** Waleed Kareem (University of Anbar & Iraq, Iraq); Eman Mahdi (University of Anbar, Iraq) [1570756783]
- **“Hybrid Technique for Multichannel EEG Signals Compression”** Azmi Shawkat (University of Anbar & Departement of Computer Science, Iraq) [1570757802]
- **“Medical Condition Assessment via ECG Signal Monitoring Based on IoMT”** Azmi Shawkat (University of Anbar & Departement of Computer Science, Iraq) [1570757808]
- **“The Development of Energy Efficient Routing Protocol Based on SDN Architecture and Intelligent Technique for IIHC-IoT”** Ahmed Sh. Al-Obady and Thair Al-Janabi (Middle Technical University, Iraq); Ammar Hussein (University Kebangsaan Malaysia, Malaysia) [1570757854]
- **“A Secure EEG Simulator for Remote Healthcare Evaluation”** Azmi Shawkat (University of Anbar & Department of Computer Science, Iraq) [1570758221]
- **“A Review on Automation Artificial Neural Networks Based on Evolutionary Algorithms”** Rizgar R. Zebari (Nawroz University, Iraq); Subhi Zeebaree (Duhok Polytechnic University, Iraq); Zryan Rashid (Sulaimani Polytechnic University, Iraq); Hanan Shukur (Al-Kitab University, Iraq); Ahmed Alkhayat (The Islamic University Najaf, Najaf, Iraq,); Mohammed


	<p>Mohammed Sadeeq (Duhok Polytechnic University, Iraq) [1570758488]</p>	
<p>COFFEE BREAK TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE</p>		<p>7:00 pm – 7:15pm <i>(UAE Time)</i></p> <p>3:00pm – 3:15pm <i>GMT Time</i></p>
<p>SESSION D2 – VIRTUAL eSystem Engineering (Main Track)</p> <p>Session Chair – Dr. Sadiq Abdulhussain</p> <p>Session Co-Chair – Dr. Ala Al-Khafri</p> <p></p> <p>https://ljmu.zoom.us/j/88474116884?pwd=Ri9vdXExZGcwSXAYWXBCVFVYy1gyQT09</p> <p>Meeting ID: 884 7411 6884</p> <p>Passcode: 913609</p>	<p>SESSION E2 - VIRTUAL Computational Intelligence and Machine Learning in Emerging Applications of Health, Science, and Engineering</p> <p>Session Chair – Prof. Mushtak Salih Nada Al-Ouqaili</p> <p>Session Co-Chair – Dr Esam Taha Yassin and Dr. Ahmed Al-Jaaf</p> <p></p> <p>https://ljmu.zoom.us/j/89934097352?pwd=YU8xdjhzUW00Z0RSMIFGYXYzMUMyZz09</p> <p>Meeting ID: 899 3409 7352</p> <p>Passcode: 545532</p>	<p>7:15 pm – 8:30pm <i>(UAE Time)</i></p> <p>3:15pm – 4:30pm <i>GMT Time</i></p>

- **“A Conceptual Framework: Point-Of-Sales (Pos) System Integrated With Business Intelligence (Bi) Capability Focused On Sme In Indonesia”** Khalida Shajaratuddur Harun (Asia Pacific University of Technology & Innovation, Malaysia) [1570750162]
- **“VRrunner: Providing Runner Platform for Personal Shopper, Delivery Services and Queue Assistant for Urban Community”** Intan Farahana Kamsin (Lecturer, Malaysia) [1570750168]
- **“Food Customization in Cloud Kitchens Based on Meal Plans for Working-Class Consumers in Malaysia”** Intan Farahana Kamsin (Malaysia) [1570750170]
- **“Integration of Wireless Sensor Network Based Smart Parking Management System for APU”** Intan Farahana Kamsin (Malaysia) [1570750177]
- **“Quaesitor - an Open-Source Intelligence (OSINT) Information Gathering Tool”** Vinesha Selvarajah (Asia Pacific University of Technology & Innovation, Malaysia) [1570750831]
- **“SQL Injection Methodology and Impact”** Vinesha Selvarajah (Asia Pacific University of Technology & Innovation, Malaysia) [1570750845]

- **“Proposed Image Encryption Algorithm Based on Paillier Homomorphic and Elliptic Curve Algebra”** Zainab Mohammed Muneef, Hala Abdul Wahab and Abdul Mohssen Abdul Hossen (University of Technology, Iraq) [1570760895]
- **“Biogas Production Modelling of Integrated Anaerobic-Aerobic Sequencing Batch Reactor Treating Poultry Slaughterhouse Wastewater”** Ahmed Rahomi Rajab (University of Anbar, Iraq); Mohd. Razman Salim (UCSI University, Malaysia); Johan Sohaili (Universiti Teknologi Malaysia (UTM), Malaysia); Aznah Nor Anuar (Universiti Teknologi Malaysia, Malaysia) [1570761981]
- **“Prediction of Strength of Foamed Concrete Containing Waste Plastic as Coarse and Fine Aggregates Using Minitab Software”** Aya Mohammed Abbas (University of Anbar, Iraq) [1570761982]
- **“Optimum Content of Waste Fine Plastic Aggregate Using Mini181 Software for Best Performance of Reinforced Concrete”** Dhifaf Hamdullah, Sheelan Hama and Shaho Hama (University of Anbar, Iraq) [1570761999]
- **“Hybrid Intelligent Controller for Magnetic Levitation System Based on Virtual Reality Model”** Yousif Ismail Al Mashhadany (University of Anbar, Iraq) [1570762596]
- **“An Analysis Review: Real Measurement for Surface Electromyography (sEMG) Signal”** Yousif Ismail Al Mashhadany (University of Anbar, Iraq) [1570762603]
- **“Enhanced Iterated Local Search for Scheduling of Scientific Workflows”** Alaa Abdalqahar Jihad (University of Anbar & Computer Center, Iraq); Sufyan T Faraj Al-Janabi (University of Anbar, Iraq); Esam Yassen (University of Anbar & Center for Artificial Intelligent (CAIT), Universiti Kebangsaan Malaysia, Iraq) [1570762660]
- **“Implementation of Data Transportation Protocol Depending on the Light-Weight Cipher Algorithms”** Seddiq Q. Abd Al-Rahman, Sarah Hamad and Dena Turkey (University of Anbar, Iraq) [1570762900]
- **“Energy Model of Wireless Sensor Network”** Ayam T Ahmed, almula (University of Anbar, Iraq) [1570763488]
- **“Prediction of Single Object Tracking Based on Learning Approach in Wireless Sensor Networks”** Sahar Hamad Ahmed (University of Anbar, Iraq) [1570763577]

END OF SECOND DAY

DAY 3 – THURSDAY, 9TH DECEMBER 2021

<p style="text-align: center;">SESSION A3 - ONSITE</p> <p style="text-align: center;">THE UNIVERSITY OF SHARJAH AL-BAYRONI /LECTURE THEATRE eSystem Engineering (Main Track)</p> <p> https://sharjah-ac-ae.zoom.us/j/91752101679</p> <p>Session Chair – Prof. Ghazi Gaseem Khaleel Al-Khateeb</p> <p>Session Co-Chair – Dr. Ali Cheaitou</p>	<p style="text-align: center;">11:00 am – 12:40pm <i>(UAE Time)</i></p> <p style="text-align: center;">7:00am – 8:40am <i>GMT Time</i></p>
<ul style="list-style-type: none"> • <i>“Identifying Diagnostic and Prognostic Targets for Papillary Thyroid Carcinoma Through Mining Gene Expression BIG Datasets Using Adaptive Filtering and Advanced Bioinformatics Algorithms”</i> Asma Almansoori and Poorna Bhamidimarri (Sharjah Institute for Medical Research, United Arab Emirates); Riyad Bendardaf and Rifat Hamoudi (University of Sharjah, United Arab Emirates) [1570774479] • <i>“A Deep Neural Network-Based Prediction Model for Students' Academic Performance”</i> Ghaith Al-Tameemi, James Xue, Suraj Ajit and Triantafyllos Kanakis (University of Northampton, United Kingdom (Great Britain)); Israa Hadi Ali (University of Babylon, IT, Software dept., Iraq); Thar Baker (University of Sharjah, United Arab Emirates); Mohammed Al-khafajiy (University of Reading, United Kingdom (Great Britain)); Rawaa Al-Jumeily (Belvedere British School, United Arab Emirates) [1570764826] • <i>“Palm Vein Based Authentication System by Using Convolution Neural Network”</i> Ali Salam Al-jaberi and Ali Mohsin Al-juboori (Al-Qadisiyah University, Iraq); Rawaa Al-Jumeily (Liverpool John Moores University, United Kingdom (Great Britain)); Mohammed Al-khafajiy (University of Reading, United Kingdom (Great Britain)); Thar Baker (University of Sharjah, United Arab Emirates) [1570766240] • <i>“Comparison of GA, GWO, and HHO Optimization Techniques for Modeling Substrate/Buffer Loading Effect on GaN HEMTs”</i> Abdallah Y.I Abushawish (University City of Sharjah & Sharjah, United Arab Emirates); Anwar Hasan Jarndal (University of Sharjah, United Arab Emirates) [1570768358] • <i>“Quantifying Impacts of Connected and Automated Vehicles on Traffic Operation of a Diamond Interchange in UAE Using Micro-Simulation”</i> Mohamad Tulimat, Osama Obaid, Lubna Obaid and Khaled Hamad (University of Sharjah, United Arab Emirates) [1570756036] 	
<p style="text-align: center;">COFFEE BREAK</p> <p style="text-align: center;">TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE</p>	<p style="text-align: center;">12:40pm – 01:00pm <i>(UAE Time)</i></p> <p style="text-align: center;">8:40am – 9:00 am <i>GMT Time</i></p>

SESSION B3 - ONSITE

UNIVERSITY OF SHARJAH
AL-BAYRONI /LECTURE THEATRE
eSystem Engineering (Main Track)



<https://sharjah-ac-ae.zoom.us/j/91462834806>

Session Chair – Prof. Abdul Ghani Olabi

Session Co-Chair – Dr. Fikri T. Dweiri

01:00 pm – 3:00pm
(UAE Time)

9:00am – 11:00am
GMT Time

- **“Classifying and Forecasting Traffic Incident Duration Using Various Machine Learning Techniques”** Zakiya Rahmat-Ullah, Sara Alsmadi and Khaled Hamad (University of Sharjah, United Arab Emirates) [1570756283]
- **“Autonomous Localization of the Best Depth Blob Using TOPSIS: Application on Forage Plants for the Sharjah Pastures Project”** Radhwan Sani, Ali Cheaitou and Tamer Rabie (University of Sharjah, United Arab Emirates) [1570763146]
- **“Detection of Epileptic Seizure Using Discrete Wavelet Transform on Gamma Band and Artificial Neural Network”** Mahmud D'yab Qatmh, Talal Bonny, Nida Nasir, Mohammad AlShabi and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570772989]
- **“Accuracy of Linear Measurements of Maxillary Sinus Dimensions in Gender Identification Using Machine Learning”** Abdullah Mohammed Abdullah Al-Amodi and Natheer Al-Rawi (University of Sharjah, United Arab Emirates); Ibrahim Kamel (University of Sharjah & Concordia University, United Arab Emirates) [1570773183]
- **“GaN Power Amplifiers Design Using Efficient GA-ANN Dynamic Nonlinear Model”** Anwar Hasan Jarndal and Husna Hamza (University of Sharjah, United Arab Emirates) [1570766080]
- **“Machine Learning Based Prediction Models for the Percentage Deaths Due to COVID-19”** Anwar Hasan Jarndal (University of Sharjah, United Arab Emirates); Saddam Husain (Nazarbayev University, Kazakhstan); Maha Diab and Amir Shikhli (University of Sharjah, United Arab Emirates) [1570768086]
- **“Optimization of a Conceptual Rainfall-Runoff Model Using Evolutionary Computing Methods”** Hamad Mohamed Ahli and Tarek Murabteen (University of Sharjah, United Arab Emirates); Mohsin Siddique (Mechanical Engineering, United Arab Emirates) [1570773305]

DAY THREE KEYNOTE SPEAKER

“AI AT THE EDGE”

PROF. OMAR RANA

COLLEGE DEAN OF INTERNATIONAL
PROFESSOR OF PERFORMANCE ENGINEERING,
CARDIFF UNIVERSITY, UK



SESSION CHAIR: DR THAR BAKER

<https://lomu.zoom.us/j/88130309407?pwd=K0dTeFFadk92M2JNdzdHdzZwLzVBZz09>

Meeting ID: 881 3030 9407
Passcode: 906130

3:30pm – 4:30pm
UAE Time

11:30am – 12:30pm
GMT Time

COFFEE BREAK

TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE

4:30pm – 4:45pm
(UAE Time)

12:30pm – 12:45pm
GMT Time

SESSION C3 - VIRTUAL
Computational Intelligence and Machine Learning in Emerging Applications of Health, Science, and Engineering

Session Chair – Dr. Saad Amin

Session Co-Chair- Ms. Tara McKeown



Video link:

<https://jmu.zoom.us/j/86565536588?pwd=QmpYWE1JUkdJcU85NWFLSm02N3JNUT09>

Meeting ID: 865 6553 6588

Passcode: 500217

SESSION D3 - ONSITE

THE UNIVERSITY OF SHARJAH
AL-BAYRONI /LECTURE THEATRE
eSystem Engineering (Main Track)

Session Chair – Prof. Abdul-Kadir Hamid

Session Co-Chair- Dr. Emad S. N. Mushtaha



<https://sharjah-ac-ae.zoom.us/j/91032229628>

4:45pm – 6:45pm
(UAE Time)

12:45pm – 2:45pm
GMT Time

- **“COVID-19 Cases Estimation in the UK Using Improved SEIR Models”** Ali Al-Ataby (University of Liverpool, United Kingdom (Great Britain)); Fawzi Mohammed Munir Al-Naima (Al-Nahrain University, Iraq); Shaogang Jiang (University of Liverpool, China) [1570764237]
- **“Human-Robot Arm Interaction Based on Electromyography Signal”** Yousif Ismail Al Mashhadany (University of Anbar, Iraq) [1570764623]
- **“An Efficient Intrusion Detection System for IoT Based on Smart Techniques”** Zainab Hussam Abdaljabar (University of Altinbas, Iraq); Osman Nuri Ucan (Altinbas University, Turkey); Khattab M. Ali Alheeti (University of Anbar, Iraq) [1570767218]
- **“Credit Card Fraud Detection Using XGBoost Algorithm”** Ahmed Qasim Abdulghani (University of Altinbas, Iraq); Osman Nuri Ucan (Altinbas University, Turkey); Khattab M. Ali Alheeti (University of Anbar, Iraq) [1570767221]
- **“Supervised Machine Learning to Enhance Security in Mobile Ad Hoc Networks”** Marwa Mohammed Khalifa (University of Altinbas, Iraq); Osman Nuri Ucan (Altinbas University, Turkey); Khattab M. Ali Alheeti (University of Anbar, Iraq) [1570767223]
- **“Image Feature Detectors for Deepfake Image Detection Using Transfer Learning”** Khattab M. Ali Alheeti (University of Anbar, Iraq); Salah Rawi (Anbar University, Iraq); Haitham Abbas Khalaf and Duaa Al-Dosary (University of Anbar, Iraq) [1570767225]
- **“CNN and Genetic Algorithm for Finger Vein Recognition”** Ola Marwan (University of Mosul, Iraq) [1570769729]
- **“Study the Use of Nano-Limestone and Egg-Shell Ash in Eco-Friendly SCC: An Experimental and Statistical Evaluation Based on Computer Programming”** Haider Abdulhameed and Aseel Mansi (University of Technology, Iraq); Ahmed Mohammed (University of Fallujah, Iraq); Ali A. Abdulhameed and Ammar Hanoon (University of Baghdad, Iraq) [1570771525]
- **“Cooperative Forward Collision Avoidance System Based on Deep Learning”** Wajdi Farhat (ENISO, University of Sousse, Tunisia); Olfa Ben Rhaïem (UQAM, Canada); Hassène Faïedh (Faculty of Sciences of Monastir, University of Monastir, Tunisia); Chokri Souani (Higher Institute of Applied Sciences & Technology, University of Sousse, Tunisia) [1570774626]
- **“Simulation of MobiFall Dataset for Fall Detection Using MATLAB Classifier Algorithms”** Farhan Ahnaf Rashid (University of Technology Sydney, Australia); Kumbesan Sandy Sandrasegaran and Xiaoying Kong

- **“Predicting Traffic Incident Severity Level Using Machine Learning”** Ahmed Talat Elawady, Abdulrauf Khetrish and Khaled Hamad (University of Sharjah, United Arab Emirates) [1570773312]
- **“Artificial Intelligence: New Paradigm in Deep Space Exploration”** Aya Abdul Rahman AlChikh Omar, Mena Maurice Farag and Razan A Alhamad (University of Sharjah, United Arab Emirates) [1570773719]
- **“A Random-Key Based Genetic Algorithm for the Flexible Job-Shop Scheduling Minimizing Total Completion Time”** Atidel B. Hadj-Alouane (University of Sharjah & OASIS Laboratory, ENIT, United Arab Emirates); Asma Fekih and Hatem Hadda (OASIS, Lab, National Engineering School of Tunis, University of Tunis El Manar, Tunisia); Imed Kacem (Université of Lorraine, France) [1570774081]
- **“COVID-19 Electrocardiograms Classification Using CNN Models”** Ismaïl M. Shahin and Ali Bou Nassif (University of Sharjah, United Arab Emirates); Mohammed Bader Alsabek (SHARJAH, United Arab Emirates) [1570774196]
- **“Driver Drowsiness Detection System Using Deep Learning Based on Visual Facial Features”** Mahamad Salah Mahmoud (Case Western Reserve University, USA); Anwar Hasan Jarndal (University of Sharjah, United Arab Emirates); Ahmad Mohammad Ali ALzghoul princess sumaya university for technology (Jordan); Hossam Almahasneh (Road and Transport Authority & Self-employed, United Arab Emirates); Imad Alsyouf and Abdul-Kadir Hamid (University of Sharjah, United Arab Emirates) [1570774476]
- **“Hypertension Classification Using Machine Learning - Part II”** Nida Nasir, Paul Oswald, Feras Barneih, Omar Emad Omar Alshaltone, Mohammad AlShabi, Talal Bonny and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570774544]
- **“Hypertension Classification Using Machine Learning”** Nida Nasir, Omar Emad Omar Alshaltone, Feras Barneih, Mohammad AlShabi, Talal Bonny and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570774556]

(University of Technology, Sydney, Australia)
[1570774910]

END OF THIRD DAY

DAY 4 – FRIDAY, 10TH DECEMBER 2021

DAY FOUR KEYNOTE SPEAKER

“EDGE INTELLIGENCE – ENGINEERING THE NEW FABRIC OF IOT, EDGE, AND CLOUD”

PROF SCHAHRAM DUSTDAR

HEAD OF THE RESEARCH DIVISION OF DISTRIBUTED SYSTEMS

TU WIEN, AUSTRIA



SESSION CHAIR: DR THAR BAKER



<https://lomu.zoom.us/j/88327683925?pwd=aUI2K3JENloyaWdyT2pMQXpPdHZ3QT09>

Meeting ID: 883 2768 3925

Passcode: 125648

1:30 pm – 2:30pm
(UAE Time)

9:30am – 10:30am
GMT Time

COFFEE BREAK
TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE

2:30pm – 3:45pm
(UAE Time)

10:30am – 11:45am
GMT Time

SESSION A4 – VIRTUAL

eSystem Engineering (Main Track)

Session Chairs - Dr Ahmad Zia Ul-Saufie Mohamad Japeri (Malaysia) and Dr. Sahar AL-SUDANI

Session Co-Chair- Ms. Jan Lunn, UK



<https://ljamu.zoom.us/j/87082281383?pwd=Mng3bVNHVDVnTjFDOEt6S1ZMUDFnUT09>


Meeting ID: 870 8228 1383

Passcode: 212918

- **“DFBC Recon Tool: Digital Footprint and Breach Check Reconnaissance Tool”** Yusnita Yusof, Chen Kai Ng and Nik Sakinah Nik Ab Aziz (Asia Pacific University of Technology and Innovation, Malaysia) [1570752810]
- **“Overview of Financial Fraud Digital Forensic Investigation Framework”** Yusnita Yusof and Pei-Shan Choong (Asia Pacific University of Technology and Innovation, Malaysia) [1570752812]
- **“FlashSafe: USB Flash Drives Encryption Tool With AES Algorithm”** Julia Juremi (Asia Pacific University of Technology & Innovation, Malaysia) [1570752820]
- **“Performance Evaluation of Routing Protocols RIP and OSPF With Respect to Throughput and DelayA Computer Network is a Collection of Computers Connected Together to Share Resources Located on the Network Nodes. in a Computer Network One of the Important”** Arun Chandrasekaran (Asia Pacific University of Technology & Innovation, Malaysia) [1570753027]
- **“Power Generation Voting Prediction Model of Floating Photovoltaic System”** Ali Lari (Swansea University & Qatar Foundation, United Kingdom (Great Britain)); Augustine Egwebe (Supervisor, United Kingdom (Great Britain)); Farid Touati, Amith Khandakar and Antonio JR Gonzales (Qatar University, Qatar) [1570755632]
- **“Content Based Image Retrieval Based on Feature Fusion and Support Vector Machine”** Ibtihal Hameed and Sadiq H. Abdulhussain (University of Baghdad, Iraq); Basheera M. Mahmmod (University of Baghdad, Iraq & College of Engineering, Iraq); Abir J Hussain (Liverpool John Moores University, United Kingdom (Great Britain)) [1570760757]
- **“Object Detection and Distance Measurement Using AI”** Mustafa Faisal and Mohammad Mohammed (University of Baghdad, Iraq); Ali Muthanna Abduljabbar (University of Baghdad & Ta3leem Company, Iraq); Sadiq H. Abdulhussain (University of Baghdad, Iraq); Basheera M. Mahmmod (University of Baghdad, Iraq & College of Engineering, Iraq); Wasiq Khan and Abir J Hussain (Liverpool John Moores University, United Kingdom (Great Britain)) [1570760758]
- **“Fuzzy Logic Progress to Predict of Mechanical Properties for Shotcrete Concrete Containing Waste Plastic”** Yousif Mansoor (University of Anbar & Engineering College, Iraq) [1570762631]
- **“Water Quality Monitoring System: A Smart City Application With IoT Innovation”** Kamalanathan Shanmugam (Asia Pacific University of Technology & Innovation (APU), Malaysia); Muhammad Ehsan Rana (Asia Pacific University of Technology & Innovation, Malaysia); Daniel Tan Zi Xuen and Sharveen Aruljodey (Asia Pacific University of Technology & Innovation (APU), Malaysia) [1570771476]
- **“Crime Geo Analytics Tool”** Muhammad Hamza and Jan Lunn (Liverpool John Moores University, United Kingdom (Great Britain)); Wael N Aljumaili (University of Mosul, Iraq); Jamila Mustafina (Kazan Federal University, Russia) [1570775034]

3:45 pm – 6:15pm
(UAE Time)

11:45am – 2:15pm
GMT Time

<p style="text-align: center;">COFFEE BREAK TREAT YOURSELF WITH A LOVELY CUP OF TEA OR COFFEE</p>	<p style="text-align: center;">6:15pm – 6:30pm <i>(UAE Time)</i></p> <p style="text-align: center;">2:15pm – 2:30pm <i>GMT Time</i></p>
<p style="text-align: center;">SESSION B4 – VIRTUAL <i>eSystem Engineering (Main Track)</i></p> <p>Session Chair – Dr Obinna Anya, USA</p> <p>Session Co-Chair- Prof Mohammed Alani, Canada</p> <p></p> <p>https://ljmu.zoom.us/j/81403999968?pwd=OEZJUXFzTDhqeJZyZWUxN1VZUGt3dz09</p> <p>Meeting ID: 814 0399 9968</p> <p>Passcode: 469513</p>	<p style="text-align: center;">6:30pm – 7:30pm <i>(UAE Time)</i></p> <p style="text-align: center;">2:30pm – 3:30pm <i>GMT Time</i></p>
<ul style="list-style-type: none"> • “Modelling of Electrochemical Removal of Nitrate From Water” Saif Alquzweeni and Haifaa Mubarak (University of Babylon) [1570777254] • “RSM (Response Surface Methodology) Modelling of Inter-Electrodes Spacing Effects on Phosphate Removal” Khalid Hashim and Ibijoke Idowu (Liverpool John Moores University, UK) [1570777259] • “Rfid Indoor Localization Based on Received Signal Strength” Hamsa Mohammed Ahmed and Ahmed Noori Rashid (University of Anbar) [1570778848] • “Stacked Machine Learning Model for Predicting Alzheimer's Disease Based on Genetic Data” Abbas Saad Alatrany, Abir J Hussain, Jamila Mustafina and Dhiya Al-Jumeily (Liverpool John Moores University, UK) [1570778849] • “Legal Regulation of Crowdfunding” Natalia Yushchenko (Kazan Federal University, Russia), Rustem Magizov (Kazan Federal University, Russia) and Tara McKeown (Liverpool John Moores University, UK) [1570778932] • “Reliable Photovoltaics Output Power Prediction in Qatar” Ali Lari, Augustine Egwebe, Farid Touati, Amit Khandakar, Antonio JR Gonzales (University of Qatar) [1570755632] 	
<p style="text-align: center;">CLOSING THE CONFERENCE –</p> <p style="text-align: center;">7:30PM TO 8:30PM (UAE TIME)</p> <p style="text-align: center;">3:30PM TO 4:30PM (GMT TIME)</p>	

List of Abstracts

DAY 1 – TUESDAY, 7TH DECEMBER 2021

SESSION A1 eSystem Engineering (Main Track)

“Students Personality Assessment Using Deep Learning From University Admission Statement of Purpose”

Seemab Latif (National University of Science and Technology, Pakistan); Salma Kulsoom (National University of Sciences and Technology (NUST), Pakistan); Rabia Latif (Prince Sultan University, Saudi Arabia) [1570732418]

Abstract

Statement of Purpose (SOP) plays a vital role in the university admissions process as reviewers assess the personality of the students by reading their SOPs. In past, the Big Five personality traits of the students are assessed to predict their future academic performance. An exciting application of machine learning is the personality assessment using personality traits and behaviour. In this paper, our focus is on developing a deep learning-based personality assessment model for the detection of Big Five Personality traits from SOP and mapping them to speculate a student's academic performance at the university. Our proposed model uses Long-Short Term Memory (LSTM), Convolutional Neural Network (CNN) and Bi-Directional LSTM (Bi- LSTM) architectures to extract features and predict ratios of Big Five traits in the SOP. The proposed model has been trained and tested on an essays' dataset and 400 students' SOP collected from computer science undergraduate students. Maximum accuracy achieved for essays dataset is 88.2% and for student's personal statement is 67.0 % with FastText Embedding.

“Quality Monitoring of Abu Dhabi Drinking Water Using Machine Learning Classifiers”

Ali Hasan (University of Johannesburg, South Africa); Khawla Alhammadi (Higher Colleges of Technology, United Arab Emirates) [1570738769]

Abstract

Supplying high quality drinking water is important for human health. It is essential to monitor the drinking water quality to prevent any health damage and avoid water pollution. This paper focuses on exploring the use of machine learning classifiers for monitoring drinking water quality in Abu Dhabi. Five machine learning algorithms (Logistic regression, a Support Vector Machines, a K-Nearest Neighbors, a Naive Bayes, and Decision Trees) were applied for water quality monitoring using standard

water physical and chemical data as Abu Dhabi department of water requirements. The results show Decision Tree to be more efficient when compared with Logistic regression, a Support Vector Machines, a K-Nearest Neighbors, and Naive Bayes to predict water quality levels. Decision Tree showed 97.7011% accuracy, out-performing Logistic regression, a Support Vector Machines, a K-Nearest Neighbors, and Naïve Bayes.

“Review on Augmented Reality Technology”

Shiva Asadianfam (Islamic Azad University & Qom University of Technology, Iran); Hoshang Kolivand (Dep CS LJMU, United Kingdom) [1570743926]

Abstract

Augmented Reality (AR) and Virtual Reality (VR) based treatment has proven that it is easy to use, also motivating and more attractive, and enjoyable as most of the studies proved that. Furthermore, the cost of human resources and the equipment with standard rehabilitation therapy is high to some extent. Whereas, the AR and VR systems are low cost and easy to popularize, beside the unbelievable number of the saved time. This paper presents the comprehensive review of Augmented Reality Technology.

“A Fitness App to Fit Everybody's Schedule”

Shiva Asadianfam (Islamic Azad University & Qom University of Technology, Iran); Hoshang Kolivand (Dep CS LJMU, United Kingdom) [1570743954]

Abstract

In modern life, many people are sedentary and do not move enough which can lead to a series of physical and mental health conditions including obesity, diabetes, and poor mental health. The aim of this study was to reduce or eliminate this entirely by offering a solution which will work for everyone, even those with a very full schedule and who may find it difficult to stay active. This was carried out by gathering data from potential users, using both questionnaires and interviews to do this. After gathering data on what potential users would like the solution to do, designs were made and then implementation of the app was carried out, based on these designs. Following on from this, sufficient testing was carried out to ensure it worked as intended and satisfied the user requirements. The main findings of this study were that every person will benefit from increasing physical activity, while many people struggled sticking to a workout schedule due to reasons such as the gym being intimidating, expensive and a hassle to commute to. Our solution was made to address these issues and allow people an alternative way to increase physical activity.

“ElecPlus: A Universal Smart Hub for Mitigating the Environmental Impacts of Electrical Appliances”

Sathiapriya Ramiah (Asia Pacific University of Technology & Innovation, Malaysia) [1570745984]

Abstract

The inclining global temperature and the growing demand for electricity is a vicious cycle. The use of electrical appliances is one of the major contributors to global warming as the more power is consumed, the more fuel is burnt for energy generation, hence increasing the intensity of greenhouse gases (GHG) in the atmosphere. Environmental bodies around the globe have been giving a lot of focus to energy conservation and GHG reduction. Current energy saving approaches such as the production of energy efficient appliances do have positive results, but the adoption rate is yet to reach a satisfactory level. Some barriers of adoption include high initial cost and low awareness on the long-term benefits. Therefore, this research aims to motivate efforts of domestic consumers in energy conservation and develop an effective solution that encourages electricity saving

with the use of smart home technologies, thereby reducing the impacts of electrical appliances towards the environment.

“Data Analytics in Improved Bankruptcy Prediction with Industrial Risk”

Sonia Mann (Asia Pacific University of Technology and Innovation, Malaysia); Rajasvaran Logeswaran (Asia Pacific University of Technology & Innovation (APU) [1570746269]

Abstract

An investigation into the causes of bankruptcy filing by borrowers and the impact it has onto the financial industries is undertaken in this work. One of the major catalysts for bankruptcy filing has been the COVID-19 pandemic that has infected the world from early 2020. With the many applications of data analytics in the financial industry, Bankruptcy Prediction Models (BPM) have seen a rise in popularity to ascertain a customer's financial health and predict if at all the customer is in potential financial distress based on selected key parameters. An in-depth review of bankruptcy prediction models has highlighted several flaws, mainly being a lack of industrial risk parameter to identify the individual borrowers that have been directly affected by their industry on a large scale as seen for the aviation industry during the pandemic. In testing, Random Forest produced the highest accuracy on real-world data. It is observed that the inclusion of the Industry Risk variable can increase the accuracy of the model, but also non-financial variables such as socio-economic status are an important contribution to the accuracy of determining if a customer is potential for bankruptcy filing.

“Online Media Management Booking System”

Daniel Vistro (Asia Pacific University, Malaysia) [1570746381]

Abstract

The research has been conducted by the researcher to carry the Final Year Project (FYP) topic called Media Management Booking System. The Media Management Booking system is functioned as an integration between media management system, booking system, payroll system and gear management system. The system is specially designed for a group of media team members who works under marketing department called Beyond Media at Asia Pacific University of Technology & Innovation (APU). The system is designed using the PHP programming language which consists of HTML, CSS, JavaScript and phpMyAdmin. As most of the functions required a login function with username and password except for the recruitment system from the user side. The project was discovered because there was no official website for Beyond Media. Moreover, there is no proper system for users to book for the events coverage, members and admin to manage the events. For that, the research has been conducted based on the users who want to book the event coverage, the user who want to join Beyond Media, admin and senior member who wants to manage the event calendar and gears, senior members and selected members who want to sign the login working sheet, and admin and financial who wants to manage the payroll system using the online survey and observation methods. The unit testing and User Acceptance Testing has been tested to ensure the quality of the system and the feedback from the participants are useful for the further improvement of the system.

SESSION B1

Sensor Technologies and AI in Education

“The Integration of the Multi-Source Data for Multi-Temporal Investigation of Cultural Heritage Objects”

Jakub Markiewicz (Warsaw University of Technology, Poland); Agnieszka Bochenska (The Royal Castle in Warsaw, Poland); Patryk Kot (Liverpool John Moores University, United Kingdom); Slawomir Lapinski (Warsaw University of Technology, Poland); Magomed Muradov (Liverpool John Moores University, United Kingdom)
[1570744574]

Abstract

Nowadays, there are many techniques being developed to increase the knowledge of cultural heritage sites as there are many historical places where the knowledge about their construction and function is not well investigated yet. The example of such monument is the Justice Court Tower at Royal Castle in Warsaw where the excavation of the tower was carried out for archaeological and architectural research. This article demonstrates the integration of digital methods along with excavation work. Three measurement techniques were applied: the close-range terrestrial laser scanning and close-range photogrammetry as well as surveying. It was important to determine the potential route of the wall on the west side of the tower and to determine its relationship with the lowest part of its foundations. The results confirmed that the Tower collapsed in the Middle Ages. The building that has survived to the present day is another one erected on this site. At least two construction phases have been distinguished in the foundation structure. The relic of the wall adjacent to it from the west could have been an element of earlier buildings integrated with the Tower or an autonomous edifice. The study of the torsion angles of the surfaces of the lowest foundation layers in relation to slightly younger upper levels and the parallelism of both adjacent structures allowed to finally resolve this issue.

“Proposed Design and Implementation Guidelines for Energy Efficient Smart Street Lighting: A Malaysian Perspective”

Richson Ngu and Kamalanathan Shanmugam (Asia Pacific University of Technology & Innovation (APU), Malaysia); Muhammad Ehsan Rana (Asia Pacific University [1570745973])

Abstract

Streetlights are among the essential public infrastructure components for both urban and rural areas. It allows people to provide a clear vision at night and brings convenience to society. A Smart Street Lighting System uses IoT sensors and can interact with software to improve its effectiveness and utility. Since streetlights must be turned on for the entire duration of the night, it is essential to find ways of reducing energy consumption to actualize a greener society. It can be done by integrating sensors that can detect movements and control the way streetlights behave through the gathered data. This research aims to reduce the energy consumption needed for the operation of streetlights by applying appropriate IoT based techniques. An extensive discussion on the existing literature and similar systems reviews the current developments critically. The research gathered public insights through a quantitative research approach and applied this information in recommending a solution. With the help of a prototyping model, the authors demonstrated how a Smart Street Lighting System could achieve optimal performance.

“Punching Shear Assessments of Two-Way Reinforced Concrete Slabs Strengthened by FRP Strips: A Parametric Study”

Aleaa Radi (University of Anbar, Iraq); Akram S. Mahmoud (University of Anbar & Engineering College, Iraq)
[1570755592]

Abstract

This study deals with investigating the punching shear of two-way slabs strengthened by FRP sheets. Also, assessing the punching failure mode by modelling more than 54 specimens having many affecting values such as strengthened area, the thickness of the slab, and main steel reinforcement ratio. The results show that when slabs are strengthened 20% by FRP strips have a slight reduction in capacities and more deflection and ductility. Also, the cracks of full strengthened specimens are decreased with to 10% of unstrengthen specimens. The distances of critical sections of strengthened specimens are increased by about 100% of unstrengthen RC slabs as specified in ACI 318 code clauses.

“The Java Starter: An Ontology-Based Tutoring System for Java Beginners”

Miruna I Pirvulescu and Sahar Al-Sudani (King's College London, United Kingdom) [1570745730]

Abstract

This paper presents the design and development of the Java Starter, an ontology-based tutoring system meant to support the teaching of the Java programming language to beginners. The developed prototype is capturing the domain knowledge in the form of an ontology, developed using the Protégé ontology editor. The reasoner used for inference tasks is Hermit 1.4.3.456.

The system has been tested at every level of implementation, using JUnit for the Java component, Selenium for the user interface, and the Hermit reasoner for the ontology.

“A Study of Machine Learning Based Approaches to Extract Personality Information from Curriculum Vitae”

Leong Dickmond, Vazeerudeen Abdul Hameed and Muhammad Ehsan Rana (Asia Pacific University of Technology and Innovation, Malaysia) [1570745972]

Abstract

Curriculum Vitae (CV) is an essential document for a person to obtain a suitable job in a company. The main purpose of a CV is to create a profound impression on the recruiters which helps to attract their attention. CV also acts as the first communication between a person and the recruiter before the job is offered and the candidate is proceeded to the next stage. Personalities are very important when it comes to job hiring for a company. Most of the experienced recruiters can determine the candidates' personalities before conducting an interview session by going through the content of the CV. Employers always sought for the most suitable candidates with dynamic personalities for the relevant job positions to ensure good productivity and job performance. Therefore, personality assessment tests are conducted by the job recruiters to find the suitable candidates for the vacant positions in their company/organization. The drawback for the traditional hiring process is the large amount of time taken to process numerous applications. To save the time of both job recruiters and applicants, authors have conducted this research that allows the CV to be extracted by utilizing machine learning algorithms to obtain the vital information needed to evaluate the applicants' personalities. The research presents experimental study for the effectiveness of the selected algorithms towards extracting

personality traits from the CV. Based on the experimental evaluation, the effectivity of the algorithms is discussed with statistical evidences.

SESSION C1

e-Systems Engineering (Main track)

“A Spatio-Temporal Framework Based on Geographic Information System (GIS) to Evaluate the CO2 Emissions”

Fatma El-Zahraa Hosny (University of Sharjah, United Arab Emirates); Saleh Abu Dabous (Civil Engineering, United Arab Emirates); Abdallah Shanableh and Rami Al-Ruzouq (University of Sharjah, United Arab Emirates)
[1570762728]

Abstract

Carbon Dioxide (CO₂) emission and its associated negative effects on the environment and quality of life present a significant challenge to scientists, environmental authorities, and politicians. Lowering the released CO₂ emission is vital to preserve the natural environmental conditions and achieve sustainability in the long run. Recent literature has emphasized the importance of studying and analyzing CO₂ emissions generated by the building construction sector. However, limited research considered the Spatio-temporal analysis and its relevance to the CO₂ emissions at an urban scale. This research aims to develop a Geographic Information System (GIS) based framework to assess CO₂ emissions with urbanization over time for the United Arab Emirates (UAE). The UAE has witnessed a significant evolution in terms of urban development, demographic distribution, and lifestyle, in the last few decades. The developed framework offers a visualized CO₂ assessment of both construction carbon and operational carbon to provide concerned authorities with better insights into the environmental effect of urban development. The framework will be implemented and validated on a case study of one of the Emirates in the UAE to study the expansion and carbon emission over a specific analysis period. In this research, Ajman city was chosen to implement the methodology. In the case of construction carbon, the results illustrated that residential buildings have the highest CO₂ emissions factor with about 1,358 kg CO₂/m² associated with building construction, while governmental buildings have the lowest CO₂ emissions factor with about 445 kg CO₂/m². The results also indicated that hospitals have the highest CO₂ emissions factor associated with building operation with about 375 kg CO₂/m²/year, while educational institutes have the lowest CO₂ emissions factor of about 102 kg CO₂/m²/year. Further, the results will be used to test the impact of performing different retrofitting scenarios on the CO₂ emissions behavior. It would be interesting for future work to analyze the impact of using smart and sustainable energy fixtures on CO₂ emissions

“Energy Performance Labeling: Impact on Rental Values Across Regional Offices Within the GMT”

Aseel Hussien and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates); Nusrat Jannat and Shafayat Bin Ali (LJMU, United Kingdom) [1570771543]

Abstract

This study focuses on the investigation of energy performance labeling or ecolabelling as an important topic in the built environment industry, due to the increasing focus on sustainable practices. Within this study Five regional cities in the UK were analyzed to view any impact on rental values, attributed to energy performance labels, focusing specifically on offices. The energy performance label studied in this work is the BREEAM certification scheme. The data for the offices within the cities selected was sourced from the CoStar database. The data samples were then adapted for analysis using SPSS. A multiple regression model was used in SPSS to isolate the price effects of the ecolabel. Results show that offices with BREEAM certifications did attract a rental premium that can be attributed to the energy performance label when compared to non-BREEAM certified properties. It was found that there are some large variations across the cities as to how much the BREEAM rating has an effect. The study focuses on five cities within the UK so a larger sample of offices and locations could be used in the future. Certain property characteristics were not available at source from the CoStar database, which may have a bearing on the analysis. Finally, this study is one of the first in the topic area to focus specifically on regional cities across the UK, as opposed to the UK market. Going forward this research could be built upon for further study within the area.

“Evaluation of Cement Manufacturing Methods Using Multi Criteria Decision Analysis (MCDA)”

Nivin Ghaboun (Near East University, United Arab Emirates); Dilber Uzun Ozsahin (University of Sharjah, Sharjah, UAE & Near East University, Nicosia, North Cyprus, United Arab Emirates); Huseyin Gokcekus and Berna Uzun (Near East University, Turkey) [1570773068]

Abstract

Cement has been the most common material used in all construction projects for decades. The availability of raw materials required to produce cement increases its popularity compared with other construction materials such as steel. It represents the basic ingredient to produce mortar, plaster, grout, and reinforced concrete. Mainly there are four methods for cement manufacturing: dry, semi dry, semi wet, and wet. Although the selection of the manufacturing method depends mainly on the nature of the raw materials and available resources, each method has its advantages and disadvantages. This study aims to evaluate the methods of cement manufacturing in terms of material homogeneity, dust emission, production cost, capital cost, fuel consumption, quality, and Co2 emission using Multi Criteria Decision Making (MCDM). Fuzzy Preference Ranking Organization Method for Enrichment Evaluation (F-PROMETHEE) was used as it is one of the best tools for Multi-Criteria Decision Analysis. The analysis results indicate that the dry method is ranked as the best method for cement manufacturing due to its very low carbon dioxide emission, very low fuel consumption, very low production cost, and very low processing time. The semi-dry method is ranked as the second preferred method for cement manufacturing while the third rank was for the semi-wet method, and the least preferred choice is the wet method due to very high fuel consumption, very high processing time, very high production cost, and very high carbon dioxide emissions.

“Investigating Water Consumption Patterns Through Time Series Clustering”

Omnia Abu Waraga, Abdulrahman Abdeljaber, Manar Abu Talib and Mohamed Abdallah (University of Sharjah, United Arab Emirates) [1570774906]

Abstract

Due to the rapid population growth and economic development, water management became a necessity to assure sustainability. Analyzing water consumption patterns enables decision makers to better manage resources to meet the current demands without compromising the need of the future generation. In this paper, water consumption patterns are analyzed through timeseries clustering. Agglomerative hierarchical was applied to cluster the consumption patterns into multiple groups based on behavioral similarities. The consumption behavior of each cluster is analyzed based on the residential, commercial, and industrial sectors from 2017 to 2020. The study resulted in classifying the datasets into five clusters, in which the residential sector had the highest consumption, followed by the commercial and industrial. Moreover, the majority of the clusters reported high water consumption in 2020 except cluster 4 which its consumption decreased dramatically. In addition, the effect of data clustering was investigated on improving water demand forecasting. Based on the results, time series clustering increased the accuracy of predictions, in which ANN and RF models obtained the highest accuracy specially in clusters 4 and 5. It can be concluded that forecasting performance was correlated to the magnitude of communities in each cluster.

“The Effects of Weather Conditions on COVID-19 Forecasting, the United Arab Emirates as a Reliable Study Case”

Dana I. Abu-Abdoun and Sameh Al-Shihabi (University of Sharjah, United Arab Emirates) [1570774745]

Abstract

Predicting new COVID-19 cases was, and still is, of paramount importance to decision-makers in many countries. Due to its transmission nature, e.g., sneezing, coughing, and physical contact, researchers have developed prediction models that include weather features hoping to improve the forecasting models' predictions. The research did not show any conclusive evidence about the importance of including weather features in forecasting models. Thus, this paper addresses this problem by considering the United Arab Emirates (UAE) COVID-19 cases and weather conditions. Using long-short term memory (LSTM) models, a variant of artificial neural network used for forecasting, we compare a uni-variate, default forecasting model that only considers COVID-19 cases to other bi- and multi-variate models that relies on COVID-19 and weather features. The results show that including weather features in the forecasting models did not significantly improve the accuracy of the default LSTM model; the maximum increase in the coefficient of determination did not exceed 0.02. Moreover, humidity, if considered with other weather features, has a small influence on improving the prediction accuracy.

SESSION D1
eSystem Engineering (Main Track)

“Botnet as a Service Towards National Defense and Security”

Nor Azlina Abd Rahman (Asia Pacific University of Technology & Innovation, Malaysia); Tan Yock Khang (Asia Pacific University of Technology and Innovation, Malaysia) [1570746873]

Abstract

The fast development of computer technologies has resulted in the evolution and emergence of botnets. The emergences of botnets have brought up attentions from the majority, which includes investors, vendors, the researcher community, and hackers. Botnets can be used for a wide range of malicious activities such as distributed denial of service (DDoS), unauthorized remote access, theft of business information, malware distribution, espionage, and cryptocurrency mining. In this paper, the vulnerabilities within government sectors that botnets can exploit on will be elaborated. Moreover, the impacts as well as the defense techniques will also be elaborated. STRIDE threat modelling will be used in this paper to identify and assess the threats and vulnerabilities brought by botnets.

“Ransomware as a Service (RaaS) and Methods to Mitigate the Attack”

Nor Azlina Abd Rahman (Asia Pacific University of Technology & Innovation, Malaysia); Ali Ahmed Mohammed Ali Alwashali (Asia Pacific University of Technology and Innovation, Yemen); Noris Ismail (Asia Pacific University of Technology and Innovation, Malaysia) [1570746878]

Abstract

Industries all around the world seek realistic predictions for new threats that might appear in new future that will affect their business and the security of their data, 2020 year was full of uncertainty due the Covid19 pandemic, entire world had to change the way they do business by shifting to the digital world. The new working methods introduced new threats which will persist, and potential continue to grow in coming few years. McAfee estimated that the cost of cybercrime reached 1 trillion (McAfee, 2020). And it is expected to even more in coming years. 2021-year cyber security predictions address challenges and threats caused by the pandemic such as the huge increase of ransomware attacks. Almost every organization changed their option to access work and used new software that will allow them to operate from home. Education sector for example uses virtual classes, healthcare sector use web to deliver and communicate with patients and so on. The more individuals and business rely on technology, the more it becomes part of their lives and cannot be replaced. Cyber criminals realized this fact and increased the demand for higher ransom. Ransomware Incidents in 2020 caused death when a ransomware attack forced a hospital in Germany to transfer patients to another hospital, ending up one of the patients dying during the transfer. It is expected for year 2021 that ransomware will continue to grow, and it is now a national security threat for the US. The goal of this paper is to study on the influence of Ransomware as a service and proposed steps to reduce the impact of Ransomware attack in for individuals/ organizations.

“EAGLE: GUI Penetration Testing Tool for Scanning and Enumeration”

Yusnita Yusof and Ammrish Singh Beker Singh (Asia Pacific University of Technology and Innovation, Malaysia); Yogeswaran Nathan (Asia Pacific University & Technology Park Bukit Jalil KL, Malaysia)
[1570746895]

Abstract

Penetration testing is a security exercise that is carried out by penetration testers to identify and exploit vulnerabilities in a system. Many penetration testing tools are available in Command Line Interface (CLI) and this requires familiarization of commands. Beginner penetration testers might struggle to understand and choose the most suitable tools. This paper presents a Graphical User Interface (GUI)-Based Penetration Testing Tool for Scanning and Enumeration named as EAGLE. It is developed to assist beginner penetration testers. EAGLE integrates features from several scanning and enumeration tools such as Nmap, Gobuster, Hydra, Nikto, Enum4Linux and Whatweb. The tool's functions include port scanning, web server enumeration, website screenshot, service brute force and service enumeration. Users or beginner penetration testers are only required to provide an IP Address of the target system as the input. This eliminates the familiarization of extensive commands used in multiple tools. The tool displays the results in a convenient manner with a filtering feature so that it is easier to read and understand the scan results. The novelty of this work is done by comparing the output / results obtained using the CLI-based tools separately with the integrated results produced using EAGLE.

“Stock Market Price Movement Forecasting on BURSA Malaysia Using Machine Learning Approach”

Leong Jia Ling and Seetha Letchumy M. Belaidan (Asia Pacific University of Technology & Innovation, Malaysia) [1570747522]

Abstract

Stock markets are volatile, emphasizing the need and interest of accurate stock prediction models within the market. Utilizing machine learning models, stock trends prediction and analysis is an area that shows great promise. In this paper, four models - LSTM, GRU, LSTM-GRU and ARIMA are built and compared to see which is more suitable for stock prediction. A dashboard is also built for better visualization for end-users. Performance evaluation of the models are relying on both the results of the evaluation metrics (MSE, RMSE, R2 and MAE) and the projected prediction adjacent with the actual pricing of the observed stock data.

“An Intelligent Hydrocephalus Shunt: A New Concept”

Osman Salih, Marco Messina and Dhiya Al-Jumeily (Liverpool John Moores University, United Kingdom)
[1570747955]

Abstract

Hydrocephalus is currently managed using traditional mechanical shunts. These mechanical shunts have both operational and fundamental issues and shortcomings. A smart patient monitoring and shunting system is desirable for both patient follow-up and drainage of the cerebrospinal fluid in order to combat these shortcomings. This paper presents a conceptual work of a smart shunting system focusing on the hardware development required for such systems. In this work the valve mechanism is put under attention and a design layout is proposed. A Novel drainage valve is presented. The valve utilizes both the passive nature of the classical shunts and the controllable feature of the fully automated one as dynamic simulation shows that both a fully automated valve and a fully mechanical valve have their respective disadvantages.

“A Gamification Design Framework for Supporting ASD Children Social Skills”

Siti Azreena Mubin, Matthew Wee Ann Poh, Rizawati Rohizan, Aida Zamnah Zainal Abidin and Wong Chung Wei (Asia Pacific University of Technology & Innovation (APU), Malaysia) [1570749447]

Abstract

Gamification has been one of the promising approaches to engage and motivate user experience. Unfortunately, only several numbers of studies were performed within the context of autism children because the available literatures heavily focus on the general gamification users as to improve the engagement period and user experiences, regardless of specific skills. In this ASD context, special skills can be defined as categories of skills associated with their intervention treatment such as social, speech, reading, writing and any of their daily living skills. This research is concern with a development of gamification design framework for ASD children that able to support and assist their social skills. The design framework begins from early phase to the final phase of process such as analysis, design and evaluation. Based from our systematic literature review findings, the study identified three themes named therapeutic, immersive and personalization. These three elements are included in our proposed design framework as the significant elements to tackle the autistic children social skills. Our future concern is to validate the proposed gamification design framework with experts such as therapists and gamification experts and to develop gamification prototype using the proposed framework.

SESSION E1

AI in Law and Digital Health

“A Question Answering Based Information Retrieval System for Legal Domain”

Sahar Arshad (SEECs National University of Sciences and Technology (NUST) & Bahria University, Pakistan); Saeed Ullah (FUUAST, Pakistan); Iqra Basharat and Iqra Javed (Bahria University, Pakistan) [1570743813]

Abstract

This research work aims to develop a Question Answering system for legal documents in the context of the Judicial System of Pakistan. Legal text has its own characteristics such as size, structure, vocabulary, ambiguity, and citations of precedence of similar kind that makes this domain unique in its nature. The legislative domain is where question answering technologies could be used to provide people with better access to legal knowledge. In countries like Pakistan, judicial documents are not kept in a way that aids efficient information retrieval. Most of these documents are archived as a set of records with no discernible form. To address such issues in formal knowledge information retrieval system, we develop a natural language question-answering system that can aid the judicial stakeholders to cut down their cognitive effort as well as to explore key points from large and complex legal documents. Experimental evaluation shows that the model was able to achieve significant accuracy in terms of finding relevant answers against legal search queries.

“Extracting Catchy Phrases From Legal Documents Using Deep Learning”

Iqra Basharat (SECS National University of Sciences and Technology, Pakistan); Seemab Latif (National University of Science and Technology, Pakistan); Rabia Latif (Prince Sultan University, Saudi Arabia) [1570744144]

Abstract

Digitization of legal documents and case proceedings has created many opportunities and benefits for lawyers and researchers. However, it is challenging to acquire valuable information from legal documents manually as they are extensive, unstructured and highly complex. The automated analysis of legal documents highlighting keyphrases which would be useful for future proceedings can reduce both cost and time effectively. Deep learning has gained wide popularity in the field of text classification and extraction of relevant information. In this paper, Deep learning models including ELMO, Key BERT and RAKE were implemented on an unsupervised dataset containing 300 legal documents obtained from the Supreme Court of Pakistan. Preprocessing methods such as lexical analysis, tokenization and stemming were performed to filter irrelevant words and phrases. The performance of models was then evaluated by calculating accuracy through comparison of generated output with correct output along with the consultation of expert opinion from the legal system. The results showed better accuracy for Key BERT unified with ELMO deep learning model.

A Review on Smart Healthcare System Using Blockchain Technology”

Daniel Vistro (Asia Pacific University, Malaysia) [1570745437]

Abstract

Almost in every space of life, the IoT (Internet of Things) entered its source. The most significant domains are smart healthcare that widely utilizes IoT solutions and frameworks. When we use the cell phones and wearable devices, then healthcare domain will be massively enhanced by IoT-based smart healthcare systems. For accurate, improved, and timely diagnosis, the cell phones and wearable devices conduct a considerable utilization of health data sharing. For many security breaks and different harmful attacks, smart healthcare systems are profoundly vulnerable against these problems such as forgery, privacy leakage, tempering and so on. With the passage of time, the blockchain innovation arose as a hopeful arrangement against such breaks and difficulties. In this survey paper we discuss about a modern study on various difficulties and issues that were occur in small healthcare system because of the traditional methods of security measures and also we found solution of these problems in blockchain. We also discuss the benefits of these solutions and important security requirements of the smart healthcare system.

“AlzBot- Mobile App Chatbot for Alzheimer's Patient to Be Active With Their Minds”

Zailan Arabee Abdul Salam (Asia Pacific University of Technology & Innovation, Malaysia); Le Xin Teng (School of Computing and Technology, Asia Pacific University of Technology, and Innovation, Malaysia); Amad Arshad (Asia Pacific University of Technology & Innovation, Malaysia) [1570746305]

Abstract

In today's world, one of the critical concerns that have lately drawn the attention of many researchers and policymakers around the world is the concern of Alzheimer's disease population. Alzheimer's Association reported that age is the main major risk factor for Alzheimer's, but such conditions are not a natural feature of ageing. Furthermore, the overloaded burden of families or caregivers taking care of the individual with

Alzheimer's is getting serious nowadays. Concerning this, the researcher proposes a mobile application named AlzBot with the implementation of Chatbot to create an assistive toolkit application for both Alzheimer's patient and caregiver. Enhancing the socialization of Alzheimer's patient will be the primary purpose of this application as it provides a chatbot for Alzheimer's patient to reach out and communicate with the bot agent during their boring time. Besides enhancing the socialization of the patient, this application able to track the location of the user to minimize the loss of Alzheimer's patient and reduce the caregiver's burden. On the other hand, this research describes the waterfall methodology that has been chosen for the entire project development. Interviews and observations research methods have been applied among different target users. The system was further tested and validated to determine the efficiency of overall functionalities and usability. The findings indicate that the proposed system has the potential to meet the expectation of Alzheimer's patient and their caregivers to enhance their quality of life.

“VMS - Visitation Management System”

Amad Arshad (Asia Pacific University of Technology & Innovation, Malaysia) [1570746313]

Abstract

The Covid-19 pandemic has affected every single continent in the world with rising cases of infected individuals that are happening every day and it affected all walks of life. When the Movement Control Order is put into place to curb the infection rates. The constant intake of chronically ill or possible Covid-19 infected patients into the hospital along with the high influx of visitors will jeopardize the safety and wellbeing of both the front liners and patients especially when hospitals are one of the most important facilities to combat the spread of Covid-19 into the community. With the implementation Visitation Management System (VMS), the system can solve the problem such as the high influx of hospital's visitors that causes high risk of Covid-19 infection, additional hospital staff to cope with the high influx of visitors at the entrance of the hospital, the difficulty of identifying high-risk Covid-19 infection locations in the hospital, as well as risk of shutting down hospitals if there are Covid-19 clusters found while losing profits or income. Apart from that, this research will also describe the use of system development methodology for the development of VMS. VMS will also be tested for both functionalities and the design of the system. This journal research will also include the findings of the analytical data that was collected to ensure that the user requirements of VMS will be achieved and help to underline the implementation of VMS to help to curb the spread of Covid-19 in hospitals.

“Adopting Smart Home Healthcare via IoT Technology”

Nor Azlina Abd Rahman (Asia Pacific University of Technology & Innovation, Malaysia); Noris Ismail and Amina Ibrahim Doualeh (Asia Pacific University of Technology and Innovation, Malaysia) [1570746869]

Abstract

With recent advances in internet technologies, Internet of Things (IoT) considered as one of the new emerging technology, as well as it is a good opportunity to investee, where it expected to reach in 2020 more than three thousand billion dollars. Actually, most of the literature focused on the technical aspects of the IoT services, as well as the benefits sides, while few studies interested on the behavioral studies that illustrate the patients' perspective about the adoption IoT and use it for home healthcare purposes.

The purpose of this paper is to investigate the factors that might have influence on the adoption of IoT at homes for healthcare purposes. Consequently, it has been developed, and tested a conceptual framework of factors

determining patients' acceptance of IoT technology at homes, to demonstrate whether there is a relationship between some factors, and the propensity of patients towards the adoption of IoT. The framework of this paper has been built based on the Unified Theory of Acceptance and Use of Technology (UTAUT), and Technology Readiness Theory (TRT). supplemented by a critical review of related articles. The outcome of this paper is a conceptual framework that links the performance, and effort expectancy in UTAUT with other factors such as security and privacy in TRT for the IoT services.

“Image Registration Techniques and Applications: Comparative Study on Remote Sensing Imagery”

Mohamed Ihmeida and Hong Wei (University of Reading, United Kingdom) [1570755744]

Abstract

Image registration is a crucial task in many computer vision applications. It is the process of matching and aligning two or more images of a scene. These images can be captured from different viewpoints, different sensors, or different times. Feature based image registration has four main steps: feature detection and description, feature matching, outliers rejection and computing homography and image re-sampling. Computational cost and registration accuracy of feature-based image registration mainly depend on the robustness of feature

detection and description methods. Therefore, choosing an optimal feature detection and description method is vital in image registration applications. This research illustrates a comparison between popular image registration algorithms; Scale-invariant feature transform (SIFT), Speeded Up Robust Features (SURF), Oriented FAST and Rotated BRIEF (ORB), KAZE, Binary

Robust Invariant Scalable Keypoints (BRISK) and Accelerated- KAZE (AKAZE) in different scenarios: rotation (0 to 360 degrees), scaling (25% to 600%) and multitemporal. The remote sensing images that are used in the experiments are Radar images, Aerial images, and Unmanned Aerial Vehicle (UAV) images. Nearest Neighbour Distance Ratio (NNDR) is performed in the feature matching, whereas RANSAC is applied to reject the outliers matching. The results of the experiments show that SIFT outperforms other algorithms, showing strong stability and high precision in all scenarios. As for real-time application, ORB performs well, and it is the fastest algorithm for all scenarios and then AKAZE as the second fastest one

“Roles of Caregivers in Physiological Data Collection Experiments With People With Dementia and Mitigating the Impacts of COVID-19”

Matthew L Harper and Fawaz Ghali (Liverpool John Moores University, United Kingdom) [1570756168]

Abstract

Timely detection of behavioural and psychological symptoms of dementia is important for the prevention and reduction of distress for people with dementia and their loved ones. Wearable computing-based systems can be used to predict such difficulties in a timely manner, but a data collection experiment is needed to collect data to develop such a system. Caregivers can be vital assets in such experiments, however, often face high burden and stress due to their caring obligations. An even greater burden has been experienced by many due to the ongoing COVID-19 pandemic. In this paper, the roles that caregivers played in physiological data collections are reviewed. Three main roles were identified as being performed by caregivers in such data collection experiments: observation of difficulties; consenting for participants and themselves; device set-up and maintenance. Roles such as aiding in recruitment and providing information to participants before and during the study were also performed. Each of these roles can present their own burdens, which can be mitigated in a number of ways.

Overall, it is vital that researchers consider the burden that may be placed on the caregiver who is fulfilling any of these roles in an experiment with sufficient mitigations to those burdens being implemented. Furthermore, we propose a pivot in our research towards analysing stress during the pandemic, justifying how this will help towards developing a system to detect dementia-related difficulties.

“Application of Virtual Reality and Electrodermal Activity for the Detection of Cognitive Impairments”

Rebecca Patient, (Liverpool & Liverpool John Moores University, United Kingdom); Fawaz Ghali (Liverpool John Moores University, United Kingdom); Hoshang Kolivand (Dep CS LJMU, United Kingdom); William Hurst (Information Technology Group, The Netherlands); Nigel W. John (University of Chester, United Kingdom) [1570756659]

Abstract

Mild Cognitive Impairment (MCI) is a definition of the diagnosis of early memory loss and disorientation. This study aims to identify people's symptoms through technology. However, machine learning (ML) can classify Cognitive Normal (CN) and Mild Cognitive Impairment (MCI) and Early Mild Cognitive Impairment (EMCI) using standard assessments from the Alzheimer's Disease Neuroimaging Initiative (ADNI); Montreal Cognitive (MOCA), Mini-Mental State Examination (MMSE), Functional Activities Questionnaire (FAQ). Consequently, a Multilayer Perceptron (MLP) model was assembled into tables; MCI vs CN, MCI vs EMCI, and CN vs MCI. Additionally, an MLP model was developed for CN vs MCI vs EMCI. As a result, of advanced model performance, a cascade 3-path categorisation approach was created. Similarly, the exploitation of meta-analysis indicated a combination of MLP models (MCI vs CN, MCI vs EMCI, and CN vs MCI) with an accuracy of 99.76±0.48,

89.64±3.94, and 90.81±2.91. In addition, the average Accuracy of the multi-class MLP model was 84.28±3.66. Furthermore, splitting the MLP methodology enhanced the multi-class categorisation performance with an average accuracy of 86.26±3.15. A total of 9099 participants were divided into (5200) cognitive or (2304) non-cognitive impairments. However, cognitive versus non-cognitive had an initial risk difference (RD=0.32; p=0.0001). Female versus male participants revealed results of (OR=6.10; p=0.00001). Anxiety, depression, and stress had the effect of (SMD=-0.39; p=-0.09). In conclusion, ML, VR, and electrodermal activity are constrained. Two studies with 46 participants suggested results (SMD=0.60; p=0.31), introducing the possibility of activity-based applications to enhance innovative solutions for cognitive impairment diagnosis and treatment.

“Diagnosis of Breast Cancer on Imbalanced Dataset Using Various Sampling Techniques and Machine Learning Models”

Ruchita Gupta (Liverpool John Moores University, United Kingdom); Rupal Bhargava (UpGrad Education Pvt. Ltd., India); Manoj Jayabalan (Liverpool John Moores University, United Kingdom) [1570767353]

Abstract

Breast Cancer is the second most leading cause of death among women. The early detection of the disease increases the chances of survival of the patient. Therefore, there is always a need for techniques that can accurately predict the presence of cancer. Data Mining is one such powerful technique that can assist clinicians to effectively use the data for timely prediction of the disease. In the medical domain, data is usually imbalanced with unequal distribution of the positive and negative classes. Imbalanced datasets introduce a bias in the model and can thus reduce the accuracy of the minority class predictions. In the case of cancer detection also, the mammographic data is highly imbalanced, and predicting the positive (minority) class is of the utmost importance. To achieve this, different models using various class balancing techniques (data as well as algorithm-

driven) are built and evaluated. Various ensemble techniques are also explored. The evaluation of the models is done using metrics that take care of both positive and negative classes.

“The Implementation of AI in Health and Medicine: Electronic Health Records Web Based on Integration of Logistic Regression Model for Diabetes Type 2 Prediction”

Rania Boudjemadi, RBdj (John Moores University, United Kingdom); Jamila Mustafina (Kazan Federal University, Russia); Jan Lunn (Liverpool John Moores University, United Kingdom); Wael N Aljumaili (University of mosul, Iraq) [1570771706]

Abstract

The clinical note documents and diagnosis of disease have always been a real issue in both developed and developing countries. Therefore, the electronic health record technology has emerged worldwide to improve the quality of clinical notes. Moreover, to simplify disease diagnosis, nowadays, doctors opt for the Artificial Intelligence (AI). Alongside this progress, the present study aims to create a web based electronic health record integrating the AI to diagnose Diabetes Type 2 disease. In doing so, MERN stack (Nodejs /react, Express JS and Mango DB) software were used to develop the health record. It is worth noting that Pima Indian diabetes data set was adopted to construct the logistic regression model for the AI part.

DAY 2 – WEDNESDAY, 8TH DECEMBER 2021

SESSION A2 eSystem Engineering (Main Track)

“Multi Sensing Platform for Real Time Water Monitoring Using Electromagnetic Sensor”

Omar Emad Omar Alshaltone, Nida Nasir, Feras Barneih, E'qab Almajali and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570743027]

Abstract

In this paper, a novel technique has been proposed which can monitor water quality in real-time, using Electromagnetic (EM) sensor and machine learning techniques. The integrated multi-sensing device can measure various water quality parameters, such as Oxidation Reduction Potential (ORP), Dissolved Oxygen (DO), temperature, pH, flow, carbon dioxide gas (CO₂), conductivity, pressure, etc. A Nano-VNA (Vector Network Analyzer) has been used to provide various parameters including S₁₁, operating at frequencies from 50kHz to 3GHz in real-time, using which, any change in the water samples will be recorded, analyzed, and reported. Employing machine learning techniques and developed datasets (using S₁₁ signal), detection of the water impurities and their levels can be measured. Moreover, the setup is inexpensive, and results can be seen wirelessly on mobile or computer.

“Control of Quadcopter Drone Based on Fractional Active Disturbances Rejection Control”

Amal Al Ali (University of Sharjah, United Arab Emirates); Raouf Fareh (University of Sharjah Electrical Engineering, United Arab Emirates); Saif Sinan and Maamar Bettayeb (University of Sharjah, United Arab Emirates) [1570743607]

Abstract

In this paper, a fractional Active Disturbance Rejection Control (ADRC) is proposed to track the workspace desired trajectory and solve the attitude control problem of a quadcopter Unmanned Aerial Vehicle (UAV). The ADRC is a nonlinear robust control being used recently to control the UAV's technologies. It is mostly used to solve the major key challenges related to uncertainties, imperfect modeling and external disturbances in a simple structure and easy way in control parameters tuning. The main idea of the ADRC control strategy is to introduce a fictitious state variable which represents the total disturbance. Then, this disturbance is estimated via an Extended State Observer (ESO). The estimated disturbance is fed back to construct a suitable controller, and hence decouple the system from all uncertainties and disturbances acting on the plant. A fractional State Error Feedback (SEF) controller is implemented and compared with the traditional SEF to enhance the system performance. Simulation results demonstrate the robustness and effectiveness of the proposed fractional control strategy in tracking the desired trajectory in workspace of the quadcopter UAV.

“Tracking Control of Quadcopter Based on Multiple Manifold of Synergetic Control Strategy”

Mohammad Alfuqaha (University of Sharjah, United Arab Emirates); Raouf Fareh (University of Sharjah Electrical Engineering, United Arab Emirates); Saif Sinan and Maamar Bettayeb (University of Sharjah, United Arab Emirates) [1570743609]

Abstract

This paper presents a trajectory tracking control of quadcopter UAV based on different types of synergetic control. Synergetic control theory is proposed in this work to control the attitude flight dynamics of a quadcopter. The aim of this work is study the response of the system using three types of manifolds; conventional, terminal and non-singular terminal manifolds. The main idea of synergetic control is to steer the system states to reach the desired manifold and then force them to stay thereafter on this manifold. The closed loop system stability using the three types of manifolds has been proved by Lyapunov technique. The simulation results illustrate the effectiveness of these manifolds of the synergetic control approach in the workspace trajectory tracking of quadcopter.

“Fractional-Order PID Controller Design Using PSO and GA”

Mohannad Nasir (Graduate Research Assistant, United Arab Emirates); Sofiane Khadraoui (University of Sharjah, United Arab Emirates) [1570743747]

Abstract

Over the past few years, fractional-order PID controllers (FOPID) have been introduced in control system theory to enhance the stability and performance of mainly real complex systems. The fractional-order PID controller (FOPID) is considered as a special type of the classical PID controller, in which both integral and derivative orders are fractional instead of an integer. FOPID has five parameters to be tuned instead of three, which gives two extra degrees of freedom to achieve the control objectives. This article deals with the design process of FOPID controllers using metaheuristic optimization methods. In this paper, both particle swarm optimization (PSO) and genetic algorithm (GA) are implemented in order to design appropriate FOPID controllers. The tuning of the five unknown parameters of the FOPID controller is based on minimizing an objective function defined as the integral of time-weighted absolute error (ITAE). To evaluate the performance of the FOPID controller, a simulation example to control DC motors is given, where both PSO and GA algorithms are implemented to obtain suitable values of the FOPID parameters. To show the superiority of FOPID controller over the traditional PID, a performance comparison and robustness tests are carried out. Overall, the simulation results show that Genetic Algorithm (GA) is the most applicable tuning method among the other tested algorithms.

“5G Ring Antenna for Internet of Medical Things (IoMT) Applications”

Feras Barneih, E'qab Almajali, Omar Emad Omar Alshaltone, Nida Nasir and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570744092]

Abstract

Advanced sensor and interconnect solutions are driving innovation in the wearable, wireless, and connected healthcare device industry. The implementation of 5G networks is expanding rapidly hence, the Internet of Medical Things (IoMT) and medical technologies will require 5G antennas for wearable and wireless connectivity. In this paper, we proposed a novel wideband Ring Antenna that is operational over a frequency band from 28GHz to 34GHz. The proposed antenna occupies a small size of (20x20x 1.5mm) and it has return loss (S11) values well below -15dB with VSWR below 3dB at most frequencies in the said band. The antenna gain reaches 8.6dBi at 34GHz and has gain values and stable radiation patterns that offer good coverage for indoor wireless

communications. These features make the proposed design very suitable for wearable and wireless devices that are used for IoMT.

“Performance Ranking of Diagnostic SARS-CoV-2 IgG Antibody Tests by Using Multi-Criteria Decision-Making Theory”

Dilber Uzun Ozsahin (University of Sharjah, Sharjah, UAE & Near East University, Nicosia, North Cyprus, United Arab Emirates); Ayse Arikan (Near East University, United Arab Emirates); Tamer Şanlıdağ (Near East University); Murat Sayan (Kocaeli University & Near East University, Turkey); Berna Uzun (Near East University, Turkey) [1570774580]

Abstract

Many different serological tests have been developed to support healthcare workers to identify individuals who may have developed an adaptive immune response to SARS-CoV-2. The study aimed to evaluate the test performances of the FDA EUA Authorized SARS-CoV-2 IgG antibody tests that are currently being used in coronavirus disease 2019 management. The study involved 48 SARS-CoV-2 IgG antibody tests. Different criteria of rapid diagnostic tests, plate-based tests, and immunoassay-based tests were evaluated using multi-criteria decision making (MCDM) theory. While comparing the antibody tests, main criteria such as analytic sensitivity, specificity, positive predictive value, negative predictive value, specimen type, test technique, antigen target, time to the first result, time of sampling days post-infection, reagent storage conditions, practicability, etc. were assessed and used for determining the ranking of tests. The results showed that Siemens ADVIA Centaur was the most representative of expected test performance, followed by QUANTA Flash and Siemens Dimension Vista S, while EUROIMMUN was the least favorable one. Fuzzy PROMETHEE techniques can be applied in aiding decision-makers in choosing the right antibody test for the management of COVID-19.

SESSION B2 eSystem Engineering (Main Track)

“Real-Time Monitoring and Performance Harvesting for Grid-Connected PV System - A Case in Sharjah”

Mena Maurice Farag (University of Sharjah, United Arab Emirates); Fahad Faraz Ahamd (Research Institute of Sciences and Engineering, University of Sharjah, United Arab Emirates); Abdul-Kadir Hamid, Chaouki Ghenai and Maamar Bettayeb (University of Sharjah, United Arab Emirates) [1570772024]

Abstract

The unravelling inspiration of Solar Energy and its abundance has paved the way for sustainable electricity generation. Its recent development has led to its integration within the utility grid to feed various utilities and consumers. The United Arab Emirates has been blessed with plentiful sunshine, which in hand encouraged investment in solar energy integration to reduce its carbon emission index. The need for sustainable electricity generation requires constant monitoring in real-time to sustain its performance and longevity, to main long-term results. This has been encouraged through the involvement of cloud platforms and various network topologies to achieve this feat. In this study, a case study of a real-time grid-connected Photovoltaic system established in

the University of Sharjah will be demonstrated and assessed. The significant objective of the study is to emphasize the importance of real-time performance harvesting, to monitor various parameters that affect the system's generation output. Data recorded for this study took place during August 2021 with various parameters monitored such as DC generation from PV arrays, environmental parameters through external sensors, and finally the AC generation that is fed to the utility grid. 428.25 kWh AC power was generated during the month of August, which is monitored through a data acquisition hub that maintains storage of the system's data on the long run and sustains its performance.

“A Distributed Fog-Based Vehicular Navigation System for Efficient Transportation”

Naveed Ahmed, Thar Baker and Zaher Al Aghbari (University of Sharjah, United Arab Emirates); Ahmed Khedr (UOS, United Arab Emirates) [1570773083]

Abstract

The current Global Positioning System (GPS) has been heavily criticized by several parties (e.g., drivers and researchers) due to the delay in disseminating en-route data to drivers ahead of time. This issue resulted in poor rates of accuracy of data (i.e., traffic status), which eventually causes inefficient transportation. According to National Institute of Standards and Technology, the delay is caused mainly by the transmission medium. This paper presents a new distributed fog-based vehicles navigation system for efficient transportation. The proposed system uses closer-to-the-source data (a.k.a. drivers) nodes (i.e., fogs) as a new transmission medium for disseminate the road details to subscribed drivers who are connected to those nodes. A package delivery scenario has been implemented to show the impact of using fog nodes in reducing the navigation time and improving efficiency. Those fog nodes gather and broadcast real-time traffic data from/to drivers within the area they cover. In addition, a new road navigation simulator has been designed and developed to simulate the proposed system. The simulation results show superior performance of the new navigation system in terms of travel time and in-situ road data provisioning to drivers.

“Optimal Placement of Grid-Connected Solar Photovoltaic Systems Using Artificial Intelligence Methods”

Sam Ansari, Abdul-Kadir Hamid and Noor Ahmad Al Hindawi (University of Sharjah, United Arab Emirates) [1570773122]

Abstract

Solar energy is a sustainable, clean, and free energy source used to supply heat, electricity, and even fuel and chemical energy to residential, commercial, and industrial centers. The problems associated with fossil resources and the consequences of environmental and global climate change have created good opportunities for solar energy to compete with fossil fuels, especially in countries with high radiation potential. Scientific and technical weaknesses, variations in irradiance level due to climate and seasonal changes, radiation angles, geographical location, etc., have confined the solar energy-related applications. The optimal placement of the photovoltaic (PV) power stations providing maximum performance is critical to be addressed. This study intends to empower grid-connected solar PV systems by investigating various constraints and influencing factors related to the location of solar farms. We exploit selected machine learning algorithms such as k-means, k-medoids, fuzzy c-means (FCM) methods, as well as a new proposed algorithm based on an image processing approach to optimize the system by detecting the appropriate clusters and site locations. Finally, by performing several simulations, we compare the results and the efficiency of the algorithms. Our results further designate the significant superiority of the proposed techniques.

“Does a Novel Game-Based Arm Rehabilitation Device, the ArmAble™, Improve Upper Limb Function in People with Stroke?”

Senthil Kumaran D, Swathi GA, Riya Raja, Ali A Sulfikar and Nirmala Nayak (Manipal Academy of Higher Education, India); Ashokan Arumugam (University of Sharjah, United Arab Emirates) [1570773258]

Abstract

The purpose of this study was to assess the preliminary effects and feasibility of a game-based rehabilitation program on improving upper limb (UL) function in people with stroke. Six individuals post-stroke received game-based rehabilitation and intensive functional training to UL with the ArmAble™ device, a novel interactive arm rehabilitative device, for at least 30 minutes/day, 5 days a week for 2 weeks. Baseline and post-intervention outcome measures included the Fugl-Meyer assessment-upper extremity (FM-UE) and action research arm test (ARAT). The feasibility outcomes included retention and adherence rate, safety, and the level of satisfaction following the intervention. With the Wilcoxon signed-rank test, there was a statistically significant difference in the ARAT score (0.036), but not for the FM-UE scores (0.058), post-intervention. We observed a 100% retention rate and 83.3% exercise adherence rate on completing the game-based rehabilitation program. All participants showed moderate to high level of satisfaction with the device, games, and the rehabilitation program. The game-based rehabilitation with the ArmAble™ was feasible and effective on improving UL function post-stroke. All participants reported that training with the ArmAble™ was fun, motivating and enjoyable.

“Sleep Apnea Detecting and Monitoring System (SADMS)”

Razan A Alhamad, Sara Mohammed, Meiaad Abdullah, Fatima Mohammed and Talal Bonny (University of Sharjah, United Arab Emirates) [1570773789]

Abstract

Sleep Apnea is a serious sleep disorder that causes pauses in breathing during sleep. Breathing pauses can last from 10 seconds to several minutes and occur at least five times per hour. Sleep apnea may be diagnosed and monitored by In-Lab sleep study that requires the patient to stay overnight at the hospital. Even though an In-Lab polysomnography is very effective, it is highly costly. This paper presents a design to a user-friendly system that detects and monitors sleep apnea at home with a low cost. The device uses a nasal temperature sensor that senses the change in breathing to detect sleep apnea events. In case of a severe apnea event, the device can wake the patient up and send an SMS to an authorized person. Users can visualize the results of their sleep study using a mobile application. The application allows the user to send the recorded data to the doctor or the sleep center.

“The Exploitation of Multiple Feature Extraction Techniques for Speaker Identification in Emotional States Under Disguised Voices”

Noor Ahmad Al Hindawi, Ismaill M. Shahin and Ali Bou Nassif (University of Sharjah, United Arab Emirates) [1570773997]

Abstract

Due to improvements in artificial intelligence, speaker identification (SI) technologies have brought a great direction and are now widely used in a variety of sectors. One of the most important components of SI is feature extraction, which has a substantial impact on the SI process and performance. As a result, numerous feature extraction strategies are thoroughly investigated, contrasted, and analyzed. This article exploits five distinct feature extraction methods for speaker identification in disguised voices under emotional environments. To evaluate this work significantly, three effects are used: high-pitched, low-pitched, and Electronic Voice Conversion (EVC). Experimental results reported that the concatenated Mel-Frequency Cepstral Coefficients (MFCCs), MFCCs-delta, and MFCCs-delta-delta is the best feature extraction method.

“Arctic Ice Thickness Prediction Using Artificial Neural Networks”

Tarek Zaatar and Ali Cheaitou (University of Sharjah, United Arab Emirates); Olivier Fauray (EM Normandie, France) [1570774268]

Abstract

This paper presents an artificial neural network model that predicts Arctic ice thickness that can be used as a decision making tool for Arctic navigation. Ice thickness historical data from Copernicus database are collected and preprocessed and used to train and validate the artificial neural network. Using the mean square error, the results show a good ability of the developed tool to predict future ice thickness.

SESSION C2

Computational Intelligence and Machine Learning in Emerging Applications of Health, Science, and Engineering

“Question Classification Using Universal Sentence Encoder and Deep Contextualized Transformer”

Najam Arif (National University of Sciences and Technology (NUST), Pakistan); Seemab Latif (National University of Science and Technology, Pakistan); Rabia Latif (Prince Sultan University, Saudi Arabia) [1570746915]

Abstract

One of the most vital steps in automatic Question Answer systems is Question classification. The Question classification is also known as Answer type classification, identification, or prediction. The precise and accurate identification of answer types can lead to the elimination of irrelevant candidate answers from the pool of answers available for the question. High accuracy of Question Classification phase means highly accurate answer for the given question. This paper proposes an approach, named Question Sentence Embedding, for question classification by utilizing semantic features. Extracting a large number of features does not solve the problem every time. Our proposed approach simplifies the feature extraction stage by not extracting features such as named entities which are present in fewer questions because of their short length and features such as hypernyms and hyponyms of a word which requires WordNet extension and hence makes the system more external sources dependent. We encourage the use of Universal Sentence Embedding with Transformer Encoder for obtaining sentence level embedding vector of fixed size and then calculate semantic similarity among these

vectors to classify questions in their predefined categories. As it is the time of the Global pandemic COVID-19 and people are more curious to ask questions about COVID. So, our experimental dataset is a publicly available COVID-Q dataset. The acquired result highlights an accuracy of 69% on COVID questions. The approach outperforms the baseline method manifesting the efficacy of the QSE method.

“Monte Carlo Simulation Prediction of Stock Prices”

Shubashini Rathina velu and Sotirios Zygiaris (Prince Mohammad Bin Fahd University, Saudi Arabia); Jeremy Ng Phak Xiang (Asia Pacific University of Technology & Innovation (APU), Malaysia) [1570753209]

Abstract

Stock market provides limitless opportunities for average income earners to grow their wealth. Nevertheless it is well-known that most people lose their cash by investing in it. This study investigates the statistics of market volatility by obtaining and analyzing data sources from financial websites using Python programming language. The implemented method uses a mathematical model called Geometric Brownian Motion (GBM) in order to simulate stock prices in the United States and Malaysia. The stocks were used as a data set for the simulations, which in turn were conducted in time periods 1000 cycle. The two main parameters which determine the outcome of the simulations are the mean return of a stock and the standard deviation of historical returns. This study provides useful insights for retail traders through the Monte Carlo Analysis in finance.

“The Impact of Data Aggregation Strategy on a Performance of Wireless Sensor Networks (WSNs)”

Ahmed Subhi Abdalkafor (University of Anbar, Iraq); Salah A. Aliesawi (University of Anbar, Iraq) [1570754023]

Abstract

Wireless sensor networks (WSNs) are made up of small sensor devices whose main purpose is to detect phenomena in the target area. WSNs are now being used in a variety of essential applications. Because of their low battery consumption, sensor nodes are tiny and have limited processing energy. Data aggregation is an effective technology in WSNs for keeping the network alive for as long as possible. Because sensor networks have a high node density, similar data is sensed by numerous nodes, resulting in data redundancy. The data aggregation technique may be used to overcome this problem during packet routing from source nodes to the base station. From the present literature, researchers are still having trouble finding an efficient and appropriate data aggregation method for WSNs. Data aggregation is a well-known methodology for enhancing the overall WSNs performance. However, it has been a hot issue in recent papers, and researchers still have limited knowledge of it. This paper provides insight and support for researchers by knowing how aggregation technology affects the overall performance of wireless sensor networks since this topic needs real knowledge to fully exploit WSNs capabilities.

“A Review Study on Measurement and Evaluation of Prosthesis Testing Platform During Gait Cycle Within Sagittal Plane”

Saif Mohammed Haider (Al-Nahrain University, Iraq) [1570755630]

Abstract

The main problem with designing prostheses is the ability to assess newly manufactured devices on patients under unsafe conditions. Some of the issues that obstruct the testing process of the prosthetic limbs on amputees

are informed consent, safety straps, and inadequate repetitiveness. This paper introduced a literature study regarding prosthesis testing platforms in which the sagittal plane is considered in all motions and forces. The article focused on the mechanical design, the actuator system, and the control strategies of test platforms to assess the functional characteristics of a prosthetic lower limb, such as the types of movements and loads, the technologies adopted, and the types of control techniques that have been used to design closed-loop motion. Furthermore, this study illustrated the performance test of a prosthetic limb through kinematic and kinetic measurement. In conclusion, these problems can be solved by utilizing robotic testing, which provides extra benefits that can be activated for a long time and working in environments that are dangerous for patients.

“Features Extraction of Fingerprints Based Bat Algorithms”

Waleed Kareem (University of Anbar & Iraq, Iraq); Eman Mahdi (University of Anbar, Iraq) [1570756783]

Abstract

Most of the traditional techniques depend on the methods used in some organizations, an example of these methods is the password method and the smart card. The primary tasks of a security system are to verify that people are in fact what they claim to be. This paper proposed a new approach that is used to extract features from fingerprint images based on Bat Algorithm (BA). The bat algorithm was inspired by bats' distance sensing echolocation behavior. Bats use short, powerful sound impulses to hunt at night and listen for the echo reflecting back from an obstacle or prey. A bat's particular hearing apparatus can help it determine the size and location of an object. When the BA algorithm extracts the best features for all user fingerprints in the database with proper time for each user, the findings reveal that the suggested system performs better.

“Hybrid Technique for Multichannel EEG Signals Compression”

Azmi Shawkat (University of Anbar & Department of Computer Science, Iraq) [1570757802]

Abstract

A Tele-monitoring of Electroencephalogram (EEG) via wireless is very critical as EEG. EEG medically is a tool test used to estimate the electrical activity of the brain. There are many channels through which EEG signals are recorded consistently and with high accuracy. So the size of these data is constantly increasing, need large storage area and a bandwidth for the transmission of the EEG signal remotely. In the last decade, the EEG signal processing grew up, additionally, storing and transmitting EEG signal data requirement is constantly increasing. This article includes the analysis method of an EEG compression and decompression. This method is evaluated on the basis of various compression and parameters quality such as CR (compression ratio), SNR (Signal to noise ratio), PRD (percent-root-mean-square-difference), quality score (QS), etc.

“Medical Condition Assessment via ECG Signal Monitoring Based on IoMT”

Azmi Shawkat (University of Anbar & Department of Computer Science, Iraq) [1570757808]

Abstract

Recently, the world has witnessed a significant increase in attention to healthcare sensing and surveillance. For patient's surveillance, especially cardiac diseases patients for continuing therapy purposes, physiological information acquisition is very critical and very significant as many chronic patients can interest in continuous surveillance as a part of a diagnostic procedure. The Medical internet of things (IoT) is becoming a promising

future for various applications. One of its operations is to monitor the physiological signals of patients with cardiac diseases, specifically cardiac diseases wirelessly, which can be measured by wearable or implantable biological sensors or wearable wireless sensor networks (WWSN). In this paper, a complete real-time surveillance ECG system that monitors patients in various environments is presented. This system consists of Arduino LIKE (ArLi) system (model WEMOS D1-ESP 8266) with WWSN connect directly to the patient body by many electrodes with a cluster head sensor which connects directly with PC to implement a complete connection to the internet to transfer these signals to the WSN via the deployed networks on home, hospital or anywhere. All recorded data based on ArLi system are transferred using WSN in the hospital. The ECG ArLi system consists of a WWSN connect directly with a low-cost ECG sensor attached to the chest of the patient by many electrodes, a sensitive board for amplifying the ECG signal for evaluation purposes, sample and filter the signal, a graphical user interface (GUI) as user-friendly, and a mobile device with internet environment that provides the ability to connect with patients directly. To guarantee a stored ECG signal safely and quickly without any distortion through transmission, and to guarantee the compatibility of these signals through the processing, the authenticated Blynk server was used with its SW app.

“The Development of Energy Efficient Routing Protocol Based on SDN Architecture and Intelligent Technique for HIHC-IoT”

Ahmed Sh. Al-Obady and Thair Al-Janabi (Middle Technical University, Iraq); Ammar Hussein (University Kebangsaan Malaysia, Malaysia) [1570757854]

Abstract

Due to the covid-19 virus infections that have occurred recently, the development of an intelligent healthcare protocol that considers emergent heart cases becomes indispensable. This protocol is based on the method that aims to monitor patients remotely by using Internet of Thing (IoT) devices, which do not select the nodes that are nearby the patient's or in the room to choose as a clusters head (CH). So on, the energy consumption of these devices will be reduced, because of their highest importance than the other non-medical ones. Accordingly, this paper proposes a method called high importance healthcare-internet of things (HIHC-IoT), which is suitable for the emergent healthcare conditions of the patient and the caregiver. Furthermore, WSNs have some issues that reduce system performance, such as resource limits for sensors that may affect power supply, memory, communication capacity, and processing units. In the proposed work, the optimum set of CHs has been selected depending on the residual energy, the distance between the nodes, and the HI nodes. In addition, cloud technology, SDN architecture, and an efficient intelligent algorithm called high importance-future search algorithm (HI-FSA) have been used. Finally, the compared result of normal protocols with the proposed intelligent protocol, showed an increase in network life by about 40% and about 22% for an optimized routing protocol and increasing the number of packets delivered between nodes.

“A Secure EEG Simulator for Remote Healthcare Evaluation”

Azmi Shawkat (University of Anbar & Department of Computer Science, Iraq) [1570758221]

Abstract

Electroencephalogram (EEG) Simulator or often called EEG Specter in principle is a signal generator in the form of an "EEG-like" signal or EEG signal that has been recorded. The purpose of this manuscript is to design an EEG Simulator tool. The design through the stages as follows: circuit design and circuit testing. This design is based on Arduino UNO and uses 12-bit Digital to Analog Converter to convert Digital data which is the output of Arduino UNO into Analog data in the form of EEG signals. Based on the measurement results obtained an error rate (ER)

of 0.420% sensitivity of 0.5mV, 0.22% sensitivity of 1.0mV, and 0.22% sensitivity of 2.0mV in the BPM setting 30, obtained an ER value of 0.342% sensitivity of 0.5mV, 0.460% sensitivity of 1.0mV, and 0.432 % sensitivity of 2.0mV at BPM setting 60, obtained an error rate value of 0.121% sensitivity of 0.5mV, 0.1% sensitivity of 1.0mV, and 0.1% sensitivity of 2.0mV at setting BPM 120, obtained an error rate value of 0.423% sensitivity of 0.5mV, 0.310% 1.0mV sensitivity, and 0.520% 2.0mV sensitivity at 180 BPM settings and 0.246% 0.5mV sensitivity, 0.230% 1.0mV sensitivity and 0.246% 2.0mV sensitivity at 240 BPM settings.

“A Review on Automation Artificial Neural Networks Based on Evolutionary Algorithms”

Rizgar R. Zebari (Nawroz University, Iraq); Subhi Zeebaree (Duhok Polytechnic University, Iraq); Zryan Rashid (Sulaimani Polytechnic University, Iraq); Hanan Shukur (Al-Kitab University, Iraq); Ahmed Alkhayyat (The Islamic University Najaf, Najaf, Iraq,); Mohammed Mohammed Sadeeq (Duhok Polytechnic University, Iraq) [1570758488]

Abstract

The biological human brain model was used to inspire the idea of Artificial Neural Networks (ANNs). The notion is then converted into a mathematical formulation and then into machine learning, which is utilized to address various issues throughout the world. Moreover, ANNs has achieved advances in solving numerous intractable problems in several fields in recent times. However, its success depends on the hyper-parameters it selects, and manually fine-tuning them is a time-consuming task. Therefore, automation of the design or topology of artificial neural networks has become a hot issue in both academic and industrial studies. Among the numerous optimization approaches, evolutionary algorithms (EAs) are commonly used to optimize the architecture and parameters of ANNs. We review several successful, well-designed strategies to using EAs to develop artificial neural network architecture that has been published in the last four years in this paper. In addition, we conducted a thorough study and analysis of each publication.

Furthermore, details such as methods used, datasets, computer resources, training duration, and performance are summarized for each study. Despite this, the automated neural network techniques performed admirably. However, the long training period and huge computer resources remain issues for these sorts of ANNs techniques.

SESSION D2 eSystem Engineering (Main Track)

“A Conceptual Framework: Point-Of-Sales (Pos) System Integrated with Business Intelligence (Bi) Capability Focused On SME in Indonesia”

Khalida Shajaratuddur Harun (Asia Pacific University of Technology & Innovation, Malaysia) [1570750162]

Abstract

This paper intends to conduct a study review and propose a conceptual framework to be used in the implementation of POS system targeted for Small and Medium Enterprises in Indonesia. The study covers THREE domain areas which includes review on similar systems, software & tools utilizations together with system architecture and design. The utilization of appropriate POS system with Business Intelligence capability will

enable better decision making through insight analysis. Thus, this paper develops a conceptual framework in which leads towards the implementation of the POS System with Business Intelligence capability and uses an existing SME in Indonesia as the subject of the study.

“VRunner: Providing Runner Platform for Personal Shopper, Delivery Services and Queue Assistant for Urban Community”

Intan Farahana Kamsin (Lecturer, Malaysia) [1570750168]

Abstract

Nowadays, people are busy with works, studies, or tasks, as well as the disabled people, are getting some problem in daily life. Therefore, all of them are pursuing convenience and efficiency in their daily life. This research is to discuss about a proposed system called as VRunner, which is a mobile application that provides the on-demand runner booking service to the user from the available runner or rider in order to offer delivery service, queue assistant, errand runners, and personal shopper. The VRunner application provides errand services for personal shoppers or riders, which can purchase items from groceries to costume, jewelry and bag for customers and deliver them to the customer's doorstep. The on-demand runner service able to offer delivery everywhere based on the customer's request. The purpose of the VRunner is to provide the runner service in an urban community and provide revenue-generating opportunities for the riders and provide solutions for customers who need runner services such as food delivery, personal shoppers, queue assistants, and errand runners. It also assists companies in increasing productivity by offering advertising space and delivering Business to Customers (B2C) business.

“Food Customization in Cloud Kitchens Based on Meal Plans for Working-Class Consumers in Malaysia”

Intan Farahana Kamsin (Malaysia) [1570750170]

Abstract

huge chunk of the world's population is from the working-class; people who work from 9-5 for a salary at the end of every month. Unfortunately, for them, cooking at home is a luxury they do not have. Most of the workers consume their daily meals at restaurants, which is not healthy in the long-term. This is a problem for individuals who want to stay fit. Staying fit requires of them to follow strict meal plans and hit their daily nutrition intake targets. Restaurants do not provide the luxury to order food according to a customized meal plan. Therefore, this research aims to develop an effective IoT solution that allows consumers to customize their food according to their meal plans. Subjects involved in the research will be selected randomly and be surveyed and interviewed. This research gives a new use for an existing invention. This research can be further carried into other countries where citizens are facing the same problem.

“Integration of Wireless Sensor Network Based Smart Parking Management System for APU”

Intan Farahana Kamsin (Malaysia) [1570750177]

Abstract

In this 21st century new technology and creation are assumed the principle part in our way of life. We can't reject that new technology is improving our method of living in the way of quickest, easiest, and more beneficial. In the system WSN modules is install into each parking slot equipped with one sensor node. The condition of the parking slot is distinguished by the sensor node and is accounted for intermittently to implanted web-server and the portable application through the conveyed WSN. All This information will send off the central labourer using Wi-Fi networks logically and furthermore, the client can discover empty parking garages utilizing standard cell phones.

“Quaesitor - an Open-Source Intelligence (OSINT) Information Gathering Tool”

Vinesha Selvarajah (Asia Pacific University of Technology & Innovation, Malaysia) [1570750831]

Abstract

Open-Source Intelligence (OSINT) is the latest way to gather information on people, companies and about any topic of discussion online. Nowadays, the process of gathering this information has become complicated due to the vast amount of information to be collected as well as the vast number of different tools that each provide different functions. The problem of today is having to pick and choose what is suitable information and what tools are suitable for the use of information gathering. This project comes into place to tackle this issue by attempting to produce a solution that can condense the functions of multiple tools into one single location in which these functions can be carried out without having to even exit the tool. However, issues arise with being able to convince users to use the proposed solution instead of existing methods. Therefore, research will be conducted to examine the domain area, similar systems, technical requirements, software development methodology and on the users to gather information on what they would require from the proposed tool. The results gathered from this report will be taken into close consideration during the second phase of this project in which the development of the proposed solution will be completed.

“SQL Injection Methodology and Impact”

Vinesha Selvarajah (Asia Pacific University of Technology & Innovation, Malaysia) [1570750845]

Abstract

Data is the most valuable asset of a person in the current cyber world. More and more data are being collected by applications for multi-purposes. These valuable data are stored inside a database. Standard Query Language (SQL) is a database query language for managing databases. SQL injection attack is the most common attack being used by attackers to gain unauthorized access to the database although it has been used for more than a decade. Many security professionals have proposed countermeasures against SQL injection attacks, but it is still listed as one of the Top 10 Web Application Security Risks today. The concept of SQL injection attack is to inject SQL codes into the database server and executes the injected codes to retrieves the desired result. SQL injection attacks can be classified into different categories depending on the characteristic of the attack. The severity of a SQL injection attack may vary, depending on the vulnerability and the permission assigned. It may only be causing leakage of some insensitive data or might be causing the destruction and major modification of the database. This paper includes an overview of SQL injection attacks and a demonstration of attacking the database. Moreover, the characteristics and examples of exploiting different types of SQL injection vulnerability were discussed.

SESSION E2

Computational Intelligence and Machine Learning in Emerging Applications of Health, Science, and Engineering

“Proposed Image Encryption Algorithm Based on Paillier Homomorphic and Elliptic Curve Algebra”

Zainab Mohammed Muneef, Hala Abdul Wahab and Abdul Mohssen Abdul Hossen (University of Technology, Iraq) [1570760895]

Abstract

With the increasing use of media in communications, the content security of digital images attracts attention from both academia and industry. In This paper proposes an asymmetric image encryption algorithm based on a Homomorphic cryptosystem (Paillier) with an elliptic curve. The algorithm is used for securing images that are transmitted over a public unsecured channel. The Homomorphic property with an elliptic curve is used in this paper, the proposed approach consists of three stages: key generation, encryption, and decryption. To realize such an approach, the encryption cryptosystem must support additional operations over encrypted data. This cryptosystem can be effective in protecting images and supporting the construction of programs that can process encrypted input and produce encrypted output while preserving the original execution time of the proposed algorithm.

“Biogas Production Modelling of Integrated Anaerobic-Aerobic Sequencing Batch Reactor Treating Poultry Slaughterhouse Wastewater”

Ahmed Rahomi Rajab (University of Anbar, Iraq); Mohd. Razman Salim (UCSI University, Malaysia); Johan Sohaili (Universiti Teknologi Malaysia (UTM), Malaysia); Aznah Nor Anuar (Universiti Teknologi Malaysia, Malaysia) [1570761981]

Abstract

Biogas production from ASBR compartment of IAASBR has been monitored in terms of OLR, TCODremoved, anaerobic F/M ratio, VSS loading rate, and the concentration of MLVSS inside the ASBR. These parameters are used as predictors for building up the model using SPSS software, whereas the corresponding biogas generated was considered as a dependent variable. The data were collected during the system's performance investigation at OLR tolerance and HRTan changing period. The aim of this work is to establish a prediction formula that might aid to estimate the quantity of biogas production from this system (IAASBR) which was operated under ambient temperature (26 - 28 °C) and best operation mode. In conclusion, the prediction model has a high coefficient of determination ($R^2 = 0.928$) and it is highly correlated with the applied OLR value and the numbers of cycles per day considered. Furthermore, the value of OLR should not exceed 4.5 kg(TCOD)/m³.d for good biogas production.

“Prediction of Strength of Foamed Concrete Containing Waste Plastic as Coarse and Fine Aggregates Using Minitab Software”

Aya Mohammed Abbas (University of Anbar, Iraq) [1570761982]

Abstract

In this research, waste plastic as aggregate was used in production of foamed concrete as partial replacement of sand. The Minitab program was used to determine the number of experimental mixes (mix proportions). After that, these mixes were mixed, poured, cured to investigate their required compressive strength. Finally, the strength values of all the mixes were analyzed and the best mix was predicted with the best improvement in strength. Four mixes were relied on as being the best among the 31 experimental mixes. In these mixes, the cement ratio is fixed, as 400 kg / m³ and the percentage of fly ash as 60 kg/m³, the proportion of fine plastic is 15%, and the proportion of coarse plastic is 70%, with the constant ratio of water to cement and constant amount of foam. Comparing the reference mix with that containing 70% coarse waste plastic, it was found that the decrease in strength is about 9% and the decrease in density is about 16%. While, compared to the mix containing about 89% fine and coarse waste plastic, it was found that the decrease in strength is about 24% and the decrease in density is 23%. The results showed that the use of plastic as aggregates caused a negative effect on the strength values, however; a good reduction in density was achieved.

“Optimum Content of Waste Fine Plastic Aggregate Using Mini181 Software for Best Performance of Reinforced Concrete”

Dhifaf Hamdullah, Sheelan Hama and Shaho Hama (University of Anbar, Iraq) [1570761999]

Abstract

This research tries to find out the best content of waste plastic from waste compacted disk to be used in reinforced concrete through optimization process using Minitab software. Waste plastic has been used as partial replacement of volume of natural with these levels; 0, 2.5, 5, 7.5, 10, 12.5, and 15%. It was found compressive strength, modulus of elasticity, and bond strength between steel bar and concrete decreased with increasing plastic content. While compact resistance of reinforced two-slabs increased with increased plastic content. Besides from stress-strain relation, it can see the ductility of specimens increased with increasing plastic content. Optimization using Mini 181 software was made and it was found that the optimum content of eggshell is 5.91%.

“Hybrid Intelligent Controller for Magnetic Levitation System Based on Virtual Reality Model” Yousif Ismail Al Mashhadany (University of Anbar, Iraq) [1570762596]

Abstract

Magnetic levitation could be a technique during which associate degree object is suspended within the air by a flux, except once magnetic attraction and superconducting materials are during a magnetic field and management led by a magnetic field employing a control technique. The manipulation of the magnetic field by the steering method is performed to levitate an object. The task of the control is to use a controlled current to the coil in order that the attraction performing on the levitating object and therefore the gravitation acting on it are precisely the same. The flight system is inherently unstable with none control action. It is sensible not solely to win the article however additionally to remain within the desired position or perpetually follow a given route. Here, a hybrid intelligent controller (HIC) is meant for the magnetic flight system. First, a classical controller has been developed for the system and simulation, which ends up during a trailing error of below 0.001 m. to resolve the on top of problem, the HIC is designed for the system by taking the Virtual Reality (VR) model of the system. The output of the controller is in the (0.5 ~ 1) voltage range. The tracking of the reference signal is additionally verified within the simulation, and therefore the trailing error is among 0.00012 m. A general simulation of the projected system has been administrated with the appearance of MATLAB 2020a, and the obtained satisfactory results demonstrate sensible applicability the proposed system design.

“An Analysis Review: Real Measurement for Surface Electromyography (sEMG) Signal”

Yousif Ismail Al Mashhadany (University of Anbar, Iraq) [1570762603]

Abstract

In line with current trends, smart utility products are being developed and advertised for diagnostic procedure indications (EMG) during user muscle activity. Standardization of electromyography (EMG) instruments is of particular importance to ensure the accuracy of the recordings. Technical factors such as hardware, EMG hardware, and software, combined with amplifiers and filters, evaluation of virtual signals and devices, connector types, stimulation strategies for excellent and standardized EMG scans, and EMG artifacts can be detected as well as the policies to be followed. During this work, a rapid demonstration of the various methods of preprocessing, characteristic extraction and class of EMG indicators in comparison with their performance is impressive. The database for this research paper has been compiled based on the update published by renowned publishers: IEEE, Springer, Elsevier, SAGA and Natures. Finally, the garage of facts, databases, record generators, and external data to denote this assessment due to the excellent map are combined to become tools for maintaining the EMG tag with sufficient accuracy and sensitivity.

“Enhanced Iterated Local Search for Scheduling of Scientific Workflows”

Alaa Abdalqahar Jihad (University of Anbar & Computer Center, Iraq); Sufyan T Faraj Al-Janabi (University of Anbar, Iraq); Esam Yassen (University of Anbar & Center for Artificial Intelligent (CAIT), Universiti Kebangsaan Malaysia, Iraq) [1570762660]

Abstract

Recently, cloud computing has been used to host and implement scientific applications that have large data and are processing-intensive. This is because cloud computing provides a cost-effective, scalable, and pay-per-use deployment environment. Optimizing workflow scheduling is one of the areas of research activities currently and one of the most important issues in the cloud environment and this problem is considered NP-complete. There are many improvement objectives in workflow scheduling, one of the most important of which is to reduce the makespan. The iterated local search (ILS) has been shown as an effective approach for tackling numerous real-world difficult problems as it simply adapted to different research instances. In this paper, an enhanced ILS algorithm is proposed for achieving this aim. Several enhancing modifications have been proposed for developing the ILS algorithm; two methods for developing an initial solution of the algorithm, and four proposed methods for developing the perturbation phase. Experiments are conducted on well-known scientific workflows of various sizes and types and with WorkflowSim in order to test the six proposed methods. Experimental results show that some of these enhancing modifications outperform the standard ILS as they obtained better results compared with this ILS.

“Implementation of Data Transportation Protocol Depending on the Light-Weight Cipher Algorithms”

Seddiq Q. Abd Al-Rahman, Sarah Hamad and Dena Turkey (University of Anbar, Iraq) [1570762900]

Abstract

Light-weight cryptography (LWC) takes a novel orienting to produce security for low-power devices and constrained applications such as the Internet of Things (IoT) and Wireless Sensor Node (WSN). In these WSN and IoT applications, whole nodes communicate with each other over a network, therefore there are opportunities for penetration of this node via the extrinsic attack. The most important thing here is to preserve this node from all kinds of extrinsic attacks taking into account the hardware implementation and memory size. Considering the above problem, it is necessary to find a proposal that transfers data and ensures that it is not stolen or tampered. This proposal based on previous light-weight encryption algorithms. The proposal transferred the data (in xml data formats) between the start and end nodes with least number of nodes. This provided a speed in the transfer process, which leads to a significant improvement in data security. Essentially light-weight cipher provides the security at the node level only. We also calculated the execution time of these five light-weight algorithms, the time of data transfer and the number of nodes for transport data.

“Energy Model of Wireless Sensor Network”

Ayam T Ahmed, almula (University of Anbar, Iraq) [1570763488]

Abstract

Wireless sensor network has emerged recently as an effective way of monitoring inhospitable or remote physical environments. One of the main challenges in the networks lies in the constrained energy and computational resources available to sensor nodes. The deployment of the sensor nodes is the initial step to establishing a sensor network. In this paper the objective of the method of the location estimation is to estimate locations of the sensor nodes with respect of the set of the anchor nodes that their locations' information is known. This network consists of sensors that are battery-powered, and that gather the data and route it to the central Base Station(BS). Cluster-based routing efficiently utilizes with a limited energy of the sensor devices by selecting the Cluster Head (CH) at every round depending in the number, energy, and prior of the nodes. Also, Sensor Mode Setup Phase(SMSF) help increase the wireless sensor networks lifetime, and also see that the lifetime increases when the sensor nodes number is increased.

“Prediction of Single Object Tracking Based on Learning Approach in Wireless Sensor Networks”

Sahar Hamad Ahmed (University of Anbar, Iraq) [1570763577]

Abstract

In recent years, there has been a growing interest in wireless sensor networks because of their potential usage in a wide variety of applications such as remote environmental monitoring and target tracking. Target tracking is a typical and substantial application of wireless sensor networks. Generally, target tracking aims basically at estimating the location of the target while it is moving within an area of interest and consequently report it to the base station on time. However, achieving high accuracy of tracking together with energy efficiency in target tracking algorithms is extremely challenging. This paper presents an efficient target tracking approach by combining dynamic clustering technique with the predictive tracking technique using the Long Short Term Memory (LSTM) networks which is the extension of Recurrent Neural Networks (RNNs), We used two models from the LSTM, where the first model used for predict the three nodes that will track the object, and the second model was used to classify the direction of movement of the object and then calculate the new position of the object. Through the results obtained, we note that the approach that was proposed by us, was very successful and the use of two models of LSTM increased the work efficiency.

DAY 3 – THURSDAY, 9TH DECEMBER 2021

SESSION A3 eSystem Engineering (Main Track)

“Identifying Diagnostic and Prognostic Targets for Papillary Thyroid Carcinoma Through Mining Gene Expression BIG Datasets Using Adaptive Filtering and Advanced Bioinformatics Algorithms”

Asma Almansoori and Poorna Bhamidimarri (Sharjah Institute for Medical Research, United Arab Emirates);
Riyad Bendardaf and Rifat Hamoudi (University of Sharjah, United Arab Emirates) [1570774479]

Abstract

Thyroid Cancer is the most common endocrine malignancy. Although the mortality rate of thyroid cancer is considered to be low, however the reoccurrence and persistence of the disease is still considered high. The most common type of thyroid cancer is papillary thyroid carcinoma consisting of >70% of all types of thyroid cancer. Thyroid cancer is heterogeneous and the complex mechanisms involving multiple cellular pathways are not well characterized. Consequently, no objective diagnostic and prognostic tools and limited therapeutic drugs are available for its management. BIG data in the form of publicly available gene expression (transcriptomics) datasets can provide valuable source to gain deeper understanding of complex diseases such as papillary thyroid carcinoma (PTC). In this study, we used a novel bioinformatics method based on adaptive filtering to reduce the number of genes expressed eliminating genes that are invariant across the various disease stages. In order to shed light on some of the mechanisms involved in PTC, the filtered genes were used in systematic pathway analysis searches across 20,500 annotated cellular pathways using modified Kolmogorov-Smirnov algorithm to identify the relevant differentially activated cellular pathways across the various stages of the disease. Our analysis from 95 PTC patient biopsies consisting of 41 normal, 28 non-aggressive and 26 metastatic papillary thyroid carcinoma revealed 2193 differential activated cellular pathways among non-aggressive samples and 1969 among metastatic samples compared to normal tissue. The key pathways for non-aggressive PTC includes calcium and potassium ion transport, hormone signaling pathways, protein tyrosine phosphatase activity and protein tyrosine kinase activity. The key pathways for metastatic PTC include growth, apoptosis, activation of MAPK activity and regulation of serine threonine kinase activity. The most frequent genes across the enriched pathways were KCNQ1, CACNA1D, KCNN4, BCL2, and PTK2B for non-aggressive PTC, and EGFR, PTK2B, KCNN4 and BCL2 for metastatic PTC. Survival analysis results showed that PTK2B, CACNA1D and BCL2 contributed to poor survival of PTC patients. The results identified using BIG gene expression data mining algorithms, novel insights into the mechanism of PTC as well as putative diagnostic and prognostic targets that might be useful in managing patients with PTC.

“A Deep Neural Network-Based Prediction Model for Students' Academic Performance”

Ghaith Al-Tameemi, James Xue, Suraj Ajit and Triantafyllos Kanakis (University of Northampton, United Kingdom); Israa Hadi Ali (University of Babylon, IT, Software dept., Iraq); Thar Baker (University of Sharjah, United Arab Emirates); Mohammed Al-khafajiy (University of Reading, United Kingdom); Rawaa Al-Jumeily (Belvedere British School, United Arab Emirates) [1570764826]

Abstract

Education providers are increasingly using artificial techniques for predicting students' performance based on their interactions in Virtual Learning Environments (VLE). In this paper, the Open University Learning Analytics Dataset (OULAD), which contains student demographic information, assessment scores, number of clicks in the virtual learning environment and final results, etc, has been used to predict student performance. Various techniques such as standardisation and normalisation have been employed in the pre-processing stage. Spearman's correlation coefficient is used to measure the correlation between the activity types and the students' final results to determine the importance of the activities. Deep learning has been utilised to predict students' performance based on their engagement in the VLE. The empirical results show that our model has the ability to accurately predict student academic performance.

“Palm Vein Based Authentication System by Using Convolution Neural Network”

Ali Salam Al-jaberi and Ali Mohsin Al-juboori (Al-Qadisiyah University, Iraq); Rawaa Al-Jumeily (Liverpool John Moores University, United Kingdom); Mohammed Al-khafajiy (University of Reading, United Kingdom); Thar Baker (University of Sharjah, United Arab Emirates) [1570766240]

Abstract

The recognition of hand palm print through veins is one of the promising biometric techniques, which has received great interest lately due to its accuracy in identifying individuals. Although the literature witnessed several techniques and developments to deal with the problem of identifying people through the veins in the palm, the technology is still in its infancy. In this research, we propose our palm print recognition model which use convolution neural networks preceded by the pre-processing stages to optimise the data and to extract the important regions.

The pre-processing helped in extracting the vein pattern which feed into the proposed convolution neural network model. The CASIA database has been used; it contains 7200 images taken form 100 people based on 6 wavelengths (940 nm, 850 nm,

700 nm, 630 nm, 460 nm, and white). The model has been tested with all wavelengths in the database. AlexNet is used for benchmarking. The results show that our approach using the proposed pre-processing has helped to surpass AlexNet in terms of performance, speed, and accuracy.

“Comparison of GA, GWO, and HHO Optimization Techniques for Modeling Substrate/Buffer Loading Effect on GaN HEMTs”

Abdallah Y.I Abushawish (University of Sharjah & Sharjah, United Arab Emirates); Anwar Hasan Jarndal (University of Sharjah, United Arab Emirates) [1570768358]

Abstract

In this research, a comparison between three optimization techniques in the context of hybrid-direct extraction of GaN on Si HEMTs elements that characterize the substrate/buffer loading effect has been developed. The optimization techniques used are Genetic Algorithm (GA), Grey Wolf Optimization (GWO), and Harris-Hawks Optimization (HHO). The open de-embedded structure's Z-parameter have been used to simulate this effect on GaN on Si HEMTs devices. Comparing the measured Z-parameters with the simulated ones has been considered the validation of the techniques. The convergence speed and extraction time have been utilized for the

evaluation of the techniques' efficiencies. The results showed the advantage of GWO in terms of fitting error and convergence speed.

Quantifying Impacts of Connected and Automated Vehicles on Traffic Operation of a Diamond Interchange in UAE Using Micro-Simulation”

Mohamad Tulimat, Osama Obaid, Lubna Obaid and Khaled Hamad (University of Sharjah, United Arab Emirates)
[1570756036]

Abstract

Connected and Automated Vehicles (CAVs) are expected to dominate our future mobility. CAVs have potential benefits for improving traffic operations and safety for all road users, reducing traffic congestion, vehicle emissions, fuel consumption, and smoothening traffic flow. Since CAVs are still on a very narrow level of implementation worldwide, their impact on traffic flow is still under investigation. Traffic simulation tools have been frequently utilized to collect more insights and clarify uncertainties associated with CAVs implementation. Many studies have investigated CAVs at the segment level; however, exploring CAVs' impact at the network level has not been conducted widely. This study aims to quantify the impacts of CAVs on the traffic operation of a diamond interchange in Abu Dhabi City, UAE, by utilizing a widely-used micro-simulation tool, namely PTV VISSIM. The performance of multiple scenarios was analyzed in terms of both traffic operations and environmental emissions, specifically average speed, average delay, and produced emissions. Moreover, the simulation was performed for different Market Penetration Rates (MPRs), starting from 0% (representing no CAVs) up to 100% (full CAVs) with an increment of 10%. Each scenario was run at three different traffic congestion levels: uncongested with a 0.8 volume-to-capacity (V/C) ratio, moderate congestion with a V/C ratio of 1, and over-congested with a V/C ratio of 1.2. Results showed that the average delay and the average speed had undergone an improvement of 15.5% and 9.66%, respectively, at 100% MPR and over-congestion level (V/C ratio =1.2). Furthermore, GHG emissions were found to be reduced by 9.6%. Moreover, it was revealed that CAVs would have a more significant role in arterial roads than freeways because of the aggressive driving behavior in arterial road driving nature.

SESSION B3

eSystem Engineering (Main Track)

“Classifying and Forecasting Traffic Incident Duration Using Various Machine Learning Techniques”

Zakiya Rahmat-Ullah, Sara Alsmadi and Khaled Hamad (University of Sharjah, United Arab Emirates)
[1570756283]

Abstract

Non-recurring events, such as crashes, construction zones, adverse weather conditions, are considered the major cause of traffic congestion. The duration of those incidents is significantly affected by multiple factors, including their type, level of severity, and other conditions. Compiling incident-related data can provide valuable information for municipal planners and road users to aid in traffic management. Recently, machine learning models have proven their efficiency in predicting incident duration. This study develops machine-learning models to predict incident-duration classes, including artificial neural networks (ANN) and random forest (RF). Incident records data were retrieved from TranStar Houston's Transportation Management Center, and after cleansing, about 48,200 records remained with over 50 independent variables. The collected response data are divided into four classes, where events that lasted from 5 to 15, 15 to 30, 30 to 60, and 60 to 120 minutes are classified as minor, intermediate, major, and severe incidents, respectively. The findings of the predictive classification models revealed that RF scored the highest overall accuracy of 71%. The accuracy of predicting minor incidents using RF was the highest of 80%, followed by major (76%), intermediate (64%), and severe (43%) incidents. On the other hand, the accuracy of the ANN model followed the descending order of severe, intermediate, minor, and major incidents scoring 81, 75, 53, and 43%, respectively. The mean square error of ANN was reported as 28.4%, which is 10.4% higher than that of RFs. The assessment results showed that the most significant independent parameters on incident duration prediction are type and number of lanes blocked, type and number of emergency department responses, type of vehicles involved, and temporal factors. The outcomes proved the higher performance efficiency of classification predictive models using RF compared to ANN. Overall, the findings showed satisfactory performance compared to similar studies found in the literature.

“Autonomous Localization of the Best Depth Blob Using TOPSIS: Application on Forage Plants for the Sharjah Pastures Project”

Radhwan Sani, Ali Cheaitou and Tamer Rabie (University of Sharjah, United Arab Emirates) [1570763146]

Abstract

This research constitutes a building block of a larger decision support system, that combines computer vision and multi-criteria decision making, to identify indigenous forage plants in close-range aerial images. Such system enables managing the open pastures project of the Emirate of Sharjah, United Arab Emirates (UAE). The system aims at the identification of forage plants through the detection of plant inflorescences in depth images, and applying TOPSIS, to select and localize the best plant inflorescence.

“Detection of Epileptic Seizure Using Discrete Wavelet Transform on Gamma Band and Artificial Neural Network”

Mahmmud D'yab Qatmh, Talal Bonny, Nida Nasir, Mohammad AlShabi and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570772989]

Abstract

Electroencephalography (EEG) is a useful tool for obtaining brain signals that correlate to different states from the scalp surface area. Based on signal frequencies ranging from 0.1 Hz to more than 100 Hz, these signals are classified as delta, theta, alpha, beta, and gamma. The EEG signal-based Brain-Computer Interface (BCI) technology has become one of the current hot spots. The most fundamental research in BCI technology is how to extract the EEG features. In this paper, we use the EEG signal extracted features to detect Epileptic Seizures, by using a combination of both Discrete Wavelet Transform (DWT) and Artificial Neural Network (ANN) using MATLAB. Bonn University EEG database has been used. The data was obtained using 128 channels and is divided into five different data classes: Z, N, O, F, and S. Each dataset class contains 100 segments taken from individual channels with a period of 23.6 seconds, or in other words, each dataset class contains 4097 pulses/samples with a sampling frequency of 173.61 Hz. Important statistical features were computed such as mean, standard deviation, skewness, and kurtosis.

“Accuracy of Linear Measurements of Maxillary Sinus Dimensions in Gender Identification Using Machine Learning”

Abdullah Mohammed Abdullah Al-Amodi and Natheer Al-Rawi (University of Sharjah, United Arab Emirates); Ibrahim Kamel (University of Sharjah & Concordia University, United Arab Emirates) [1570773183]

Abstract

Linear measurements of the maxillary sinus are useful for gender prediction. This variation could be used for forensic identification purpose in mass disaster. The aim of the study is to evaluate the accuracy of artificial intelligence-based technique in gender prediction using linear measurements of maxillary sinus from Cone Beam Computed Tomography CBCT scans.

“GaN Power Amplifiers Design Using Efficient GA-ANN Dynamic Nonlinear Model”

Anwar Hasan Jarndal and Husna Hamza (University of Sharjah, United Arab Emirates) [1570766080]

Abstract

Linear measurements of the maxillary sinus are useful for gender prediction. This variation could be used for forensic identification purpose in mass disaster. The aim of the study is to evaluate the accuracy of artificial intelligence-based technique in gender prediction using linear measurements of maxillary sinus from Cone Beam Computed Tomography CBCT scans.

“Machine Learning Based Prediction Models for the Percentage Deaths Due to COVID-19”

Anwar Hasan Jarndal (University of Sharjah, United Arab Emirates); Saddam Husain (Nazarbayev University, Kazakhstan); Maha Diab and Amir Shikhli (University of Sharjah, United Arab Emirates) [1570768086]

Abstract

Worldwide COVID-19 pandemic is currently affecting all countries and led to loss of human life. A lot of scientific research are conducted in different areas to improve the future response. The purpose of the project to use Machine learning (ML) techniques in predicting COVID-19 deaths which will enhance the hospitals response. This paper contributes by developing models that can predict COVID-19 deaths based on three factors: total number of elderly patients (greater than 65 years), diabetic patients, and smoking patients. Gaussian Process Regression (GPR), Support Vector Regression (SVR), Artificial Neural Network-Multi Layer Perceptron (ANN-MLP), and Artificial Neural Network- nonlinear autoregressive network with exogenous inputs (ANN-NARX) approaches are used to build the predictive models. All models are trained and tested using trusted data reported by the World Health Organization (WHO) in various countries. The developed models revealed very good results with excellent prediction rate and performance, especially GPR, which has the best performance. Also, it showed that region-based predictive models are more suitable than a single general model. The GPR predictive model showed the best performance compared to other models.

“Optimization of a Conceptual Rainfall-Runoff Model Using Evolutionary Computing Methods”

Hamad Mohamed Ahli and Tarek Murabteen (University of Sharjah, United Arab Emirates); Mohsin Siddique (Mechanical Engineering, United Arab Emirates) [1570773305]

Abstract

Application of artificial intelligence (AI) in hydrologic modeling is receiving increasing attention to explore new optimization approaches to the complex nonlinear high-dimensional models. This paper presents the application of two evolutionary computing (EC) methods to calibrate the parameter of a conceptual rainfall runoff model (i.e., the Tank model). Tank model has been selected as for several reasons including its simplicity in presenting the runoff processes, its flexible adaption and its capability to produce real catchment hydrograph if suitable parameters' calibration is attained. To this end, two global optimization methods (GOM), the Genetic Algorithm (GA) and Particle Swarm Optimization (PSO), are used to optimize the Tank model parameters, applied to actual rainfall runoff hydrograph. The performance of two methods have been compared under different scenarios and environments based on two objective functions namely, the root mean square error (RMSE) and Nash-Sutcliffe model efficiency coefficient (NSE). The results proved the capability of GOM to calibrate the 4-stage Tank model with 16 parameters, even under insufficient data availability (as in the case of UAE watersheds). Both techniques performed satisfactorily with slight superiority of GA over the PSO. Also, NSE proved that it can be considered a superior criterion, to use as objective function, compared to RMSE. The research concludes by recommending the best optimized 16 parameters of the tank model for the selected watershed and provides promising results for UAE watersheds.

SESSION C3

Computational Intelligence and Machine Learning in Emerging Applications of Health, Science, and Engineering

“COVID-19 Cases Estimation in the GMT Using Improved SEIR Models”

Ali Al-Ataby (University of Liverpool, United Kingdom); Fawzi Mohammed Munir Al-Naima (Al-Nahrain University, Iraq); Shaogang Jiang (University of Liverpool, China) [1570764237]

Abstract

The paper suggests a machine learning algorithm with two modified SEIR models customized for the 2019-nCoV virus and vaccine uses to simulate the spread of COVID-19 in the UK (from Jan 2020 to March 2021) and make predictions of future cases. The algorithm uses COVID daily cumulative case data and second dose vaccine use data provided by the Public Health England as the training set and is capable of making relatively accurate short-term predictions of future COVID cases in the UK (before the delta and later variants of the virus starts spreading within the country). The obtained overall accuracy is above 80% for daily incremental case numbers in terms of the overall fit of the model to real-life data, and with an accuracy of more than 80% for estimation of daily incremental case numbers for 14 days period future prediction. The goal of this paper is to propose improved SEIR models capable of a more accurate simulation for COVID-19 modelling and estimation with various machine learning algorithms.

“Human-Robot Arm Interaction Based on Electromyography Signal”

Yousif Ismail Al Mashhadany (University of Anbar, Iraq) [1570764623]

Abstract

Many applications in biomedical engineering based on Electromyography signal (EMG) by interface that It will be used effectively within the scientific application of human-robot interaction (HRI) in a very structured and dynamic environment. In HRI applications, we principally specialize in the illustration of automaton workpieces. First, we distinguish between the assorted ideas of representational process, and that we introduce purposeful anthropomorphism to represent a person's movement for human robots, given the functional limitations obligatory by some people. Robots are useful in many ways and serve various purposes. The human-robot interface has been acknowledged in the past. Electromyography (EMG) is the measurement of nerve signals due to the contracting muscles.

In this work, a humanoid robot is controlled through electrical signals acquired from a user's arm. This work consists of three main parts, which are as follows: First, the robot arm's motion was controlled using six variable resistors in order to calculate how much effort the servo would need to move at the desired angle. Second, The EMG signals are obtained from the muscles of the hand by using sensors placed on sites on the arm, where the voltage resulting from muscle contraction and relaxation is measured, and the highest value for the voltage is taken when contracting and the lowest value for the voltage when relaxing. Third, A connection between the real human arm and the robot arm is designed in full synchronization where the results that were calculated in the first paragraph of the work were calibrated with the results that were calculated from the second paragraph.

“An Efficient Intrusion Detection System for IoT Based on Smart Techniques”

Zainab Hussam Abdaljabar (University of Altinbas, Iraq); Osman Nuri Ucan (Altinbas University, Turkey);
Khattab M. Ali Alheeti (University of Anbar, Iraq) [1570767218]

Abstract

The Internet of things (IoT) allows billions of computer and networking devices to be interconnected. Digital entities such as sensors, Radio-frequency identification (RFID), Internet and localization technologies enable everyday objects to be transformed into intelligent objects, which can communicate with one another. The built-in sensors in intelligent objects track and collect various types of data about equipment, the environment and human social life. Although the IoT is useful, safety susceptibility is a major concern. There are universal and continuous interconnections between people, devices, sensors and services. Even if the security system is well built, smartly configured, implemented effectively and managed correctly, it must be human-made and are not resistant to security threats. Therefore, the conception of cyber security solutions requires a human element. To fight attacks, this paper presents an Intrusion Detection System (IDS) based on Smart Techniques such as k-nearest neighbours (kNN) and Random Forest (RF) algorithms which take data as input for spotting harmful activities. The methodology of IDS was created for identifying malicious activities of network traffic utilizing a set of features. Designing efficient IDS involves a data source that incorporates a collection of attributes for evaluating its performance while identifying normal and attack instances. This is one of the challenges that we strive to address in this study. Based on KNN and RF algorithms has presented a collection of features for spotting harmful activities that take advantage of IoT applications to utilize these procedures. The data sources are taken from the UNSW-NB15 source files.

“Credit Card Fraud Detection Using XGBoost Algorithm”

Ahmed Qasim Abdulghani (University of Altinbaş, Iraq); Osman Nuri Ucan (Altinbas University, Turkey); Khattab M. Ali Alheeti (University of Anbar, Iraq) [1570767221]

Abstract

Credit card is one of the modern payment methods that are widely spread all over the world. It provides great facilities in buying and selling operations. But it suffers from fraud problems, causing great economic losses to banks, institutions and individuals, amounting to billions of dollars annually. This has made great interest in finding systems and means with great capabilities to confront fraud, whose patterns and methods are increasing dramatically. One of the most prominent techniques used by researchers in this field is Machine Learning techniques. In this paper, we proposed some of the classification machine learning algorithms such as Logistic regression (LR), Linear Discriminant Analysis (LDA) and Naïve Bayes (NB), additionally, the boosting algorithm XGB to create models capable of detecting fraud. the dataset used from Kaggle. To evaluate the model's performance, we used some performance metrics such as the accuracy, precision, f1, recall, AUC confusion matrix. the XGBoost model presented the best results compared to other models.

“Supervised Machine Learning to Enhance Security in Mobile Ad Hoc Networks”

Marwa Mohammed Khalifa (University of Altinbaş, Iraq); Osman Nuri Ucan (Altinbas University, Turkey);
Khattab M. Ali Alheeti (University of Anbar, Iraq) [1570767223]

Abstract

Mobile Ad hoc Networks (MANET) provide a service in one way or another through network applications in many diverse areas due to the multiple characteristics of MANET such as high-level mobility, decentralization of nodes, and physical insecurity. The function of the intrusion detection system is to detect threats and stop them before they disrupt the network. supervised machine learning techniques, it is easy to implement and comprehend because it uses the knowledge and experience it has gathered from the available data to learn the system how to classify network nodes into normal or malicious. to enhance security in MANET networks in this paper we proposed a security detection system employing classify misbehavior of nodes depending on supervised machine learning techniques such as Random Forest (RF), and Naive Bayes (NB) techniques. using a network simulator-2 simulation was made to produce a data set, explained Our experimental results for our proposed system have good accuracy for detecting intrusion in the system. and the RF was more efficient.

“Image Feature Detectors for Deepfake Image Detection Using Transfer Learning”

Khattab M. Ali Alheeti (University of Anbar, Iraq); Salah Rawi (Anbar University, Iraq); Haitham Abbas Khalaf and Duaa Al-Dosary (University of Anbar, Iraq) [1570767225]

Abstract

Deepfake is heavily based on artificial intelligence and machine learning to generate audio content and visuals with an extremely high potential to deceive. In this paper, a new detection system to identify any deepfake for audio or images. In other words, transfer learning techniques are used to present an intelligent detection system of deepfake videos. In this work, a support vector machine is employed for the detection process. Outstanding results are obtained from the train and test this system with various types of images that are real or fake.

“CNN and Genetic Algorithm for Finger Vein Recognition”

Ola Marwan (University of Mosul, Iraq) [1570769729]

Abstract

Biometrics are modernized methodologies for checking or seeing the character of a living individual dependent on some physiological characteristics, like finger vein, palm vein, and iris or depending on behavioral characteristics like keyboard typing style, signature, and voice. Classical Finger Vein Recognition systems performed by identification depended on finger-vein lines elicited from the images, which were inputted or image improvement, and texture specification elicitation from the finger-vein images. This paper will study applying the Genetic Algorithm with Convolution Neural Network for finger vein classifying recognition system. The Genetic Algorithm's (GA) global searching ability is utilized to start the training process of a traditional Neural Network (CNN). Before training, the weights of the network are established using the GA genetic algorithm rather than random initializers. In terms of performance, the proposed strategy of employing a Genetic Algorithm and a Convolutional Neural Network (GA-CNN) performs better in terms of accuracy, sensitivity, and precision. GA-CNN is a new method and saves time in the training phase for detection and verification processes in biometric systems. This will be used in the future in the detection and face recognition systems.

“Study the Use of Nano-Limestone and Egg-Shell Ash in Eco-Friendly SCC: An Experimental and Statistical Evaluation Based on Computer Programming”

Haider Abdulhameed and Aseel Mansi (University of Technology, Iraq); Ahmed Mohammed (University of Fallujah, Iraq); Ali A. Abdulhameed and Ammar Hanoon (University of Baghdad, Iraq) [1570771525]

Abstract

The main concrete effect on the environment is the CO₂ emissions during cement production. Calcium carbonate is the major component of both egg-shell and limestone; also, it is the primary raw material in the production of cement. This paper reports a feasibility study of production self-consolidating concrete (SCC) with a lower impact on the environment by incorporating nano-limestone powder (NLP) and egg-shell powder (ESP) as partial replacement of cement. Different SCC mixtures were designed at a consistent water-to-binder ratio and a binder content of 0.34 and 450 kg/m³, respectively. The cement was partially replaced with an equal amount of limestone and egg-shell powder at percentages of 10, 15, 20, and 30 % by weight of cement. Both rheological and hardened properties for the resulting concrete were studied. Also, the durability of the proposed mixture was tested in terms of residual compressive strength and density after exposure to high temperatures. The results showed that the rheological properties of all developed mixtures are met the requirements recommended by the European Federation of National Associations Representing for Concrete (EFNARC) for SCC. While the hardened properties are structurally acceptable. On the other hand, higher residual strength and less reduction were achieved compared to the control mixture under high temperatures. Finally, the computer analysis of the derived statistical compressive strength models can be effectively used to predict the compressive strength of SCC.

“Cooperative Forward Collision Avoidance System Based on Deep Learning”

Wajdi Farhat (ENISO, University of Sousse, Tunisia); Olfa Ben Rhaiem (UQAM, Canada); Hassène Faiedh (Faculty of Sciences of Monastir, University of Monastir, Tunisia); Chokri Souani (Higher Institute of Applied Sciences & Technology. University of Sousse, Tunisia) [1570774626]

Abstract

Self-driving vehicles can move autonomously without involving a human pilot by sensing the surrounding environment. Having a forward collision avoidance system will help improve road safety and prevent car accidents. However, this system has drawbacks in terms of crash avoidance (i.e., lack of warning messages, complexity of driving situations and weather conditions). Recently, deep learning algorithms become more suitable to overcome this issue, which have better accuracy and adaptive capability to different environments. In this paper, we propose a Cooperative Forward Collision Avoidance System (CFCA) based on deep learning method. Particularly, this system alerts the driver and broadcast a multi-hop warning messages using vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communication based ITS-G5. The experimental results show that the proposed system performs better than existing systems and can efficiently help drivers avoid collisions. In fact, we have considered two databases (KITTI and a private database). Our model achieved 94.04% accuracy with approximately 5% loss rate using KITTI database. While performance accuracy of approximately 92.42% was achieved using a private database.

“Simulation of MobiFall Dataset for Fall Detection Using MATLAB Classifier Algorithms”

Farhan Ahnaf Rashid (University of Technology Sydney, Australia); Kumbesan Sandy Sandrasegaran and Xiaoying Kong (University of Technology, Sydney, Australia) [1570774910]

Abstract

Fall accidents are considered one of the significant global public health concerns and the largest proportion of fatal accidents are experienced by elderly people. Currently, there is a demand for creating an effective machine learning-based fall detection system that is significantly portable at a low cost. Public datasets are available for simulating an effective classifier for development. Hence, the current study is aimed at simulating the MobiFall fall detection dataset to acquire an effective machine learning classifier. The methodology included a study of the various fall detection systems as well as general features for machine learning classifications. The most suitable potential combination of machine learning algorithms that will provide the best accuracy, precision,

sensitivity, specificity, and lowest training time were developed via simulation models using MATLAB. Input data was selected from MobiFall dataset for simulations. Up to 23 algorithms including Decision Trees, Discriminant Analysis, Naïve Bayes Classifiers, Support Vector Machines, KNN and available Ensemble Classifiers were simulated. Four sets of experiments were done with using the accelerometers with varying features and cross-validation. Currently, a combination of Quadratic SVM, Cubic SVM and Fine KNN was chosen to be used as the most appropriate classifier to train a fall detection system.

SESSION D3

eSystem Engineering (Main Track)

“Predicting Traffic Incident Severity Level Using Machine Learning”

Ahmed Talat Elawady, Abdulrauf Khetrish and Khaled Hamad (University of Sharjah, United Arab Emirates)
[1570773312]

Abstract

One of the most common forms of traffic congestion is recurring congestion caused by traffic incidents. These are events that result in reducing road capacity or excessively increasing demand. Traffic crashes, disabled cars, and spilled cargo are also examples of incidents. Predicting the severity of incidents is a crucial aspect of reducing the delay generated by these incidents. The purpose of this paper is to utilize three modeling techniques, Random Forest (RF), Support Vector Machine (SVM), and Artificial Neural Networks (ANN), to predict incident severity and compare the performance of these models in terms of their prediction accuracy. More than 119,000 incident records with over 53 variables were retrieved from TranStar Houston's Traffic Management Center from January 1st, 2004, to December 31st, 2013. A sensitivity analysis of these models was also conducted to identify the importance of incident-related factors. The results showed that the Radial basis function (RBF) SVM model had the best prediction overall with 98% accuracy. Moreover, the outcomes of the models with decreased input variables (top 20, top 10, and top 5 variables) revealed only marginally worsening output (less than 4% difference in the worst case) than the model with all-inclusive input variables. When using only five variables, the difference was higher, ranging from 20% to 27% in the worst case. This research can help reduce the incidents' duration by deploying the appropriate agencies based on incident severity, leading to shorter incident clearance times.

“Artificial Intelligence: New Paradigm in Deep Space Exploration”

Aya Abdul Rahman AlChikh Omar, Mena Maurice Farag and Razan A Alhamad (University of Sharjah, United Arab Emirates) [1570773719]

Abstract

The unravelling mystery of deep space has led to the large investments made by several countries to employ various exploration schemes and strategies. Major Organizations such as The National Aeronautics and Space Administration agency (NASA) have emphasized on the success rate of space exploration through the continuous development of space exploration activities, which in hand provides the full understanding of the solar system physical behavior to ensure Earth's sustainability. The employment of Artificial Intelligence techniques have had a crucial role to improve the ambiguous deep space exploration and to set strategies by 2030 for the possible exploration of Martian Surfaces. In this review, a discussion based on two Artificial intelligence applications in

deep exploration will be discussed - Hyperspectral Imagery systems & Robot systems in Space. Furthermore, Hyperspectral Imagery algorithm discusses the analysis of space image capture and analysis through various algorithms such as HERD and LEOPARD that are discussed in this review. Moreover, Autonomous robotic systems are also discussed in this review and its contribution to various deep space activities that contribute to efficient exploration. Finally, present challenges for employment of practical AI based deep space algorithms are discussed along with proposed solutions to ensure longevity in the future of deep space exploration.

“A Random-Key Based Genetic Algorithm for the Flexible Job-Shop Scheduling Minimizing Total Completion Time”

Atidel B. Hadj-Alouane (University of Sharjah & OASIS Laboratory, ENIT, United Arab Emirates); Asma Fekih and Hatem Hadda (OASIS, Lab, National Engineering School of Tunis, University of Tunis El Manar, Tunisia); Imed Kacem (Université of Lorraine, France) [1570774081]

Abstract

This paper studies the flexible job-shop scheduling problem (FJSP) with the objective of minimizing the total completion time. This problem is known to be strongly NPhard [1]. We develop a Random-Key based genetic algorithm which is based on a joint resolution of the inherent assignment and sequencing subproblems. We also develop and test a mixed integer linear program. Computational experiments are carried out on a large set of instances. The proposed algorithm is proved to be both effective and efficient in solving the studied problem.

“COVID-19 Electrocardiograms Classification Using CNN Models”

Ismail M. Shahin and Ali Bou Nassif (University of Sharjah, United Arab Emirates); Mohammed Bader Alsabek (SHARJAH, United Arab Emirates) [1570774196]

Abstract

With the periodic rise and fall of COVID-19 and numerous countries being affected by its ramifications, there has been a tremendous amount of work that has been done by scientists, researchers, and doctors all over the world. Prompt intervention is keenly needed to tackle the unconscionable dissemination of the disease. The implementation of Artificial Intelligence (AI) has made a significant contribution to the digital health district by applying the fundamentals of deep learning algorithms. In this study, a novel approach is proposed to automatically diagnose the COVID-19 by the utilization of Electrocardiogram (ECG) data with the integration of deep learning algorithms, specifically the Convolutional Neural Network (CNN) models. Several CNN models have been utilized in this proposed framework, including VGG16, VGG19, InceptionResnetv2, InceptionV3, Resnet50, and Densenet201. The VGG16 model has outperformed the rest of the models, with an accuracy of 85.92%. Our results show a relatively low accuracy in the rest of the models compared to the VGG16 model, which is due to the small size of the utilized dataset, in addition to the exclusive utilization of the Grid search hyperparameters optimization approach for the VGG16 model only. Moreover, our results are preparatory, and there is a possibility to enhance the accuracy of all models by further expanding the dataset and adapting a suitable hyperparameters optimization technique.

“Driver Drowsiness Detection System Using Deep Learning Based on Visual Facial Features”

Mahamad Salah Mahmoud (Case Western Reserve University, USA); Anwar Hasan Jarndal (University of Sharjah, United Arab Emirates); Ahmad Mohammad Ali ALzghoul princess sumaya university for technology (Jordan); Hossam Almahasneh (Road and Transport Authority & Self-employed, United Arab Emirates); Imad Alsyof and Abdul-Kadir Hamid (University of Sharjah, United Arab Emirates) [1570774476]

Abstract

Driver's drowsiness is one of the leading causes of road accidents in the UAE and around the globe. Many lives are daily lost because of drowsy driving making an automatic driver drowsiness detection system an urgent necessity for our modern society. Over the past few years, many such systems have been investigated in academic and industry research but none are yet widely used in our day to day life due to high cost, or limited effectiveness. In this paper, we present the first steps of a real time, non-intrusive, smart drowsiness detection system that works in different real-world scenarios and lighting conditions. Our system utilizes computer vision techniques to detect the driver's face in an infrared video, then a deep neural network predicts whether the driver is drowsy or not based only on their face. Our initial experiments report a promising 94.39% prediction accuracy which outperforms many previously published work especially in night time conditions or scenarios where the driver is wearing sunglasses.

“Hypertension Classification Using Machine Learning - Part II”

Nida Nasir, Paul Oswald, Feras Barneih, Omar Emad Omar Alshaltone, Mohammad AlShabi, Talal Bonny and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570774544]

Abstract

In this study, we propose four distinct machine learning classification models to predict blood pressure (BP) levels. The classifiers used are: Random Forest (RF), CatBoost (CB), Support Vector Machine (SVM), and, K-Nearest Neighbors (KNN). Furthermore, several performance indicators such as accuracy, specificity, precision, recall, and F1 score have been calculated for each model. An accuracy of up to 90% was achieved for CATBoost and RF, and up to 87% and 78.33% for SVM and KNN. This study was able to predict blood pressure-related disorders and cardiovascular diseases.

“Hypertension Classification Using Machine Learning”

Nida Nasir, Omar Emad Omar Alshaltone, Feras Barneih, Mohammad AlShabi, Talal Bonny and Ahmed Al Shamma'a (University of Sharjah, United Arab Emirates) [1570774556]

Abstract

In this paper, we proposed four different machine learning classification models, i.e., Logistic Regression (LR), Decision Tree (DT), Multilayer Perceptron (MLP), and XGBoost, to predict the Blood Pressure (BP) levels. Moreover, various performance metrics for each model have been calculated, such as accuracy, specificity, precision, recall, and F1 score. According to the findings and comparison of each classification model, XG-Boost achieves the highest classification accuracy of 90%. In contrast, MLP, DT, and LR achieved 87.33%, 83.83%, and 73.50% for blood pressure classifications, respectively. This study can forecast blood pressure-related diseases in the medical field.

DAY 4 – FRIDAY, 10TH DECEMBER 2021

SESSION A4 eSystem Engineering (Main Track)

“DFBC Recon Tool: Digital Footprint and Breach Check Reconnaissance Tool”

Yusnita Yusof, Chen Kai Ng and Nik Sakinah Nik Ab Aziz (Asia Pacific University of Technology and Innovation, Malaysia) [1570752810]

Abstract

Nowadays, Internet is no longer private. Web service providers are trying to extract every single piece of user data for analytics or advertising purposes so that targeted ads or personalized contents can be provided. Collecting data of a user has also been easier for hackers with malicious intent. Publicly available data such as Personal Identifiable Information (PII) or breached account credentials are increasing the opportunity for attackers to gain access to users' account and information. Hence, users must be aware of personal data that they are sharing and constantly monitor security of their account. This paper presents a Digital Footprint and Breach Check (DFBC) Reconnaissance Tool which was developed to ease and speed up the process of extracting the publicly available information of users and checking account breach status. It comes with both Command Line Interface (CLI) and Graphical User Interface (GUI), thus both professional and novice users can utilize this tool and better understand the potential risks of their data and account. The tool focuses on gathering data in social network which are Facebook and Twitter, and email breach. From the results, it shows that 60% strongly agree while the rest 40% agree that the result gathered using this proposed tool is comprehensive.

“Financial Fraud Digital Forensic Investigation”

Yusnita Yusof and Pei-Shan Choong (Asia Pacific University of Technology and Innovation, Malaysia) [1570752812]

Abstract

Financial fraud cases are dangerously escalating. Industries and consumers are struggling to prevent being victims of fraud cases. Fraudsters typically aim to gain financial benefits from pulling fake documents or information to perceive as a legitimate beneficiary claimant. However, issue of tracking down fraudsters committed fraud through the Internet is increasingly challenging due to the advancement of computer technology nowadays. The lack of evidence traces and enormous data to be processed to filter out relevant evidence exhaust both time and manpower. Hence, based on the summary of other research work, criminal profiling and machine learning are proposed to be integrated into digital forensic to improve both speed and accuracy in investigation financial fraud cases.

“FlashSafe: USB Flash Drives Encryption Tool with AES Algorithm”

Julia Juremi (Asia Pacific University of Technology & Innovation, Malaysia) [1570752820]

Abstract

FlashSafe is a portable software which enables users to safeguard their personal data using the secure AES 128 bits key with a password on your removable drive. It helps to protect the data by creating a password-protected virtual drive on the storage device which is portable. Once set, nobody can access the personal data without having the appropriate password. This assures the data is safe across Windows platform, with no download necessary, functions completely from the drive, and while the device is unplugged it instant locks.

**“Performance Evaluation of Routing Protocols RIP and OSPF with Respect to Throughput and DelayA
Computer Network is a Collection of Computers Connected Together to Share Resources Located on the
Network Nodes. in a Computer Network One of the Important”**

Yusnita Yusof and Pei-Shan Choong (Asia Pacific University of Technology and Innovation, Malaysia)
[1570752812]

Abstract

A computer network is a collection of computers connected together to share resources located on the network nodes. In a computer network one of the important components is a router, which moves data packets between nodes and other network. In a router, the communication between routers are determined by routing protocols. This paper will discuss and compare the performance evaluation of two wireless routing protocols which are OSPF and RIP respectively. The main aim of this paper is to come up with a conclusion on which routing protocol is better based on the metrics obtained from NETSIM simulation. Moreover, it is also important to prove if the results obtained are accurate based on the previous research that have been done.

“Power Generation Voting Prediction Model of Floating Photovoltaic System”

Yusnita Yusof and Pei-Shan Choong (Asia Pacific University of Technology and Innovation, Malaysia) Ali Lari (Swansea University & Qatar Foundation, United Kingdom (Great Britain)); Augustine Egwebe (Supervisor, United Kingdom (Great Britain)); Farid Touati, Amith Khandakar and Antonio JR Gonzales (Qatar University, Qatar) [1570755632]

Abstract

Solar energy is the most promising renewable energy within the Gulf area as annual solar irradiance is among the highest in the world (>2000kWh/m²). Therefore, countries within the Gulf area have focused their energy investment on solar energy harvesting, especially Photovoltaics (PV). Photovoltaics (PV) power output is highly dependent on environmental conditions variability. Accurate PV generation power prediction models are essential to investigate the effects of varying environmental conditions and ensure solar power converters' optimum performance whilst meeting peak demand through various environmental conditions. The environmental data which is analysed and discussed in this paper includes air temperature, relative humidity, Photovoltaics (PV) surface temperature, irradiance, dust, wind speed, and output power. The model proposed in this paper optimises and trains three prediction algorithms, including Artificial Neural Network (ANN), Multi-Variate (MV), and Support Vector Machine (SVM). The model deploys three well-known prediction algorithms and voting algorithm to decide the optimum prediction of PV generation power. Furthermore, the voting algorithm shows high prediction accuracy of the output power given the environmental conditions. The Mean Square Error (MSE) for the Artificial Neural network (ANN), Multi-variate (MV), and Support Vector Machine

(SVM) are 98, 81, and 82, respectively. In comparison, Mean Squared Error (MSE) of the voting algorithm is significantly lower which is just above 53. The proposed PV power generation prediction algorithm shows reliable outcome with respect to the environmental conditions in Qatar. This tool is expected to assist in the design process of Photovoltaics (PV) plants design where energy generation is highly predictive using proposed voting algorithm.

“Content Based Image Retrieval Based on Feature Fusion and Support Vector Machine”

Ibtihal Hameed and Sadiq H. Abdulhussain (University of Baghdad, Iraq); Basheera M. Mahmmod (University of Baghdad, Iraq & College of Engineering, Iraq); Abir J Hussain (Liverpool John Moores University, United Kingdom (Great Britain)) [1570760757]

Abstract

Large number of image datasets have been generated with diverse functionality and applications. This is because of the development in communication technologies and affordable image acquisition devices. However, the generated image datasets require an efficient search engine to retrieve images that meet the needs of end-user. Content-Based Image Retrieval (CBIR) is an automatic mechanism to retrieve images from relevant class according to their visual content. In this paper, local and global features are combined to provide a powerful image descriptor. CBIR performance is measured through two major key factors which are: accuracy and retrieval time. The first one is related to the amount of retrieved images from the same semantic class while the latter is related to the speed of the search. There is a tradeoff between these two factors. In this regard, this paper proposes CBIR algorithm based on feature fusion and support vector machine (SVM). The feature are texture, shape, and color features. The statistical moments, mean and standard deviation are calculated after transforming the RGB channels to moments' domain through the use of SKTP to construct the color descriptor. Canny Edge Detection and LBP are utilized to construct edge and texture descriptors, respectively. WANG dataset is used to assess the performance of the proposed algorithms. The proposed algorithm focused on achieving an interesting accuracy level (90.15 %) through the use of SVM classifier. Thus, the proposed algorithm achieved its goal and outperformed existing algorithms.

“Object Detection and Distance Measurement Using AI”

Mustafa Faisal and Mohammad Mohammed (University of Baghdad, Iraq); Ali Muthanna Abduljabbar (University of Baghdad & Ta3leem Company, Iraq); Sadiq H. Abdulhussain (University of Baghdad, Iraq); Basheera M. Mahmmod (University of Baghdad, Iraq & College of Engineering, Iraq); Wasiq Khan and Abir J Hussain (Liverpool John Moores University, United Kingdom (Great Britain)) [1570760758]

Abstract

To control and manage traffics as well as guide the driver on roads, the lines on the roads are used. In addition, these lines serve as barriers and to ensure the safe, smooth and harmonious flow of traffic. However, in some countries, these lines are missed and causes the driving chaos; and thus, car accidents happen. A car accident is one of the most causes of death and the majority of the accident are due to human error. This research works aims to help driver to provide safety roads and reduces or eliminate care accidents. Object detection is a technique used to find and locate objects in images. In this works, YOLO Version 3 is the network used to detect the object in the frame because of its speed, simplicity, and ability to predict as well as classify objects. In addition, a steering angle circuit is designed and implemented to measure the direction of the car. The steering angle measurements is used with object detection (vehicles and pedestrians) to issue a warning when these objects are close to the driving car (10 meters). After the objects are detected using YOLO V3, the distance of the detected

objects is measured using the height of the object. While being affordable and low-cost, the system achieved positive and competitive results, this system can be used at night and in dark environments.

“Fuzzy Logic Progress to Predict of Mechanical Properties for Shotcrete Concrete Containing Waste Plastic”

Yousif Mansoor (University of Anbar & Engineering College, Iraq) [1570762631]

Abstract

This work aims to build fuzzy logic model depended on the experimental study. The lab work goal is to show the possibility of using waste plastic (Polyethylene Terephthalate (PET), that got by shredded PET bottles) as aggregate, which substituted part of natural aggregate in the manufacturing of the shotcrete concrete. For this purpose, an experimental study was carried out to evaluate the strength of the shotcrete concrete that contained waste plastic aggregate and were compared with reference shotcrete concrete without plastic aggregate. The natural aggregate is substituted with the PET-aggregate at percentage (0%, 1%, 2.5%, by volume of the fine aggregate) to produce shotcrete concrete mixes, in addition, using super plasticizer (SP), and silica fume (SF), as a partial replacement by weight of cement. Also fiber plastic used (0.5% by the total volume of mixture) as alternative for steel fiber in shotcrete mixture. To can achieve the ideas of research, the compressive and flexural tests apply for all samples. 72 total samples would test for research purpose. The research could be the first trying to study addition of waste plastic to shotcrete concrete and prediction of their effect by using fuzzy concepts. The results obtained from the fuzzy logic prediction model were not accurate compared with the average results of the experiments and were found to be remarkably not so close to one another. This result may be because not sufficient data. The result of flexure test shows when using a 2.5 % of plastic aggregate could increase flexure strength around 5.14 % at 28 days. While the compressive tests appear that it uses 0.5% of fiber plastic as alternative of steel fiber could increase the compressive strength around 5.11% at 7 days while the different mixture cause decreasing around (16.70% to 52.42%) at 7 days. The results indicate that the compressive strength decreases with the increase of PET-(aggregate) content compared to the reference shotcrete concrete approximately for all mixes, that the addition of waste plastics aggregate has a negative impact on the compressive strength of shotcrete concrete. The average error for the predicted mechanical properties (around all properties) in fresh and hardened concrete is 45%.

“Water Quality Monitoring System: A Smart City Application with IoT Innovation”

Kamalanathan Shanmugam (Asia Pacific University of Technology & Innovation (APU), Malaysia); Muhammad Ehsan Rana (Asia Pacific University of Technology & Innovation, Malaysia); Daniel Tan Zi Xuen and Sharveen Aruljodey (Asia Pacific University of Technology & Innovation (APU), Malaysia) [1570771476]

Abstract

In the current era of globalisation, water pollution has gradually worsened, and it has started to reach alarming heights. Water pollution has a severe impact on human health and the environment. The rationale of this research is to propose an affordable water quality monitoring system to save and conserve the quality of consumed water. Water conservation is among the most critical segments of a future smart city project that many countries strive to achieve. This research investigates Malaysia's current water pollution situation and reviews the existing policies that the government has already implemented to curb this issue. Furthermore, it provides an in-depth analysis of similar systems that other fellow researchers have presented. In this paper, the authors have proposed an enhanced water quality monitoring system by implementing an IoT based technological infrastructure suitable for a smart city project. The proposed approach provides a low-cost and power-saving alternative to commercially available systems.

“Crime Geo Analytics Tool”

Muhammad Hamza and Jan Lunn (Liverpool John Moores University, United Kingdom (Great Britain)); Wael N Aljumaili (University of mosul, Iraq); Jamila Mustafina (Kazan Federal University, Russia) [1570775034]

Abstract

This paper presents an online crime analytics (Crime Geo Analytics Tool). The purpose is to facilitate the use of information technology to enable the general public to access data regarding crime in a geographical location, both online and interactively. Crime Geo Analytics Tool is a web-based system that informs stakeholders about criminal offence rates. To the best of our knowledge, there is no such online system in Pakistan, which helps people to get crime statistics, visualizations, and report on crimes. The system can also perform predictions and suggestions for users.

SESSION B4 eSystem Engineering (Main Track)

“Modelling of Electrochemical Removal of Nitrate from Water”

Saif Alquzweeni and Haifaa Mubarak (University of Babylon) [1570777254]

Abstract

Modeling of experimental data provides many advantages for the industry, such as eliminating the need for repeating experiments that saves time, cost and resources. In this context, the current preliminary study focuses on modelling the impacts of the inter-electrodes distance (I-ED) (4 to 10 mm) and treatment time (5-25 minutes) on removing nitrate using an electrocoagulation (EC) reactor. Response Surface Methodology -Central Composite Design method was used in the modelling process. The pH of water, current density, and initial nitrate concentration were kept constant at 9, 2 mA/cm² and 100 mg/l, respectively. The results showed the best removal of nitrate was 50.95% at I-ED of 4 mm after 25 minutes. High agreement was noticed between experimental and predicted removals ($R^2 = 0.9508$).

“RSM (Response Surface Methodology) Modelling of Inter-Electrodes Spacing Effects on Phosphate Removal”

Khalid Hashim and Ibijoke Idowu (Liverpool John Moores University, UK) [1570777259]

Abstract

RSM modelling has been applied in this study to understand the effects on inter-electrodes on the performance of the electr-chemical reactors in the removal of pollutants. RSM has been selected because it has the ability to predict the effects of more than one paramtere on the targeted variable. Thus, the RSM has been used in this article to model the effects of inter-electrodes spaces (IES) (4 to 10 mm) and treatment time (TT) (5-55 min) on the ability of the electrocoagulation (EC) cells to remove phosphate from water. The results showed the best removal of phosphate was 92.5% at I-ES of 4 mm and TT of 50 min. High agreement was noticed between experimental and predicted removals ($R^2 = 0.984$).

“Rfid Indoor Localization Based on Received Signal Strength”

Hamsa Mohammed Ahmed and Ahmed Noori Rashid (University of Anbar) [1570778848]

Abstract

Study on positioning indoors has been one of the most well-studied topics in recent years. Localization approaches using RSS are attestable for collecting position information since they can reuse the current wireless infrastructure for localization. This paper introduces an indoor location device with 2.4 GHz RFID Reader signals based on RFID technology in a wide-area network for indoor localization. These techniques are compared when using IoT devices in terms of position accuracy and power consumption. Modality values have been used, and trilateration has been performed by the obtained signal strength indicator (RSSI). The data collection can be accessed online. In the selection of wireless technology for an indoor localization system following application criteria, the experimental results can be used as an indicator.

“Stacked Machine Learning Model for Predicting Alzheimer's Disease Based on Genetic Data”

Abbas Saad Alatrany, Abir J Hussain, Jamila Mustafina and Dhiya Al-Jumeily (Liverpool John Moores University, UK) [1570778849]

Abstract

Alzheimer's disease is one of the brain disorders. It's also characterized as a degenerative disease because it becomes worse over time. Apolipoprotein E (APOE) is a genetic risk factor for Alzheimer's disease that has been linked to the disease in several genome-wide association studies (GWAS). Single nucleotide polymorphisms are the most common type of genetic variation among individuals (SNPs). SNPs have been identified as important biomarkers for this condition. SNPs aid in the study and detection of the disease in its early stages. We focus on employing a stacked Machine Learning (ML) model to categories Alzheimer's patients in this paper. The model was tested on all AD genetic data from phase 1 of the neuroimaging project (ADNI-1). The results showed that the stacked model outperformed other machine learning methods with an overall accuracy of 93.7 percent. The findings suggest that stacking approaches are effective in detecting Alzheimer's disease.

“Legal Regulation of Crowdfunding”

Natalia Yushchenko (Kazan Federal University, Russia), Rustem Magizov (Kazan Federal University, Russia) and Tara McKeown (Liverpool John Moores University, UK) [1570778932]

Abstract

There are many examples of financing the projects at the expense of raising funds from a large number of people. With the development of the Internet and social networks, the form of crowdfunding has gained rapid development. The limitless possibilities of the Internet make it possible to seek financial support from a large number of people and often completely for free. Typically, shares or bonds are issued to fund large companies or projects, but this is not possible for smaller projects, usually with no financial benefit. Therefore, more and more individuals, creative companies and entrepreneurs resort to crowdfunding every year. Crowdfunding has been known to the Russian practice for several years. However, the concept of this phenomenon has not yet been defined in the legislation. In jurisprudence, there are only single examples of disputes between participants of crowdfunding projects. Every year all over the world crowdfunding raises on average \$30 - 50 billion. Until 2017 in Russia, the crowdfunding market had a fairly modest size. Since the cryptocurrency hype 2017 - 2018

resulted in fundraising for thousands of projects via ICO (initial coin offering) there was a need for regulatory framework for this area. January 1, 2020, the Act on crowdfunding has entered into force, marking a new era of the Russian investment market, legalizing the forms of investment that have emerged in recent years.

“Reliable Photovoltaics Output Power Prediction in Qatar”

Ali Lari, Augustine Egwebe, Farid Touati, Amit Khandakar, Antonio JR Gonzales (University of Qatar)
[1570755632

Abstract

Renewable energy is gradually becoming the most promising type of power generation that could replace fossil fuels in the future. One of the most widely used form of renewable energy is solar/PV energy. To examine the impacts of different climatic circumstances and maintain solar power converters' optimal performance while meeting peak demand via diverse environmental conditions, accurate PV generating power prediction models are required. Air temperature, relative humidity, Photovoltaics (PV) surface temperature, irradiance, dust, wind speed, and output power are among the environmental parameters examined and addressed in this study. The model suggested in this study optimises and trains three prediction algorithms: the Artificial Neural Network (ANN), the Multi-Variate (MV), and the Support Vector Machine (SVM). To choose the best PV generating power forecast, the model uses three well-known prediction algorithms plus a voting method. Furthermore, given the environmental circumstances, the voting system predicts the output power with great accuracy. The MSE for Artificial Neural Network (ANN), Multi-variate (MV), and Support Vector Machine (SVM) is 98, 81, and 82, respectively. In comparison, the voting algorithm's Mean Squared Error (MSE) is only slightly higher than 53. With respect to the environmental circumstances in Qatar, the suggested PV power generation forecast algorithm produces trustworthy results. The suggested voting algorithm is anticipated to aid in the design process of photovoltaic (PV) facilities when energy output is very predictable.