



27-28  
December  
**2023**

# IRICT 2023

## ABSTRACT BOOK

The 7th International Conference of Reliable  
Information and Communication Technology 2023  
(IRICT 2023)

Organised By:



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

In Collaboration with:



Pulai Springs Resort, Johor Bahru , Malaysia



**The 7<sup>th</sup> International Conference of  
Reliable Information and Communication  
Technology (IRICT 2023)**

**27<sup>th</sup>–28<sup>th</sup> December 2023**

**(Hybrid Conference)**

***“Advances in Intelligent Computing  
Techniques and Applications”***

**Editors:**

Faisal Saeed  
Fathey Mohammed  
Ahlam Al-Dhamari

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## Messages

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### CONFERENCE HONORARY CHAIR MESSAGE

It is an honor and a great pleasure to welcome all attendees of the 7th International Conference of Reliable Information and Communication Technology 2023 (IRICT 2023). We are happy to have this great collaboration, for the seventh time, with the conference co-organizers. The conference shares an insight into the recent research and cutting-edge technologies of intelligent computing and informatics, which gains a great interest of young and brilliant scholars, business delegates and talented research communities.



The theme of IRICT 2019 conference, "Advances in Intelligent Computing Techniques and Applications," is closely aligned with our research interest in UTM Big Data Center that aims to exploit the advantages of intelligent computing and data analytics to enhance decision-making, optimize resource utilization, and derive meaningful insights from vast and complex datasets in various domains.

Finally, I would like to express my sincere appreciation to the keynote speakers and all participants of IRICT 2023 conference for sharing your research contributions with us. Many thanks to the organizing and technical committee members; this conference would not have this great success without your valuable efforts.

I hope you are enjoying the conference and your stay in Pulau Springs Resort, Malaysia.

**Prof. Dr. Naomie Salim**  
**IRICT 2023 Honorary Chair**  
**Director, UTM Big Data Center**  
**Universiti Teknologi Malaysia**



## Messages

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### **CONFERENCE GENERAL CO CHAIR MESSAGE**

I am pleased to welcome you to the 5th International Conference of Reliable Information and Communication Technology 2020 (IRICT 2020) that is held in Pulau Springs Resort, Johor Bahru on December 27-28, 2023. IRICT 2023 is organised by the Yemeni Scientists Research Group (YSRG) and Big Data Center in Universiti Teknologi Malaysia (Malaysia) in collaboration with Association for Information Systems – Malaysia Chapter (MyAIS) and College of Engineering, IT and Environment at Charles Darwin University (Australia).

We are happy that 99 papers have been submitted by researchers from 23 countries including: Algeria, Egypt, Finland, India, Indonesia, Iran, Iraq, Jordan, Malaysia, New Zealand, Nigeria, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Sri Lanka, Sudan, Tunisia, Turkey, United Kingdom, United States, Yemen. Of those submissions, only 56 papers have been selected to be included in this book. All submissions underwent a rigorous double-blind peer-review process. The conference proceedings will be published in Springer Book Series: “Lecture Notes on Data Engineering and Communications Technologies“, which is indexed by SCOPUS, INSPEC, EI Compendex”. The IRICT 2023 program involves five keynote speeches and two parallel sessions during the two days of the conference.

I would like to thank all authors for the participation in IRICT 2023. Many thanks go to our keynote speakers for sharing their knowledge and experience with us. A special thanks to our teams in organizing and technical committees for the great efforts to make this conference a huge success !

I hope you are enjoying the conference this year at Pulau Springs Resort and I wish you every success in your research.

**Assoc. Prof. Dr. Noorminshah Iahad**  
**IRICT 2023 General Co-Chair**  
**President, Association for Information Systems – Malaysian Chapter**

## Messages

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### CONFERENCE GENERAL CO CHAIR MESSAGE

I am pleased to welcome all of you to the 7<sup>th</sup> International Conference of Reliable Information and Communication Technology 2023 (IRICT 2023) that is held on 27-28, December 2023.



The conference book includes 56 papers that discuss several research topics such as health informatics, artificial intelligence, machine learning, data mining, big data, business intelligence, internet of things, communication systems, Information Security and information Systems. These papers will be presented in two parallel sessions during the two days.

I would like to thank all authors who contributed significantly to this event, and to thank our keynote speakers, Prof. Richard Smith, Prof. Okfalisa, Prof. Wadii Boulila, Prof. Mamoun Alazab and Prof. Abdulqader Mohsen for sharing their knowledge and expertise with us. A special thanks for the organizing and technical committee members for their great efforts in ensuring the successful implementation of the conference. In particular, I would like to thank Dr. Fathey Mohammed, Program and Publication Committee Chair; Dr. Sameer Albakri, Registration Committee Chair; Dr. Nadhmi Gazem, General Secretary; Dr. Tawfik Al-Hadrami, Technical Committee Co-Chair; Abdullah Dahawi, Finance Committee Chair and all other members. I am very happy and proud to work with a great team like you.

Finally, I hope you enjoy attending IRICT 2023 conference from home and I hope you are staying healthy and safe.

**Dr. Faisal Saeed**  
**IRICT 2023 General Co-Chair**

## Messages

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### CONFERENCE PROGRAM CHAIR MESSAGE

It is an honor and a great to welcome you to the 7<sup>th</sup> International Conference of Reliable Information and Communication Technology (IRICT 2023). 56 abstracts of the papers scheduled to be presented online on 27-28, December 2023 are included in this book. The full papers are included in IRICT 2023 Proceedings which is submitted to Springer to be published in “Lecture Notes on Data Engineering and Communications Technologies” Book Series.

I would like to thank all authors for submitting their research works to IRICT 2023 and for presenting their papers during the conference days. I also would like to express my gratitude to the external reviewers for providing constructive and valuable suggestions for the authors to improve the quality of the papers.

Also, I would like to take this opportunity to express my utmost gratitude and sincere thanks and appreciation to all organizing committee members, this conference would not have this great success without your valuable efforts.

I also would like to extend our thanks and appreciation to all who participated, attended and supported this conference and make it a reality.

Finally, I hope that all guests, participants, and attendees have a great time at IRICT 2023. The success of this conference will inspire us more in future.

**Dr. Fathey Mohammed,  
IRICT 2023 Program Chair**

## Keynote Speakers

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### *Keynote Speaker I:*

#### **Professor Richard Smith**

Director of the Cyber Technology Institute  
Associate Professor of Cyber Security  
De Montfort University, United Kingdom



#### **Keynote title:**

*“Pro-Active Cyber Security for  
Operational Technology”*

#### **Brief Profile**

Dr Smith is the head of the Cyber Technology Institute research group at De Montfort University. As a member of the Research Institute for Trustworthy Inter-Connected cyber-physical Systems and the NCSC Industrial Control Systems Community of Interest he is investigating new ways to defend old technology, with a particular focus on Critical National Infrastructure. He is an experienced researcher particularly in the area of incident response, developing an Agile framework for Incident Response in Industrial Control Systems to allow organisations to migrate from a reactive to proactive approach in responding to incidents. His work has also centred around the develop of simulated cyber warfare scenarios around Industrial Control Systems to aid in the training and development of new tactics for both industry and government personnel through both DMU’s Cyber Range CYRAN and SCIPS Simulated Critical Infrastructure Scenarios. He has significant experience working with industry and has lead international consortia on projects for the European Space Agency, NCSC and more.

## Keynote Speakers

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### ***Keynote Speaker II: Professor Okfalisa***



Informatics Engineering Department,  
Faculty Science and Technology  
Universitas Islam Negeri Sultan Syarif  
Kasim Riau, Indonesia

**Keynote title: “*Integrated  
Decision Making on Business  
Intelligence as A Future Smart  
Management Analytical*”.**

#### **Brief Profile**

Prof. Dr Okfalisa, ST, MSc. completed her PhD in Information System and Computer Science at Universiti Teknologi Malaysia in 2012. Her research interests are performance measurement, strategy execution, management information system, knowledge management, knowledge management system, decision support system, data science, machine learning, and data mining. She was once involved in several research projects and publications, national (cooperation with UIN Jakarta; UIN Bandung; UIN Malang; UGM) and international (cooperation with Universiti Teknologi Malaysia Johor Bahru Malaysia; Price of Songkla University-Hat Yai; Universiti Teknologi MARA-Perlis, Malaysia; International Islamic University Malaysia (IIUM)-Kuala Lumpur, Malaysia, University De Haute-Alsace-France; Ostbayerische Technische Hochschule Amberg-Weiden (OTH-AW)-German; University of Antwerp-Belgium; and Sheffield Hallam University) under grant from UIN Suska Riau, Indonesia Islamic Higher Education Minister, and Bank Indonesia. She reviewed several local and international journals and conferences and invited speakers in many occasions. She was awarded two silvers and one bronze medal during the paper presentation and exhibition at the 2nd International Indonesia, Malaysia, and Thailand Symposium on Innovation and Creativity 2018. Currently, she is a professor in the informatics Engineering Department in UIN Suska Riau, and she is a life member of the Association Higher Education Informatics and Computers (Aptikom) and the Institute of Electrical and Electronics Engineers (IEEE).

## Keynote Speakers

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### *Keynote Speaker III:*

#### **Professor Wadii Boulila**

Prince Sultan University, Saudi Arabia

#### **Keynote title:**

***“Minimal Data, Maximum Results:  
Unlocking the Potentials of Few-  
Shot Learning”***



#### **Brief Profile**

Wadii Boulila received the B.Eng. degree (1st Class Honours with distinction) in computer science from the Aviation School of Borj El Amri, in 2005, the MSc. degree in computer science from the National School of Computer Science (ENSI), University of Manouba, Tunisia, in 2007, and the Ph.D. degree in computer science conjointly from the ENSI and Telecom-Bretagne, University of Rennes 1, France, in 2012. He is currently an associate professor of computer science with Prince Sultan University, Saudi Arabia. He is also a senior researcher with the RIOTU Laboratory, Prince Sultan University, Saudi Arabia, a senior researcher with RIADI Laboratory, University of Manouba, and previously a Senior Research Fellow with the ITI Department, University of Rennes 1, France. Wadii received the award of the young researcher in computer science in Tunisia for the year 2021 from Beit El-Hikma and the award of best researcher from the University of Manouba in Tunisia for the year 2021. He participated in many research and industrial-funded projects. His primary research interests include data science, big data analytics, deep learning, cybersecurity, artificial intelligence, uncertainty modeling, and image analysis and interpretation. He has served as the chair, a reviewer, and a TPC member for many leading international conferences and journals. His work has gained global recognition, and he has been nominated as one of the top 2% of scientists in his field by Stanford University. Wadii Boulila is an IEEE Senior member, an ACM member, and a Senior Fellow of the Higher Education Academy (SFHEA), U.K.

## Keynote Speakers

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### *Keynote Speaker IV:*

#### **Professor Mamoun Alazab**

Discipline Chair, Information Technology, Director, NT Academic Centre for Cyber Security and Innovation (ACCI), Faculty of Science and Technology, Charles Darwin University, NT 0810, Australia

**Keynote title:** *“Cyber Security: Trends and Future Directions”*

#### **Brief Profile**

Professor Mamoun Alazab is a full Professor at the Faculty of Science and Technology, at Charles Darwin University (CDU), Australia. He is inaugural director of the NT Academic Centre for Cyber Security and Innovation (ACCI) at CDU. Currently, he is the Discipline Chair for Information Technology at CDU. He is the Founding Chair of the IEEE Northern Territory (NT) Subsection. He is a cyber security researcher and practitioner with industry and academic experience. His research is multidisciplinary and focuses on cyber security, data analytics and digital forensics with a focus on cybercrime detection and prevention. He looks at the intersection use of AI as an essential tool for security and privacy, for example, authorship attribution, access control systems, detecting attacks, crime investigation, analyzing malicious code, or uncovering vulnerabilities in software. He received several awards including: the NT Young Tall Poppy of the year (2021) from the Australian Institute of Policy and Science (AIPS), it recognises his excellence in research as well as enthusiasm for communicating science beyond the walls of the laboratory. Japan Society for the Promotion of Science (JSPS) fellowship (2015) through his nomination from the Australian Academy of Science, IEEE Outstanding Leadership Award (2020) and (2021), the CDU Exceptional Researcher Award in (2020) and (2021). He ranked in the top 1% highly cited researchers and 0.1% influential researchers in the Clarivate Highly Cited Researcher list for 2022. Mamoun has written government publications on cybercrime. He devoted considerable time to communicating his research with members of the public, technical, non- technical and policymakers through publications in non-academic outlets. He has served as the program committee member in many national and international conferences. This year, he co-organised the “Tackling Disruptive Technology in the Era of Digital Transformation” conference that took part in Seoul, South Korea in April. He has published more than 300 research papers in journals and conference proceedings.

## Keynote Speakers

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### *Keynote Speaker V:*

#### **Professor Abdulqader M. Mohsen**

University of Aden (UA), Aden, Yemen

#### **Keynote title:**

*“Healthcare Revolution: AI’s Role in Personalized Medicine and Disease Prevention”*



#### **Brief Profile**

He has a Ph.D. in Computer Sciences, from the School of computer sciences, Universiti Sains Malaysia (USM), Penang, Malaysia, February 2011. M.Sc. in Computer Sciences, Department of Computer Science, Faculty of Science and Engineering, University of Science and Technology (UST), Sana’a, Yemen, 2006. B.Sc. in Computer Sciences, Department of Computer Science, Faculty of Science and Engineering, University of Science and Technology, Sana’a, Yemen, 1999.

In April 2011, he joined the Computer Science Department, UST, as a full-time Assistant Prof. He is currently the Dean of the Arab Academy for Banking, Financial and Administration Sciences, Yemen Since 2021 until the date. He is also an Associate Professor of Computer Science at University of Aden, Yemen.

Previously, he was the dean of the Faculty of Computing & IT, UST, Yemen, from 2013 to 2021. He was the Head of the Computer Science Department, UST, Yemen, from 9/2011 to 12/2012. In addition, he was a part-time Assistant Professor at the Arab Academy for Banking and Financial Sciences (AABFS) and University Malaysia (OUM), Yemen from 1/2012 to date. Currently, he is a member of the Steering Committee of the ACIT conference and an editorial board member of many journals and conferences. He has published about 40 journals and conferences and papers. He was the main supervisor on more than 10 master theses and a co-supervisor on 4 Ph.D. students. His research and teaching interests and activities are in the areas of Artificial Intelligence (Computational Intelligence), Optimization, Bioinformatics, Data Mining, approximate (metaheuristic Algorithms), and Information Systems. In addition, he is an IEEE senior member and the chair and one of the founders of the IEEE Yemen Subsection.



## Conference Program

**! Note: All times are in GMT time**

Day 1: Wednesday 27th December, 2023		
Time :	8:30 am – 5:00 pm	
Zoom link :	IRICT2023 First Day_ ZOOM Meeting Link	
Main Room: Maharaja Suite		
8:30 am - 9:00 am	Registration	
9:00 am - 9:05 am	Arrival of guests	
9:05 am - 9:10 am	Doa'a Recitation	
9:10 am - 9: 20 am	Welcoming speech by <b>Dr. Faisal Saeed</b> , the IRICT2023 General Co Chair	
9:20 am – 9:30 am	Speech and officially opening IRICT2023 by <b>Assoc. Prof Dr. Noorminshah</b> , the IRICT2023 General Co Chair	
9:30 am– 10:10 am	<b>Keynote Speech 1 by: Professor Okfalisa</b> Universiti Islam Negeri Sultan Syarif Kasim Riau, Indonesia <b>Title:</b> <i>“Integrated Decision Making on Business Intelligence as A Future Smart Management Analytical”</i>	
10:10am - 11:00am	Break	
11:00am – 1:00 pm	Session 1	
	Main Room: Maharaja Suite (AI)	
	8 papers	
1:00 pm – 2:00 pm	Lunch Break	
Main Room: Maharaja Suite		
2:00 pm – 2:40 pm	Keynote Speech 2 by: Professor Wadii Boulila Prince Sultan University, Saudi Arabia <b>Title:</b> <i>“Minimal Data, Maximum Results: Unlocking the Potentials of Few-Shot Learning”</i>	
2:40 pm – 3:20 pm	Keynote Speech 3 by: Professor Abdulqader M. Mohsen University of Aden (UA), Aden, Yemen <b>Title:</b> <i>“Healthcare Revolution: AI’s Role in Personalized Medicine and Disease Prevention”</i>	
3:20 pm – 5:00 pm	Parallel Session 2 (Online)	
	Maharaja Suite (AI & Data Science)	Maharani Suite (AI & Data Science)
	7 papers	7 papers

## Conference Program

Day 2: Thursday 28 <sup>th</sup> December, 2023		
Time :	8:30 am – 5:00 pm	
Zoom link :	IRICT2023 Second Day- Zoom Meeting Link	
Main Room: Maharaja Suite		
9:00 am – 9:30 am	Keynote Speech 4 by: Professor Mamoun Alazab Charles Darwin University, Australia Title: <i>“Cyber Security: Trends and Future Directions”</i>	
9:30 am – 10:00am	Keynote Speech 5 by: Professor Richard Smith De Montfort University, United Kingdom Title: <i>“Pro-Active Cyber Security for Operational Technology”</i>	
10:00am – 11:00am	Session 1	
	Maharaja Suite (IoT + AI)	
	4 papers	
11:00am- 11:15am	Break	
11:15 am – 1:00 pm	Parallel Session 2 (Online)	
	Maharaja Suite (Security & AI)	Maharani Suite (IS)
	7 papers	7 papers
1:00 pm – 2:00 pm	Lunch Break	
2:00 pm – 4:15 pm	Parallel Session 3 (Online)	
	Maharaja Suite (AI & Data Science)	Maharani Suite (AI)
	9 papers	8 papers
4:15 pm - 4:30 pm	Closing ceremony	

## Sessions Schedule

Day 1: Wednesday, 27 <sup>th</sup> December, 2023	
<b>Note: All times are in Malaysia time (GMT+8)</b>	
<b>Time</b>	: 8:30 am – 5:00 pm
<b>Zoom link</b>	: IRICT2023 First Day_ ZOOM Meeting Link
<b>Main Room: Maharaja Suite</b>	
9:30 am– 10:10 am	<p><i>Keynote Speech 1</i> by: <b>Professor Okfalisa</b> Universiti Islam Negeri Sultan Syarif Kasim Riau, Indonesia</p> <p><i>Title: “Integrated Decision Making on Business Intelligence as A Future Smart Management Analytical”</i></p>
10:10 am-11:00 am	<b>Break</b>
<b>Session I</b>	
<b>Main Room: Maharaja Suite (AI)</b>	
11:00 am– 11:15 am	<p><b>Improving Prediction of Bursa Malaysia Stock Index using Time Series and Deep Learning Hybrid Model</b> Abang Mohammad Hudzaifah Abang Shakawi and Ani Shabri</p>
11:15 am– 11:30 am	<p><b>Current Challenges of Big Data Quality Management in Big Data Governance: A Literature Review</b> Yunusa Adamu Bena, Roliana Ibrahim and Jamilah Mahmood</p>
11:30 am - 11:45 am	<p><b>Exploring Instructors’ Practices: Data-Driven Evaluation and Insights via LMS</b> Hanan Aldowah, Irfan Naufal Umar, Samar Ghazal, and Amira Saif</p>
11:45 am- 12:00 pm	<p><b>Learning Rate Schedules and Optimizers, A Game Changer for Deep Neural Networks</b> Olanrewaju V. Johnson, Chew XinYing, Olabisi E. Johnson, Khai W. Khaw and Ming H. Lee</p>

## Sessions Schedule

<b>12:00 pm- 12:15 pm</b>	<b>Facial Wash Products Recommendation System: Profile User-Based Using Fuzzy Analytical Hierarchy Process Approach</b> Okfalisa, Giska Dwi Kasmadani, Pizaini, Iwan Iskandar, Rizka Hafsari, Saktioto
<b>12:15 pm–12:30 pm</b>	<b>Employee Mental Workload Classification in Industrial Workplaces: A Machine Learning Approach</b> Ayesha Hussain, Pantea Keikhosrokiani, Moussa Pourya Asl
<b>12:30 pm- 12:45 pm</b>	<b>A Conceptual Framework for Malay-English Code-Switched Neural Machine Translation</b> Yit Khee Wong and Sharin Hazlin Huspi
<b>12:45 pm - 1:00 pm</b>	<b>Android Malware Detection using Machine Learning Technique</b> Nor A'Fifah Sabri, Shakiroh Khamis and Zanariah Zainudin
<b>1:00 pm – 2:00 pm</b>	Lunch Break
<b>Main Room: Maharaja Suite</b>	
<b>2:00 pm – 2:40 pm</b>	<b>Keynote Speech 2 by: Professor Wadii Boulila</b> Prince Sultan University, Saudi Arabia <i>Title: “Minimal Data, Maximum Results: Unlocking the Potentials of Few-Shot Learning”</i>
<b>2:40 pm – 3:20 pm</b>	<b>Keynote Speech 3 by: Professor Abdulqader M. Mohsen</b> University of Aden (UA), Aden, Yemen <i>Title: “Healthcare Revolution: AI's Role in Personalized Medicine and Disease Prevention”</i>

## Sessions Schedule

Parallel Session II	
Main Room: Maharaja Suite (AI & Data Science)	
3:20 pm - 3:35 pm	<p><b>Quality Criteria Conflict: The Perspective of Health Specialists and Caregivers in Arab Countries</b> Yousef Baqraf and Pantea Keikhosrokiani</p>
3:35 pm - 3:50 pm	<p><b>Leveraging ICT Technologies in the Battle Against COVID-19: A Review for applications, Challenges, and Solutions</b> Abdulaziz Aborujilah, Samir Hammami, and Kabir Hasibul</p>
3:50 pm – 4:05 pm	<p><b>Predicting Customer Revenue in E-commerce using Machine Learning a Case Study of the Google Merchandise Store</b> Basem S. Abunasser and Samy S. Abu-Naser</p>
4:05 pm - 4:20 pm	<p><b>Multi-Modal MRI-Based Classification of Brain Tumors. A Comprehensive Analysis of 17 Distinct Classes</b> Ashraf M. H. Taha, Syaiba Balqish Binti Ariffin and Samy S. Abu-Naser</p>
4:20 pm – 4:35 pm	<p><b>Integrating K-Means Clustering and Levenshtein Distance and K-Nearest Neighbor Algorithms for Enhanced Arabic Sentiment Analysis</b> Ghaleb Al-Gaphari, Salah Alhagree and Hamzah A Alsayadi</p>
4:35 pm – 4:50 pm	<p><b>A Novel Fractional ARIMA Model with Genetic Algorithm and Its Applications in Forecasting the Electricity Consumption Demand</b> Ani Shabri, Wad Ghaban, Nadhmi A. Gazem</p>

## Sessions Schedule

4:50 pm – 5:05 pm	<p><b>A Novel Fractional Accumulative Grey multivariable regression model with GA Optimizer for Forecasting Short-Term CO2 Emissions in Malaysia</b></p> <p>Ani Shabri, Ruhaidah Samsudin, Wad Ghaban, Nadhmi A. Gazem</p>
<b>Maharani Suite (AI &amp; Data Science)</b>	
3:20 pm - 3:35 pm	<p><b>Deciphering Gene Patterns through Gene Selection using SARS-CoV Micro-array Data</b></p> <p>Shamini Raja Kumaran, Jiang Runhua, He Enhao, Ding Daorui, Chen Yanhao, Hong Chang, Bi Xiaoyang, Valarmathie Gopalan, Shaidah Jusoh</p>
3:35 pm - 3:50 pm	<p><b>Investigating the Impact of Utilizing the ChatGPT for Arabic Sentiment Analysis</b></p> <p>Ghaleb Al-Gaphari, Salah AL-Hagree, and Baligh Al-Helali</p>
3:50 pm – 4:05 pm	<p><b>DAE-DBN: An Effective Lung Cancer Detection Model Based on Hybrid Deep Learning Approaches</b></p> <p>Salam Abdulzahra Schnawa, Mahnaz Rafie, Mustafa Sabah Taha</p>
4:05 pm - 4:20 pm	<p><b>Fourier Residual Modified Approach in Group Method of Data Handling for Electricity Load Forecasting</b></p> <p>Nur Rafiqah Abdul Razif and Ani Shabri</p>
4:20 pm – 4:35 pm	<p><b>Review of 3D Reconstruction on Mobile Devices based on Evaluation Methods</b></p> <p>Muhammad Anwar Ahmad and Norhaida Mohd Suaib and Ajune Wanis Ismail</p>
4:35 pm – 4:50 pm	<p><b>The Patented Technology Innovation Portfolio on 4D Printer Using Theory of Inventive Problem Solving</b></p> <p>Muhammad Saqib Iqbal and Zulhasni Abdul Rahi</p>
4:50 pm – 5:05 pm	<p><b>Detection User Needs: LDA-Based Analysis of Arabic Reviews for Governmental Mobile Applications</b></p> <p>Maha Alshamani and Mohammed Alsarem</p>

## Sessions Schedule

Day 2: Thursday, 28 <sup>th</sup> December, 2023	
<b>Note: All times are in Malaysia time (GMT+8)</b>	
<b>Time</b>	: 9:00 am – 5:00 pm
<b>Zoom link</b>	: IRICT2023 Second Day- Zoom Meeting Link
Main Room: Maharaja Suite	
9:00 am – 9:30 am	<b>Keynote Speech 4 by: Professor Mamoun Alazab</b> Charles Darwin University, Australia <b>Title:</b> “ <i>Cyber Security: Trends and Future Directions</i> ”
9:30 am – 10:00 am	<b>Keynote Speech 3 by: Professor Richard Smith</b> De Montfort University, United Kingdom <b>Title:</b> “ <i>Pro-Active Cyber Security for Operational Technology</i> ”
Session I	
Main Room: Maharaja Suite (IoT + AI)	
10:00 am - 10:15 am	<b>A review of IoT Applications in Smart Environments: From Smart Cities to Military Integration</b> Abdulaziz Alashbi, Abdul Hakim Mohamed, Ibraheem Shayea, Ayman A. El-Saleh, and Abdul Ahad
10:15 am - 10:30 am	<b>Mobile Device Influence on SDN Controller Performance in IoT-Managed Software-Defined Wireless Networks</b> Babangida Isyaku, Kamalrulnizam Abu Bakar, Saidu Abdulrahman, Muham-mad Nura Yusuf, Farkhana Binti Muchtar , and Fuad A Ghaleb
10:30 am - 10:45 am	<b>Role of Attitude, Norm and Behaviour Control Among Young Voters in Social Media Toward Political Engagement</b> Norman Sapar, and Ab Razak Che Hussin

## Sessions Schedule

10:45 am – 11:00 am	<b>Revolutionizing Airline Customer Satisfaction Analysis with Machine Learning Techniques</b> Ashraf Osman Ibrahim, Chiew Cheng Yi, Abubakar Elsafi and Fuad A. Ghaleb
11:00 am – 11:15 am	Break
<b>Parallel Session 2</b>	
<b>Main Room: Maharaja Suite (Security &amp; AI)</b>	
11:15 am - 11:30 am	<b>Hybrid SPECK Encryption Algorithm for Internet of Thing (IoT)</b> Rusul H. Altaie and Haider K. Hoomod
11:30 am - 11:45 am	<b>Hybrid PRESENT Encryption Algorithm for Internet of Things (IoT)</b> Rusul H. Altaie and Haider K. Hoomod
11:45 am– 12:00 pm	<b>Lattice-Based Cryptography for Internet-of-Things in Post-Quantum Computing</b> Levi Palmer, Yousef Fazea
12:00 pm– 12:15 pm	<b>Securing Data in IoT-RFID Based Systems Using Lightweight Cryptography Algorithm</b> Ruah Mouad Alyas AL-Azzawi and Sufyan Salim Mahmood AL-Dabbagh
12:15 pm - 12:30 pm	<b>Feedback Generation for Automatic Programming Assessment Utilizing AI Techniques: An Initial Analysis of Systematic Mapping Studies</b> Maytham. A. Ali, Rohaida Romli, and Emad I. Abdul Kareem
12:30 pm - 12:45 pm	<b>Forecasting Electricity Consumption Using a Data Grouping Method Based on the Grey Model in Malaysia</b> Zahrah Fayeز Althobaiti and Ani Shabri
12:45 pm – 1:00 pm	<b>Indicators of the Exploratory and Confirmatory Factor Analysis of the Technology Readiness Index (TRI)</b> Qasim Alajmi and Ibrahim AL-Wahaibi



## Sessions Schedule

Maharani Suite (IS)	
<b>11:15 am - 11:30 am</b>	<p><b>The Review of Patent Literature and Analytics of Robo-physic System Evolution Using Theory of Inventive Problem Solving (TRIZ)</b></p> <p>Zulhasni Abdul Rahim and Muhammad Saqib Iqbal</p>
<b>11:30 am - 11:45 am</b>	<p><b>The Problem-Based Learning Revolution: A Systematic Review Exploring its Effect on Student Achievement and Self-Regulated Learning</b></p> <p>Amira Saif, Irfan Naufal Umar, Samar Ghazal, and Hanan Aldowah</p>
<b>11:45 am– 12:00 pm</b>	<p><b>Assessing the Prioritization of Key Influencing Factors for Industrial IoT Readiness in SMEs</b></p> <p>Sajid Shah, Syed Hamid Hussain Madni, Siti Zaitoon Bt. Mohd Hashim, Javed Ali, Muhammad Faheem and Nor Azizah Ali</p>
<b>12:00 pm– 12:15 pm</b>	<p><b>Analyzing Learning Analytics in a Knowledge Forum: Examining Patterns of Interaction in Computer-Supported Collaborative Learning</b></p> <p>Samar Ghazal, Irfan Naufal Umar, Hanan Aldowah, and Amira Saif</p>
<b>12:15 pm - 12:30 pm</b>	<p><b>Overview of Cybersecurity Trends in Jordan's Financial Sector</b></p> <p>Yaser Ahmad Arabyat, Abdulsalam Alarabeyyat, and Murad Abuaddous</p>
<b>12:30 pm - 12:45 pm</b>	<p><b>The Era of Industry 5.0: An Overview of Technologies, Applications, and Challenges</b></p> <p>Mahmood A. Bazel, Fathey Mohammed, Abdullah O. Baarimah, Gamal Alawi, Al-Baraa Abdulrahman Al-Mekhlafi and Basheer Almuhaaya</p>
<b>12:45 pm – 1:00 pm</b>	<p><b>Comparative Analysis to Develop a Dimensionality Reduction Model for Classifying Intrusion Detection Systems</b></p> <p>Tolulope Olushola Olufemi, Oluwatolani Achimugu, Suleiman Abu Usman, Theophilus Aniemeka Enem, Philip Achimugu, Chinonyelum Vivian Nwufoh and Rid-wan Kolapo</p>

## Sessions Schedule

1:00 pm – 2:00 pm	Lunch Break
<b>Parallel Session 3</b>	
<b>Main Room: Maharaja Suite (AI &amp; Data Science)</b>	
2:00 pm - 2:15 pm	<p><b>Matrix Profile Unleashed: A Solution to IoT Data Redundancy Challenges</b></p> <p>Safa Ali Abdo Hussein, R. Badlishah Ahmad, Naimah Yaakob, Fathey Mohammed</p>
2:15 pm - 2:30 pm	<p><b>An Anomaly Intrusion Detection Systems in IoT Based on Autoencoder: A Review</b></p> <p>Muaadh A.Alsoufi, Maheyzah Md Siraj, Fuad A. Ghaleb, Aya Hasan Abdulqader, Elham Ali, and Maryam Omar</p>
2:30 pm – 2:45 pm	<p><b>Comparative Analysis of Topic Modeling Algorithms Based on Arabic News Documents</b></p> <p>Islam DJEMMAL and Hacene BELHADEF</p>
2:45 pm - 3:00 pm	<p><b>An Ensemble Machine Learning Approach for Predicting Flood based on Meteorological and Topographical Features: A Comparative Study in Kalu Ganga River Basin, Sri Lanka</b></p> <p>Ahrane Mahaganapathy, Dhanushka Jayasinghe, Kapila Tharanga Rathnayaka, and Wiraj Udara Wickramaarachchi</p>
3:00 pm - 3:15 pm	<p><b>Utilizing Deep Learning Technique for Arabic Image Captioning</b></p> <p>Haneen Siraj Ibrahim, Narjis Mezaal Shati, Sinan Q. Salih</p>
3:15 pm - 3:30 pm	<p><b>Performance Analysis of Textured Contact Lens IRIS Detection Based on Manual Feature Engineering</b></p> <p>Roqia Sailh Mahmood and Ismail Taha Ahmed</p>
3:30 pm –3:45 pm	<p><b>Proposed model for QCNN-based Sentimental Short Sentences Classification</b></p> <p>Nour El Houda Ouamane and Hacene Belhadef</p>

## Sessions Schedule

3:45 pm - 4:00 pm	<p><b>Plants Monitoring API to Detect Tomato Leaf Diseases using Deep-Learning Algorithms.</b></p> <p>Ayman Moustafa, AbdulRahman Alsewari, Sara Hassan</p>
4:00 pm - 4:15 pm	<p><b>Comparative Analysis of ResNet50, and VGG16 Architectures for Counterfeit Logo Identification</b></p> <p>Aishwarya Sharma, Essa Q. Shahra, and Shadi Basurra</p>
<b>Maharani Suite (AI)</b>	
2:00 pm - 2:15 pm	<p><b>Software Bug Severity Prediction using Convolutional Neural Network and BiLSTM Models</b></p> <p>Tariq Saeed Mian and Abdullah Alsaeedi</p>
2:15 pm - 2:30 pm	<p><b>Offline Signature Verification Model Using CNN and PSO Algorithm</b></p> <p>Abdoulwase M. Obaid Al-Azzani and Abdulbaset M. Qaid Musleh</p>
2:30 pm – 2:45 pm	<p><b>A Real -Time Hand Gesture Recognition based on Me-dia-Pipe and Support Vector Machine</b></p> <p>Noof T. Mahmood, Mohanad S. Jabbar, Mariam Abdalrazak</p>
2:45 pm - 3:00 pm	<p><b>Air Pollution Prediction Using Long Short-Term Memory Variants</b></p> <p>Akhas Rahmadeyan, Mustakim, Moh. Erkamim, Imam Ahmad, Sepriano and Syarfi Aziz</p>
3:00 pm - 3:15 pm	<p><b>Sentiment Analysis and Innovative Recommender System: Enhancing Goodreads Book Discovery Using Hybrid Collaborative and Content Based Filtering</b></p> <p>Choo Hui Lee, Pantea Keikhosrokiani and Moussa Pourya Asl</p>
3:15 pm - 3:30 pm	<p><b>Machine Learning-Based Predictive Models for Cardiovascular and Cerebrovascular Diseases Diagnosis and Treatment Optimization</b></p> <p>Adedayo Abidemi Ogunpola, Faisal Saeed, Shadi Basurra</p>

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<b>3:30 pm –3:45 pm</b>	<b>Hybrid Filter Feature Selection for Improving Cancer Classification in High-Dimensional Microarray Data</b> Oluwabukunmi Oyegbile, Faisal Saeed, and Samer Bamansoor
<b>3:45 pm - 4:00 pm</b>	<b>Machine Learning Techniques for Evaluating Student Performance</b> Josephine Oludipe, Faisal Saeed, and Rasheed Mohammed
<b>4:00 pm - 4:15 pm</b>	-
<b>4:15 pm - 4:30 pm</b>	<b>Closing Ceremony</b>

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### Quality Criteria Conflict: The Perspective of Health Specialists and Caregivers in Arab Countries

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**Abstract.** Recent research has shown a growing interest in the automatic assessment of health information quality on the internet. However, there is a lack of universally applicable guidelines for machine learning and deep learning practitioners to use when evaluating health information. This study seeks to address the gap by empirically identifying a set of tangible guidelines for assessing health information. Drawing from existing literature, we identified 18 criteria and collaborated with specialist doctors to convert these criteria into questionnaires. These questionnaires were then distributed through various social media platforms, including Facebook, WhatsApp, and Email, resulting in 253 responses from six Arab countries with high search volumes for health information. Our analysis revealed that the 18 criteria could be categorized into three subcategories: source quality criteria, treatment quality criteria, and content trustworthiness criteria. Each subcategory plays a crucial role in establishing the trustworthiness of the source of health information, ensuring the quality of treatment, and maintaining the general trustworthiness of the content. Furthermore, we ranked these criteria based on their perceived importance to health information quality as determined by doctors and caregivers. Our findings suggest that these dimensions are highly correlated with health information quality and can serve as valuable tools for both healthcare professionals and machine learning practitioners.

**Keywords:** Online health information, Quality evaluation, Machine learning, Deep learning.

## ABSTRACTS

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### **Leveraging ICT Technologies in the Battle Against COVID19: A Review for Applications, Challenges, and Solutions**

Abdulaziz Aborujilah<sup>1</sup> and Samir Hammami<sup>2</sup>, Kabir Hasibul<sup>2</sup>

<sup>1</sup> Dhofar University, Salalah, Sultanate of Oman.

<sup>2</sup> University of Kuala Lumpur, MIIT, Kuala Lumpur, Malaysia.

**Abstract.** The COVID19 pandemic has profoundly impacted our daily lives, with technology playing a pivotal role in the fight against the virus. Consequently, numerous groundbreaking technologies, such as telemedicine, contact tracing apps, and online learning platforms, have been swiftly developed and adopted. These technological advancements have not only assisted in mitigating the spread of the virus but have also allowed us to maintain some semblance of normalcy. However, they have encountered various challenges, including issues related to accessibility, data security, and privacy. This paper explores the threats posed by COVID19 that current technologies have addressed. It delves into the challenges faced during their innovation, development, and implementation. The article also offers suggestions and analysis on how information technology researchers can contribute to combating the COVID19 pandemic. The objective is to advance technological progress and research, enhancing strategies for battling the ongoing COVID19 crisis and potential future pandemics.

**Keywords:** Telemedicine, Contact tracing apps, Data security, Privacy issues, Pandemic technology challenges.

### **Predicting Customer Revenue in E-commerce using Machine Learning a Case Study of the Google Merchandise Store**

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**Abstract.** This research paper explores the use of machine learning algorithms to predict customer revenue in e-commerce, using the Google Analytics Customer Revenue Prediction dataset as a case study. The dataset contains anonymized data from the Google Merchandise Store, an ecommerce site that sells Google-branded merchandise. We use the data to build and evaluate different machine learning models that predict the natural log of the revenue per customer for each session, based on various features such as demographic information, traffic source, and behavior on the website. Our findings suggest that machine learning algorithm like (LGBM Regressor) can effectively predict customer revenue in e-commerce, with root mean squared error (7.18e-11), Mean squared error (5.1e-21), R-squared (0.3260359), Mean Absolute Error (1.43e-11) and time performance (32 seconds). We also identify the key features that are most predictive of customer revenue, including: visit number, total page views, total hits, hours, session id, and day of month. Overall, our research demonstrates the potential of machine learning in improving customer revenue prediction in e-commerce, and provides insights for e-commerce businesses to optimize their marketing and sales strategies.

**Keywords:** E-commerce, Google Merchandise, Customer Revenue Machine and Deep Learning.



## ABSTRACTS

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### Multi-Modal MRI-Based Classification of Brain Tumors. A Comprehensive Analysis of 17 Distinct Classes

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**Abstract.** Brain tumor classification is a critical task in medical imaging, as accurate and timely diagnosis is essential for effective treatment planning and patient care. In this study, we present a comprehensive analysis of brain tumor classification using a multi-modal MRI dataset comprising 17 distinct tumor classes. The dataset is split into training (60%), validation (20%), and testing (20%) sets, ensuring robust evaluation of our proposed approach. We employ the Xception pre-trained model, a state-of-the-art deep learning architecture, to extract high-level features from multi-modal MRI data. The model is fine-tuned on the training set and evaluated on the validation and testing sets. Our results demonstrate remarkable performance with a training accuracy of 0.9991 and a training loss of 0.0026, reflecting the model's ability to capture intricate patterns within the data. During validation, the model achieves an accuracy of 0.9791 and a loss of 0.0784, further confirming its effectiveness in classifying brain tumors across various modalities. When evaluated on the testing set, the model achieves a robust accuracy of 0.9788 with a loss of 0.0836, demonstrating its generalization capability to unseen data. Moreover, our evaluation includes essential metrics such as F1-score (0.9788), recall (0.9788), and precision (0.9791), affirming the model's balanced performance across the 17 distinct tumor classes. Additionally, the Receiver Operating Characteristic (ROC) curve analysis for each class shows excellent discriminative power with an area under the curve (AUC) of 1.000. The proposed approach showcases promising results in accurately classifying brain tumors, highlighting the potential of leveraging deep learning and multi-modal MRI data for improved diagnostic capabilities.

**Keywords:** Brain tumor classification, Multi-modal MRI, Deep learning, Xception pre-trained model, Medical imaging.

## **Integrating K-Means Clustering and Levenshtein Distance and K-Nearest Neighbor Algorithms for Enhanced Arabic Sentiment Analysis**

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**Abstract.** Arabic sentiment analysis (ASA) is a challenging field due to the complexity of the Arabic language. Although there have been some studies on ASA, the number of such studies is relatively limited compared to those conducted on English or other Latin languages, indicating a research gap. In this paper, we propose a new approach to ASA based on the comments dataset of users of mobile applications available on the Google play store. The proposed approach combines the K-Nearest Neighbor (K-NN) and K-Means Clustering (K-MC) algorithms with the Levenshtein distance (LD) algorithm for data preprocessing and feature extraction. A number of experiments were conducted to evaluate the performance of these algorithms in the context of ASA using mobile application reviews. The results of this study reveal that by integrating the K-NN, K-MC, and LD algorithms, we achieved superior performance compared to both the standalone K-NN algorithm and the combination of K-NN with LD. The integrated approach yielded impressive outcomes, with an accuracy of 84.12%, recall of 68.08%, precision of 85.33%, and F-score of 75.74%. Furthermore, it led to enhancements of 1.01% in accuracy, 1.78% in recall, 0.23% in precision, and 1.21% in F-score. The proposed study contributes to the field of ASA by proposing a novel approach that improves the performance of sentiment analysis on Arabic scripts in the context of mobile application reviews.

**Keywords:** Arabic Sentiment Analysis, K-Means Clustering, Machine learning, Levenshtein Distance, Google Play.

## ABSTRACTS

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### **A Novel Fractional ARIMA Model with Genetic Algorithm and Its Applications in Forecasting the Electricity Consumption Demand**

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**Abstract.** Electric system planning requires accurate electricity consumption forecasting. Accurate electricity consumption forecasting is required for policymakers to develop electricity distribution policies. However, insufficient data, which is commonly highly nonlinear, cannot provide sufficient data to identify satisfying forecasting accuracy. To solve these problems, several researchers used a grey model. Fractional cumulative generation operation (FAGO) is a relatively new and common method for improving the accuracy of grey models. In order to forecast electricity consumption, this study proposed a new hybrid FARIMA model that combines the FAGO and the autoregressive integrated moving average (ARIMA). Additionally, the fractional order is optimized through the use of the Genetic Algorithm (GA). Two distinct examples are used to compare the proposed model's efficacy to traditional ARIMA and two well-known grey models. The FARIMA model outperforms the other three models in all case studies, demonstrating that it can be used as a precise and promising approach for forecasting in the short term with small datasets.

**Keywords:** ARIMA, Grey Model, Fractional cumulative generation operation, GA.

## ABSTRACTS

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### **A Novel Fractional Accumulative Grey multivariable regression model with GA Optimizer for Forecasting Short-Term CO<sub>2</sub> Emissions in Malaysia**

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**Abstract.** Global warming is mostly caused by carbon dioxide (CO<sub>2</sub>) emissions. The Malaysian government needs to analyze and forecast CO<sub>2</sub> emissions in order to develop effective energy and environmental policies. The purpose of this research is to create a simple multivariate regression prediction approach for real-time CO<sub>2</sub> emissions. The proposed prediction approach is based on a modified fractional grey multivariate regression model with a genetic algorithm optimizer, known as the FGML(0,N) model, for forecasting CO<sub>2</sub> emissions. The proposed FGML(0,N) prediction accuracy was validated using a real-world CO<sub>2</sub> emission case. Experimental results showed that the proposed FGM(0,N) performed well compared to the multivariable regression model (MLR) and the support vector regression (SVR) models.

**Keywords:** Carbon dioxide, Fractional grey multivariate regression, Support vector regression..

## ABSTRACTS

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### Deciphering Gene Patterns through Gene Selection using SARS-CoV Microarray Data

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**Abstract.** Severe acute respiratory syndrome coronavirus type 1 (SARS-CoV-1) outbreak has presented a serious danger to world health, and in subsequent years, SARS-CoV-2 emerged, demanding a detailed analysis of its genetic pattern. This work used gene selection analysis to understand how genes respond to SARS-CoV-1 infection. The objective was to identify key genes that play critical roles in virus-host interaction and potentially serve as targets for therapeutic interventions. Information on gene expression from the Gene Expression Omnibus dataset GSE1739 was used to achieve this objective. This research performed gene selection using a hybrid of multi-objective cuckoo search with evolutionary operators to narrow down the set of genes that demonstrated significant expression changes. Next, the chosen genes were functionally annotated to identify their contributions to viral pathogenesis and responses. The findings of our investigation shed insight into important biochemical pathways and cellular processes impacted by the virus by identifying a group of important genes that are differently expressed during SARS-CoV-1 infection. Overall, the thorough investigation of the GSE130967 data revealed insightful information about the interactions between SARS-CoV-1 and its host, laying a foundation for further research to combat emerging coronavirus infections and improve global public health preparedness.

**Keywords:** SARS-CoV, Gene Selection, Microarray Data, Gene Expression.

## **Investigating the Impact of Utilizing the ChatGPT for Arabic Sentiment Analysis**

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**Abstract.** In the field of artificial intelligence (AI), there has been a remarkable breakthrough with the emergence of large language models (LLMs) that are fine-tuned to follow human instructions. One such model is OpenAI's ChatGPT (Chat Generative Pre-trained Transformer), which has proven to be a highly capable tool for various tasks including question answering, code debugging, and dialogue generation. However, while these models are touted for their multilingual proficiency, their ability to accurately analyze sentiment, particularly in the Arabic language, has not been extensively investigated. Recognizing this limitation, we aim to address this gap by conducting a comprehensive evaluation of ChatGPT's sentiment analysis capabilities specifically for Arabic text. We investigate the impact of utilizing the ChatGPT variants for Arabic sentiment analysis (ASA) and propose a new active labeling methods for ChatGPT. We evaluate the performance of four machine learning (ML) techniques, including Naive Bayes (NB), K-Nearest Neighbors (K-NN), Support Vector Machine (SVM), and Random Forest (FR), using accuracy, recall, precision, and F-score measure. We also compare six methods of labeling the data for ASA, manual labeling by humans, labeling using ChatGPT by Assistant-Poe, labeling using ChatGPT by Bing-Edge, labeling using ChatGPT by Assistant-Poe with humans, labeling using ChatGPT by Bing-Edge with humans, and labeling using ChatGPT by Assistant-Poe with Bing-Edge. Our experimental results show that the NB technique performed the best, achieving an accuracy of 91.22%, recall of 89.62%, precision of 88.90%, and F-score of 89.26% by using multiple Bing-Edge models for ASA. Moreover, utilizing our proposed active labeling method with ChatGPT achieved higher accuracy compared to other labeling methods. Our study suggests that the NB technique with multiple Bing-Edge models and our proposed active labeling method are effective approaches for ASA using ChatGPT. Our study contributes to the advancement of sentiment analysis in Arabic text and offers valuable insights into effective approaches for this task.

**Keywords:** Arabic Sentiment Analysis, Assistant-Poe, Machine learning, ChatGPT.

## ABSTRACTS

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### **DAE-DBN: An Effective Lung Cancer Detection Model Based on Hybrid Deep Learning Approaches**

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**Abstract.** To effectively treat lung cancer and improve patient survival, automatic lung nodule identification is crucial. Computer-aided diagnosis (CAD) is one of the most efficient tools for quickly and reliably detecting lung cancer using an autonomous approach. Segmentation is an important and challenging task when it comes to diagnosing lung cancer from the LIDC-IDRI dataset. There are several factors that contribute to this, including shape irregularity, tissue inhomogeneity, and low contrast between the lung inner tissues and the surrounding tissues. Image segmentation techniques currently in use rely on various parameters, including image quality, tissue structure, and acquisition protocol, to accurately segment the different objects present in a lung's CT-scan image. Existing segmentation techniques rely on user input and expert evaluation to manually initialize the segmentation. However, this process is time-consuming, labor-intensive, prone to error, and not practical. Additionally, it negatively impacts the accuracy and efficiency of these approaches. This paper introduces the deep belief auto encoder model (DBA), which is a fully automated solution for detecting lung cancer. The model consists of two technologies: the Deep Auto encoder (DAE) and the Deep Belief Network (DBN). The DAE is responsible for extracting discriminative features from various objects found in LIDC-IDRI images. The features are subsequently utilized to construct the DBN network, which aims to identify the boundaries of distinct objects, thereby aiding in image segmentation. The experimental evaluation demonstrated that the proposed model achieved a high accuracy rate of 0.98%, which is significantly higher than the rates reported in previous studies.

**Keywords:** Lung Cancer Detection, Computer-aided diagnosis (CAD), Image Segmentation, Deep Belief Network, and the Deep Auto encoder.

## ABSTRACTS

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### **Improving Prediction of Bursa Malaysia Stock Index using Time Series and Deep Learning Hybrid Model**

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**Abstract.** The stock market is an important component of the financial world. Most of the stock market contains uncertainty and volatility leading to difficulty in predicting the future price of stocks and the market's movement. The computing approach is a widely used technique in stock market forecasting that can assist the rapid and precise study of massive datasets. Existing studies have shown that such a technique can yield comparable or even better performances than traditional time series models in stock forecasting. Hybridizing both computing and traditional approaches lead to better performance since hybrid models utilized the advantage of each has led to better performance since hybrid models utilized the advantage of each model. In this study, a hybrid model which combines autoregressive integrated moving average (ARIMA), generalized autoregressive conditional heteroskedasticity (GARCH) and long short-term memory (LSTM) model was proposed to forecast the closing price of Bursa Malaysia Kuala Lumpur Composite Index (KLCI). The proposed model operated by capturing the linear and volatility pattern from the time series model while the deep learning model handled the remaining non-linear pattern. The findings indicated an overall improvement of 13.32% for RMSE and 0.97% for MAE as compared to other benchmark models. The hybrid models can also forecast the actual data with a shorter computational time of 0.82% of that taken by the regular LSTM model.

**Keywords:** Hybrid time series model, Machine learning, Stock market, Time series forecast, ARIMA-GARCH-LSTM.



## ABSTRACTS

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### **Fourier Residual Modified Approach in Group Method of Data Handling for Electricity Load Forecasting**

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**Abstract.** Electricity is a highly essential part of daily life, including industrial, commercial, residential, and other sectors. A strong developed nation has significantly impacted the rise of electricity load demand. Hence, accurate load forecasting is fundamental for future planning in various sectors, enabling organizations to make informed decisions, optimize resource utilization, and adapt to changing demands in a dynamic environment. Hence, this paper proposes a residual modification by integrating a Fourier Series residual modification technique on the fitted Autoregressive Integrated Moving Average (ARIMA) time series model and an Artificial Intelligence (AI) Group Method of Data Handling (GMDH) model named F-ARIMA and F-GMDH respectively. The outcomes are compared with the conventional ARIMA and GMDH single model using the Mean Square Error (MSE) and Mean Absolute Percentage Error (MAPE). The results reveal that F-GMDH outperforms the model without employing Fourier residual modification.

**Keywords:** ARIMA, GMDH, Load Forecasting, Fourier Residual Modification.

## ABSTRACTS

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### **Review of 3D Reconstruction on Mobile Devices based on Evaluation Methods**

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**Abstract.** 3D reconstruction is still a challenging task especially on mobile devices with limited computational power and memory. Overcoming this challenge will open further opportunities for various fields such as Augmented Reality. This paper presents a review of 3D reconstruction on mobile devices in terms of evaluation, strengths and limitations. We select papers ranging from 2018 to 2023 for this review. From the review, the fundamental pipeline of 3D reconstruction on mobile devices can be summarized as (1) data acquisition, (2) sparse reconstruction, (3) dense reconstruction, and (4) post processing. The strengths and limitations of each selected papers were also discussed. The issues identified that can be tackled include extracting feature points on shiny and reflective surfaces, tracking drift, updating dynamic objects, and improving computational efficiency for large scale scenes and objects.

**Keywords:** 3D reconstruction, mobile device, evaluation.

## ABSTRACTS

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### **Role of Attitude, Norm and Behaviour Control Among Young Voters in Social Media Toward Political Engagement**

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**Abstract.** The digital revolution has redefined political engagement in Malaysia, with social media's ascendancy empowering the youth to actively shape preferences and opinions in a landscape once dominated by traditional media. While platforms like Facebook and Twitter amplify information sharing and activism, decentralized information dissemination presents governance challenges. Attitudes, social norms, and behavior control mechanisms intricately interact, influencing political engagement, with diverse online information streams shaping attitudes, social norms guiding expression, and behavior control mechanisms shaping interaction patterns. However, this interaction between different factors also creates difficulties, such as the spread of false information. Recognizing these dynamics is crucial for informed policymaking to harness digital potential while addressing challenges. In the digital era, understanding the complex interplay of these factors among young voters is vital for fostering a thriving democratic society in Malaysia. The study employs a quantitative approach, through surveys, aiming to unravel the multifaceted dynamics of political engagement in the digital age. The expected results may reveal how social media shapes the opinions of young voters, unveil their social media habits and the impact on their political choices, and offer insights into challenges such as exposure to only one viewpoint and receiving inaccurate information.

**Keywords:** Digital Revolution, Political Engagement, Social Media.

## **Current Challenges of Big Data Quality Management in Big Data Governance: A Literature Review**

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**Abstract.** Advent of big data has changed the way data-driven organizations collect, process and analyses the data. However, considering how data is generated from heterogenous sources, which gives the ample amount of available information to be generated dramatically. This has forced the data-driven organizations to invest more in technologies that will determine the quality of their data through an effective data governance process. However, the lingering issues on the challenges of big data quality management in big data governance remains an alarming issue that requires much attention from the researchers and practitioners, because studies on this area are still in its infancy stage. Therefore, the main objective of this study is to identify the current challenges of data quality management in big data governance from previous studies and address them accordingly. To achieve this objective, we conducted a literature review on the recent studies that address these challenges. This study has also examined the available data quality dimensions used by the individual studies. Moreover, a total of 41 recent studies published between (2020-2023) were utilized by this review. The results of our findings including the authors recommendations on these challenges, we proposed a framework for big data quality management based on ISO 8000-61 for data quality reference model, ISO 8000-62 for organizational process maturity assessment, and “Plan-Do-Check-Act” approach for big data quality assessment. Subsequently, we proposed affordability, Operationability, and data literacy to be included in the big data quality dimensions.

**Keywords:** Big Data, Big Data Quality Management, Big Data Quality Dimensions, Big Data Quality Challenges, Big Data Governance.

## ABSTRACTS

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### **The Patented Technology Innovation Portfolio on 4D Printer Using Theory of Inventive Problem Solving**

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**Abstract.** The paper provides a comprehensive analysis of the patent literature about the evolution and development of 4D printing technology, highlighting its significant impact on the industrial and scientific domains. 4D printing, a progression derived from 3D printing, incorporates time as an additional dimension, enabling buildings to change, adapt, and respond to external stimuli autonomously. This review critically examines various patents, particularly identifying and analysing significant inventions, applications, and implications of 4D printing. Through a comprehensive examination of the intellectual property landscape, this scholarly article illuminates the path of development of the technology above and its potential to bring about transformative changes in various industries, including manufacturing and healthcare. Examining patented concepts, this study sheds light on the development, status, and prospects of 4D printing.

**Keywords:** 4D Printing, Patented Literature, Transformative Technology.

### **Detection User Needs: LDA-Based Analysis of Arabic Reviews for Governmental Mobile Applications**

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**Abstract.** User reviews in app stores are considered very rich maintenance information texts that developers need to know. Many apps' reviews contain requirements details such as bugs or problems, evaluation of user experience with some features, suggestions for improvements, and ideas for new features. The previous literature has illustrated different techniques and approaches to reduce the work needed to analyze and extract valuable content from mobile app reviews. However, no attention has been paid to analyzing and studying Arabic user reviews. This research explores user reviews of some Saudi governmental apps in the Google Play Store as a source of Arabic reviews dataset to aid software maintenance and improvement tasks in governmental applications. We adopted a seven-phase approach to analyze Arabic app reviews on the Google Play Store by applying natural language processing (NLP) techniques and Latent Dirichlet Allocation (LDA), which is one of the most used topic modeling algorithms to extract requirements issues from Arabic user feedback expressed in the app's reviews. NLP techniques combined with the LDA model enable us to identify the types of requirements issues that users are complaining about. According to the finding results, governmental applications' most frequent requirements issues are related to functional requirements issues (authentication and operational issues), after-update errors, nonfunctional requirements issues (usability issues), and user needs/user requirements. The proposed methodology can provide insight into the main requirements issues in governmental services apps to aid software engineering maintenance tasks.

**Keywords:** Arabic App Reviews, Topic Modeling, LDA, Software Requirements, Google play store.

## ABSTRACTS

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### **The Problem-Based Learning Revolution: A Systematic Review Exploring its Effect on Student Achievement and Self-Regulated Learning**

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**Abstract.** Nowadays, an increasing number of educational institutions across all levels are incorporating problem-based learning (PBL) into their pedagogical programs. These pedagogical approaches aim to enhance students' skills in self-regulated learning, problem solving, collaboration, and innovation. PBL stands out as a unique learning process that intentionally designs the learning environment and utilizes suitable teaching tools. While PBL plays a significant role in higher education by supporting self-regulated learning (SRL), there is a lack of comprehensive studies that systematically examine the PBL approach in higher education and its potential to foster self-regulated learning. Therefore, this systematic review was conducted to address this gap. Consequently, the objective of the study is to explore the effects of PBL on students' self-regulated learning according to traditional teaching. Several studies met the inclusion criteria and were included in the final analysis, involving a sample size of 478 students. The results reveal that PBL has a significant impact on students' academic achievement, especially regarding self-regulated learning. Finally, these results highlight the variation in levels of self-regulated learning.

**Keywords:** Problem-Based Learning, Self-Regulated Learning, Achievement.

## **Exploring Instructors' Practices: Data-Driven Evaluation and Insights via LMS**

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**Abstract.** Learning Management System (LMS) is widely used to support teaching and learning in higher learning institutions. This platform offers valuable information about the users' usage data and behavior in the online environment. Thus, the evaluation of such a platform is necessary to maximize its effectiveness. The aim of this study is to investigate the use of LMS by instructors to evaluate their online activities, discover user behavior and engagement patterns, and to obtain some indicators. For this purpose, statistical and visualization technique are used to analyze the courses conducted through hybrid and fully online learning modes offered in four semesters at the Universiti Sains Malaysia (USM). The LMS logs data was employed in this study as an instrument to evaluate instructors' usage pattern and engagement level in the online courses based on 13 main variables representing the common LMS tools and related activities. Based on the data mining analysis, the study found that the usage level of LMS was low during the blended semesters and relatively high during the online semesters because of the Covid-19 pandemic. Also, no significant difference was found during the two years in terms of the type of LMS tools used and activities. The study also found that resources and LMS assessment tools were the most used by instructors whereas communication and collaboration tools were the least used. To conclude, the findings of this study are expected to help the university administrators understand the status of the LMS usage and the level of engagement, and to identify the necessary strategies to improve the online teaching and learning activities.

**Keywords:** LMS, Usage data behavior, engagement.



## ABSTRACTS

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### Offline Signature Verification Model Using CNN and PSO Algorithm

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**Abstract.** The handwritten signature verification plays a crucial role in various applications including authentication and document verification. The feature extraction stage of the offline signature verification system is considered essential and significantly affects the performance of the system. The quality and quantity of the extracted features play a vital role in the ability of the system to differentiate between genuine and forged signatures. In this study, we propose a novel approach for optimizing the hyperparameters of a Convolutional Neural Network (CNN) model for handwritten signature verification using the Particle Swarm Optimization (PSO) algorithm. The PSO algorithm is a population-based optimization method that draws inspiration from flocking behavior in birds. We defined a search space consisting of hyperparameter ranges, including the number of convolutional filters, filter sizes, number of dense layers, dropout rate, and learning rate. The PSO algorithm explores this search space by iteratively updating the positions and velocities of the particles to determine the best set of hyperparameters that maximizes the accuracy of the CNN model. We evaluated our approach on the BHSig260-Bengali, BHSig260-Hindiin, GPDS, and CEDAR datasets, which contain a diverse collection of handwritten signature images. The results of the experiment demonstrated that the proposed approach obtained a high accuracy of 98.3% on the testing dataset.

**Keywords:** Offline Signature Verification, Deep Learning, Particle Swarm Optimization Algorithm and Convolutional Neural Network.

### Lattice-Based Cryptography for Internet-of-Things in Post-Quantum Computing

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**Abstract.** In Post-Quantum Cryptography (PQC), the acceptance of scalable quantum computers has been encouraged as lattice-based cryptography is the driving force technique among numerous quantum-resistant cryptography ideas. half of the ‘survivors’ are lattice-based in architecture and have been accepted and standardized from the PQC competition conducted by the National Institute of Standards and Technology (NIST). This paper assesses the practicality of these schemes being deployed. This paper critically examines and classifies fundamental concepts of Lattice-Based Cryptography (LBC) and its approaches. In aspects of various benchmarks of the Internet of Things’ critical performance, the review concludes with the recognition of some preferred LBC schemes.

**Keywords:** Post-quantum cryptography, Lattice-based, IoT security.

## ABSTRACTS

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### **Analyzing Learning Analytics in a Knowledge Forum: Examining Patterns of Interaction in Computer-Supported Collaborative Learning**

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**Abstract.** Education needs to prepare learners for sustained, collaborative, and creative work with the knowledge that is essential to 21st-century society. Helping learners develop competencies in collaborative inquiry and knowledge building is crucial. The processes of knowledge building and interaction of learners in the Knowledge Forum (KF) are investigated. This study investigates the patterns of interaction in Knowledge Forum. In KF, the learners' interaction can be measured and analyzed using embedded Analytic Toolkit tools. Various quantitative measures, such as the number of notes read, revised, and created, as well as the number of keywords created and KF scaffolds used, are calculated to provide overall patterns of learner interaction in KF. The study involved 24 postgraduate learners who were enrolled in a course at a public university in Malaysia. KF was integrated into the course for a duration of 14 weeks as a mandatory component. The findings of the study reveal a consistent increase in various Analytic Toolkit indices throughout the instructional period, indicating that the course, which incorporated KF, positively influenced learner interaction and learning. These findings have implications for the design of KF integrated with Analytic Toolkit tools in the context of 21<sup>st</sup> century classrooms and the needs of contemporary learners.

**Keywords:** Learning Analytics, Knowledge Forum, Knowledge Building, Interaction, Patterns, Computer-Supported Collaborative Learning.

### **Feedback Generation for Automatic Programming Assessment Utilizing AI Techniques: An Initial Analysis of Systematic Mapping Studies**

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**Abstract.** Automated Programming Assessment (APA) has evolved into an essential and effective method of assisting both students and educators in the process of learning programming. It significantly reduces the burden on lecturers associated with programming assessment activities while also providing students with proper support for summative and formative assessment, particularly in achieving the course learning outcome. However, there is still a need to provide proper formative assessment feedback related to static analysis so that students can improve the quality of their programming codes and consistently progress forward at the end of their learning process. Despite several early attempts to integrate APA approaches to static analysis and Artificial Intelligence (AI) techniques, which are critical assessment components in course learning outcomes. This paper reveals an initial analysis of the Systematic Mapping Study (SMS) related to the integration of AI with APA used to support feedback generation for static analysis of APA. This review will contribute to the current state of AI techniques used in APA, as well as the types of assessment feedback that have been primarily focused on the context of these studies.

**Keywords:** Automated Programming Assessment, Feedback Generation, Static analysis, Formative and summative assessment feedback, Software Testing, and AI technique.

## ABSTRACTS

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### Forecasting Electricity Consumption Using a Data Grouping Method Based on the Grey Model in Malaysia

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**Abstract.** Electricity consumption contributes significantly to the global increase in total energy consumption, which is strongly correlated with economic growth. Therefore, a study on electricity consumption prediction is required. This research aims to develop a model for seasonal data using a data grouping method-based grey model which consists of a data grouping of grey model DGGM (1,1), fractional grey model DGFGM (1,1), optimization of background value in DGGMOPT and DGFGMOPT to predict quarterly electricity consumption in Malaysia using data from 2012Q1 to 2019Q4. First, all quarterly time sequences is separated into four groups (each containing only time sequence data from the same quarter) following the suggested method. The new set of four quarters, each involving specific seasonal properties, is then used to develop models. Following that, a comprehensive quarterly time sequence is created using the forecasted data for all four quarters of these models, taking seasonal fluctuations into consideration. Each forecasting method's level of predicting accuracy is evaluated using the Mean Absolute Percentage Error (MAPE) and Root Mean Square Error (RMSE) criterion. The outcomes demonstrated the higher level of flexibility and forecasting accuracy of DGFGMOPT (1,1).

**Keywords:** Electricity consumption, Malaysia, Grey prediction, Data grouping method, Fractional grey model, Optimization of Background Value grey model, Prediction model.

### **Indicators of the exploratory and confirmatory factor analysis of the Technology Readiness Index (TRI)**

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**Abstract.** The study aims to identify the indicators of the exploratory and confirmatory factor analysis of the Parasuraman's scale of technology readiness (TRI) for students of A'Sharqiyah University in the Sultanate of Oman by identifying the explanatory model of the factors inherent in the scale as little as possible, depending on its psychometric factor properties. The scale is translated into Arabic, reviewed linguistically, and codified on the Arab-Omani environment to accomplish this. The study adopted a descriptive methodology using a study sample involving 234 male and female students; whereas Statistical Package for the Social Sciences (SPSS) v.23 was used for exploratory analysis; AMOS was used for confirmatory analysis; SmartPLS was used to confirm the assertiveness result; and the principal component method was used; factors whose latent roots exceeded Eigenvalue  $> 1$  were used; and the orthogonal rotation was carried out using the Varimax method. Findings from the factorial analysis were as follows: The "KMO" and "MSA" indices for the sample's suitability for conducting the practical analysis were 0.788 at 946 degrees of freedom and 0.000, which is a very good coefficient reflecting the sample's sufficiency and quality for statistical analysis. There were four factors identified: "Ease and Usefulness Factor," "Comfort and Security Factor," "Optimism Factor," and "Innovation Factor." It is concluded that the scale has sound psychometric features considering these data.

**Keywords:** Factor analysis, technical readiness, validity, reliability, psychometric properties.

## ABSTRACTS

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### **The Review of Patent Literature and Analytics of Robo-physic System Evolution Using Theory of Inventive Problem Solving (TRIZ)**

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**Abstract.** Robotic technology is becoming an essential tool and equipment to improve automation in the fourth industrial revolution era. However, the development and expansion of mechanical applications need to clearly show the specific elements of technical and engineering progress using market trends. This study used patented literature to review the technological trends of robotics advancement from a system innovation perspective. The patented database's analytics process uncovers the robotic system's technical value and can forecast the next innovation in this technology area. It has been found that Robo-physics is an essential part of developing technical value for robotics. This study aims to introduce the theory of inventive problem solving (TRIZ) as a systematic innovation tool to guide the evolution of robotics from the robot-physic element. Several TRIZ trends of engineering system evolution (TESE) will be presented and adopted in the concept of Robo-physic. The results show that the TESE application is aligned with the idea of robot-physic innovation and recommends leapfrogging and accelerating the advancement of robotic system evolution. The study opens possibilities for innovation for other industrial revolution technologies.

**Keywords:** Robo Physic, TRIZ, Patent Literature.

## **Hybrid SPECK Encryption Algorithm for Internet of Thing (IoT)**

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**Abstract.** A fascinating topic of study in information security is lightweight cryptography (LWC). LWC is required when there are constraints such as increased component practice, time-consuming tasks, power-consuming processes, and memory requirements. The National Security Agency (NSA) designed Speck, one of the suggested algorithms in this area, in June 2013. Many institutions and buildings are at risk of theft, fire, and loss of property and data. This paper presents the security system for IoT devices in different rooms in a building and an enterprise building and recommends a secure method for safeguarding hardware from burglars and accidents and maintaining educational institutions, medical facilities, schools, factories, and residential structures. The study suggests strong and quick encryption methods as part of a security system for defense. This proposal uses an LW algorithm to encrypt data collected from the environment and classifies it as urgent or requiring either fast or regular processing. One of the easy encryption algorithms cited in this article is the SPECK algorithm, which is applied to a group of data gathered by sensors in a set of rooms inside an enterprise building, while a different set of sensors is connected with an Ethernet shield Arduino UNO3 to collect data from the environment. In Arduino, the PRESENT method encrypts sensor data, which is used in the data gathered by sensors in several rooms inside a corporate building. It is one of the most straightforward encryption algorithms. The PRESENT algorithm encrypts sensor data to modify it and secure it from hackers. For additional safety, encrypted data is re-encrypted on the Raspberry Pi using the SPECK cipher before being transferred to the PC using the MQTT protocol to publish and subscribe to the data. The output will be secure, private, and encrypted, then duly sent to the cloud.

**Keywords:** SPECK encryption (SPE), Internet of Things (IoT), Sensors; Arduino, Security



## ABSTRACTS

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### Learning Rate Schedules and Optimizers, A Game Changer for Deep Neural Networks

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**Abstract.** The Learning Rate (LR) in the Deep Neural Network (DNN) training process determines whether and how quickly the training process may converge. LRs are most effective when the direction and timing of network parameter updates are specified. Note that the optimizers provide the LR update trajectory. The complex interactions between LR and optimizers create a multidimensional environment that calls for systematic investigation. Most existing literature studied the impact of these factors independently, thereby providing limited connecting information between the two. This paper, therefore, offers investigative insights into the complex connections between LR and optimizers through a comprehensive collection of experiments using three datasets in the domain of churn analysis in the telecommunication industry. Nine different LR techniques were employed in the first part of the experiment with optimizers, while seven optimizers were analyzed and compared in the second part. Consequently, the experimental results provide research enthusiasts with the understanding inherent in hyperparameters combination to obtain the best convergence rates and generalization performance as mechanics driving DNN training.

**Keywords:** Deep Learning, Hyperparameters, Learning Rate, Optimization.

### Software Bug Severity Prediction using Convolutional Neural Network and BiLSTM Models

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**Abstract.** Creating bug-free software is nearly impossible, but addressing bugs promptly can significantly improve the software development process. Early bug resolution enhances software quality, efficiency, and reliability, although it's costly during maintenance and development. As software requirements grow and delivery times shrink, ensuring quality becomes challenging. Bugs are a given, as error-free software is unfeasible, and testing is complex and time-consuming. The complexity of software and its development, along with insufficient testing, means developers can't guarantee bug-free products. Managing bugs is a critical yet arduous part of software maintenance, with bug repositories receiving numerous reports daily, each containing textual and metadata information about the bug. Prioritizing bugs by severity is essential but manually handling the vast number of reports is daunting. High-severity bugs should be addressed before those with lower severity. This paper explores using Convolutional Neural Network (CNN) and Bidirectional LSTM (BiLSTM) with Glove Embedding on Eclipse and Mozilla datasets for automated bug severity prediction. The proposed model's effectiveness is assessed by accuracy score, confusion matrix, and classification report. The results indicate that BiLSTM performs better than CNN, achieving 91% accuracy on the Mozilla dataset and 89% on the Eclipse dataset.

**Keywords:** Convolutional Neural Network (CNN), Bidirectional LSTM (BiLSTM), Software, Software Bugs, Software bug severity.

## ABSTRACTS

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### Facial Wash Products Recommendation System: Profile User-Based Using Fuzzy Analytical Hierarchy Process Approach

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**Abstract.** As the beauty business grows, facial wash products offer many attractive preferences in the market. This forces the users as customers to be more attentive in determining the right product distinction according to their valuable requirements and physical face condition. Therefore, this paper tries to assist users with making up one's minds about the appropriate facial wash products affiliating to the analysis of user profiles. The Fuzzy Analytical Hierarchy Process (Fuzzy-AHP) approach was employed using five criteria, including skin type, pH level, packaging, price, and texture. The criteria were then exhausted with 15 sub-criteria and eight alternatives of facial wash products. The automation of this selection is described in the development of a prototype decision-making system with user specification restrictions for millennials aged users from 15 up to 30 years old. The software testing description from 25 users reveals the functionality, value, significance, user-friendliness, and acceptance of this application in recommending the appropriate products for facial wash. Moreover, 86.9% of respondents agreed that this application made a significant contribution supported by a convenient analysis of user-profiles and conditions. Hence, the possible emergence of allergies and skin irritation due to negative effects of facial wash product consumption can be minimized and the users are retrieved with a new knowledge of facial wash products.

**Keywords:** Fuzzy analytical hierarchy process, Recommendation system, Facial wash product identification, Profile user-based, Decision support system.

## **Securing Data in IoT-RFID Based Systems Using Lightweight Cryptography Algorithm**

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**Abstract.** Radio Frequency Identification (RFID) technology enables all objects to communicate with IoT systems for its advanced capabilities in automatically identifying, localizing, and controlling access to objects. With RFID's widespread use and quick development, its privacy and security concerns cannot be disregarded. Many security attacks, including interception, tampering, and replay, may be undertaken against the wireless broadcast channel that connects RFID tags with the reader, leading to issues with privacy violations and forgery. This paper proposes a multi-level lightweight security framework (I-RFLSF) to secure data in IoT-based RFID systems by adopting a lightweight cryptography algorithm to encrypt the data in IoT-based RFID systems depending on the unique identification of each tag. The framework is designed for situations with limited resources to ensure end-to-end data security from the deployment point through data storage. It provides authentication, confidentiality, and integrity services for data flow between the system participants, including the server, IoT devices, the RFID Reader, and the RFID Tag, through three phases: Two-Level Registration, Two-Level Authentication, and securing device data using a lightweight cryptographic algorithm.

**Keywords:** RFID security, IoT devices, Lightweight Cryptography, Block cipher.

### **Employee Mental Workload Classification in Industrial Workplaces: A Machine Learning Approach**

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**Abstract.** Employees at industrial workplaces are expected to produce labour of a certain standard. They are instructed to improve their quality of work, and this may take a toll on their mental health. Mental workload directly affects employees' performance, productivity, and well-being. Therefore, this paper conducts a comparative study for the classification of mental workload where a mental workload dataset is subjected to four machine learning classification models- Naïve Bayes, Extreme Gradient Boosting, Support Vector Machine and K-Nearest Neighbour. Their performance is measured against the performance metrics- accuracy, precision, recall and f1-score. Before synthetic minority oversampling method Support Vector Machine performed the best with 90.41% accuracy and K-Nearest Neighbour performed the best with 98.61% accuracy after Synthetic Method of Oversampling Technique.

**Keywords:** Mental Workload, Machine Learning, KNN, SVM, XGB, NB, SMoTE.

### **A Conceptual Framework for Malay-English Code-Switched Neural Machine Translation**

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**Abstract.** This paper presents a conceptual framework for addressing the challenges in translating Malay-English code-switched texts using neural machine translation. The framework comprises of three phases: language identification, code-switching type identification, and segment translation. In the language identification phase, a trained model attaches language tags (M for Malay, E for English, M-E for ambiguous) to each word. Code-switching types, including intra-sentential (AM and AE) and inter-sentential (EM and EE), are identified in the code-switching type identification phase. The segment translation phase utilizes an RNN model trained on a Malay-English code-switched parallel corpus and a homonyms dictionary with POS tagging. Our framework addresses linguistic characteristics, informal language usage, structural differences, and ambiguity. It contributes to the advancement of machine translation in code-switching contexts. Despite the conceptual nature of the framework without concrete results, our thorough analysis of code-switching types and associated challenges lays a foundation for future model enhancements. By providing a comprehensive solution, it enables more accurate and effective communication in code-switched language scenarios. Further research can build upon this framework to enhance code-switched translation models.

**Keywords:** Malay-English Code-switching, Deep Learning, Neural Machine Translation, Code-switching Type Identification.

## ABSTRACTS

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### **Mobile Device Influence on SDN Controller Performance in IoT-Managed Software-Defined Wireless Networks**

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**Abstract.** The proliferation of Internet of Things (IoT) devices has rapidly increased the number of internet connectivity. However, the conventional network lacks global knowledge to manage these devices efficiently. Software Defined Wireless Network (SDWN) has emerged as a new technology to manage these devices in wireless networks efficiently. However, SDWN is a flow-driven network that requires event generation for any new event in the network. This will require an exchange of control messages more often. In addition, the mobility nature of wireless devices will also need the Software Defined Networks (SDN) controller to monitor resources for efficient network management periodically. Therefore, Flow setup requests, control messages, and network resource monitoring significantly impact the SDN controller, which may affect its performance. This study investigates the influence of mobile devices on SDN Controller Performance in IoT-Managed Software-Defined Wireless Networks. The study derived formulae to estimate control overhead, network resources management, and flow setup requests. Thus, we experimented to analyze the controller's performance based on CPU and Memory usage.

**Keywords:** SDWN, IoT, Mobility, Controller, Performance.

### **Matrix Profile Unleashed: A Solution to IoT Data Redundancy Challenges**

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**Abstract.** The burgeoning growth of the Internet of Things (IoT) has unleashed a deluge of data from diverse sensors and devices, presenting both opportunities and challenges. Among these challenges is data redundancy in IoT datasets, which hinders efficient storage, processing, and analysis. This article explores the Matrix Profile technique as an innovative approach for addressing data redundancy in IoT applications. The Matrix Profile, comprising Distance Profile and Profile Index components, proves instrumental in identifying duplicate and near-duplicate data points. Leveraging the Stumpy library in Python, this study introduces a novel method that preserves time series integrity while reducing computational costs and optimizing memory usage. The proposed technique not only identifies redundant data but also streamlines its removal, thereby enhancing storage efficiency and reducing network bandwidth consumption. The Matrix Profile is facilitated by a robust distance measure and a sliding window approach, and marks a significant contribution to IoT data management.

**Keywords:** Matrix Profile, IoT Data Redundancy, Duplicate Detection, Data Storage Efficiency.



## ABSTRACTS

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### **Plants Monitoring API to Detect Tomato Leaf Diseases using Deep-Learning Algorithms**

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**Abstract.** In the presented study, the challenge of detecting tomato leaf diseases, crucial for sustainable agriculture, is addressed. A Convolutional Neural Network (CNN) model has been developed, demonstrating a high accuracy rate of 97.29% on a variety of test datasets. The methodology employed includes a comprehensive literature review, meticulous collection and augmentation of datasets, and the development of an advanced CNN model. Through these techniques, early and precise detection of diseases in tomato plants is facilitated. The contributions of this research are pivotal in transforming agricultural practices, as evidenced by enhanced crop health, increased yield, and promotion of sustainable farming methods. The significance of this work lies in its potential to contribute to global food security and the evolution of agriculture in the digital era.

**Keywords:** CNN, Machine learning, Deep learning, Tomato disease detection.

## ABSTRACTS

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### **Sentiment Analysis and Innovative Recommender System: Enhancing Goodreads Book Discovery Using Hybrid Collaborative and Content Based Filtering**

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**Abstract.** This study addresses the challenge of finding suitable books in the digital age of education, where information overload makes manual book selection difficult. It aims to analyze reviewer sentiment on Goodreads and develop a recommendation algorithm based on readers' preferences. The study employs sentiment analysis and compares three recommender algorithms: Content-Based, Collaborative filtering, and Hybrid filtering. Goodreads data is collected using a web scraper, and the results indicate Hybrid filtering as the most effective model, outperforming others in metrics like RMSE, MSE, precision, and recall. Further optimization with the Apriori model can enhance Hybrid filtering's accuracy and recommendation breadth, reducing system errors.

**Keywords:** Sentiment Analysis, Content-Based Filtering, Collaborative Filtering, Hybrid Filtering, Apriori Model.

## ABSTRACTS

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### Comparative Analysis of Topic Modeling Algorithms Based on Arabic News Documents

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**Abstract.** Topic modeling is a text mining technique that revolves around extracting latent topics from a collection of documents. Although the majority of research within the field of topic modeling has been conducted in the English language. Nonetheless, in recent years, there has been an interest in employing the topic modeling methodology within the Arabic language, although its utilization remains somewhat restricted in this language. In this paper, we propose a comparison among various techniques commonly utilized in topic modeling. These techniques include a Probabilistic model, specifically Latent Dirichlet Allocation (LDA), as well as matrix factorization methods like Non-Negative Matrix Factorization (NMF) and Latent Semantic Indexing (LSI). Additionally, we incorporate a transformer-based model known as BERTopic. The implementation was applied to the Arabic language, and the algorithms were trained using the TF-IDF text representation. This choice aimed to ensure a fair comparison between the algorithms. The evaluation of each model is conducted using topic coherence as the metric. The results indicate that both NMF and Bertopic give an excellent performance.

**Keywords:** Topic modeling, LDA, NMF, LSI, Bertopic, TF-IDF, arabic language processing.

## **Air Pollution Prediction Using Long Short-Term Memory Variants**

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**Abstract.** Air pollution is an unresolved environmental problem that poses a health threat in many countries. Nearly 90% of the global population is exposed to polluted air that exceeds established air quality guidelines. Jakarta is one of the most polluted cities in Asia and even the world. The Air Quality Index (AQI) is a measurement index that shows the air quality in an area. The worse the air quality, the higher the AQI value. Jakarta has an average AQI value of 110, which is categorized as unhealthy for some groups of people. For this reason, it is necessary to predict air pollution to take the proper steps to protect their health. One of the deep learning approaches that can handle time series cases is the long short-term memory (LSTM). This research aims to accurately predict air pollution based on AQI using LSTM algorithm variants: Vanilla LSTM, Bidirectional LSTM, and Stacked LSTM. The trained model was evaluated using the root mean square error (RMSE) and mean absolute error (MAE) metrics. Based on the experiment results, the Bi-LSTM model with RMSprop optimizer and 0.0001 learning rate could provide the best results with an RMSE value of 16.68 and an MAE of 12.76. As the best model, Bi-LSTM was implemented to predict Jakarta's AQI in the following week. The results show that AQI in Jakarta would insignificantly increase.

**Keywords:** Air Pollution, Long Short-Term Memory, Bidirectional LSTM, Stacked LSTM, Time Series, Prediction.

## ABSTRACTS

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### Comparative Analysis to Develop a Dimensionality Reduction Model for Classifying Intrusion Detection Systems

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**Abstract.** This study aims to compare the performances of different combinations of dimensionality reduction techniques and classification algorithms for intrusion detection based on forensic frameworks. The study used a real-world dataset collected from a forensic framework to evaluate the performances of four different combinations of dimensionality reduction techniques and classification algorithms namely; Improved Genetic Algorithm (I-GA) and Support Vector Machine (SVM), I-GA with K-Nearest Neighbor (KNN), Locally Linear Embedding (LLE) with SVM, and LLE with KNN. The dataset was preprocessed and normalized then divided into training and testing sets to conduct performance evaluations based on accuracy, precision, recall, and F1 score. The results of the study showed that the combination of I-GA with SVM had accuracy of 95.17%. The combination of LLE with SVM had an accuracy of 65.88%, while the combination of I-GA with KNN had an accuracy of 98.73%. The combination of LLE with KNN had 95.12%. The study's findings suggest that the combination of I-GA with KNN is the most effective combination for detecting potential intrusions in network data. The results also demonstrated the importance of using dimensionality reduction techniques in intrusion detection systems to increase efficiency and accuracy. The study's findings could contribute to the development of more efficient and accurate intrusion detection systems to enhance the security of computer networks.

**Keywords:** Improved Genetic Algorithm, Support Vector Machine, K-Nearest Neighbor, Locally Linear Embedding, Intrusion Detection, Datasets.

### **Revolutionizing Airline Customer Satisfaction Analysis with Machine Learning Techniques**

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**Abstract.** The customer's experience is one of the most critical concerns for the airline industry. This study investigates customer satisfaction in the airline industry through machine learning analysis, employing decision trees, random forests, support vector machines, and XGBoost models to predict customer satisfaction levels. Each model offers a unique approach to analyzing and predicting customer satisfaction levels, contributing to a comprehensive evaluation of their effectiveness. The data undergoes exploratory data analysis (EDA) and preprocessing, enabling quality assessment. XGBoost consistently outperforms other models in predictive accuracy. Key metrics, including accuracy, precision, recall, F1 score, and ROC AUC, are employed to evaluate model performance. The XGBoost model was identified as being the best among the four models tested (accuracy: 0.9576, precision: 0.9683, recall: 0.9528, F1 score: 0.9574, ROC AUC score: 0.9940). These findings contribute valuable insights into improving airline customer satisfaction and inform decision-making processes within the industry.

**Keywords:** Machine learning, airline industries, customer satisfaction.

### **Android Malware Detection using Machine Learning Technique**

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**Abstract.** Malware is a common term used to describe different types of malicious activities or inappropriate applications, such as viruses, worms, spyware, Trojans, rootkits and backdoors. The primary characteristic of any malware is its intent to compromise, damage, disrupt, or steal from the targeted Android phone. In a computer environment, typical malware can infect all user programs within the computer operating system, such as applications. However, while research efforts have been directed towards preventing malicious software on personal computers, the same level of attention hasn't been extended to mobile devices, despite the increasing popularity of mobile application development. The aim of this project is to automate the analysis of Android data files using heuristic or machine learning techniques. This study has adopted the Scrum methodology, as it is well-suited for projects in the Machine Learning domain. With Scrum, we can assess the accuracy improvement of the data sets during each sprint, providing an effective means of reviewing the sprint process. The goal is to develop a system capable of identifying new viruses and disseminating that information to all mobile devices, thereby empowering them to defend against future assaults.

**Keywords:** Malware, Machine learning, Android.

## **An Ensemble Machine Learning Approach for Predicting Flood based on Meteorological and Topographical Features: A Comparative Study in Kalu Ganga River Basin, Sri Lanka**

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**Abstract.** Floods are one of the most frequently happening disasters in Sri Lanka that causes severe damage in terms of loss of lives and property damage. Kalu Ganga is one of the river basins, most prone to floods in Sri Lanka. It is stated from studies, that machine learning approaches produce higher accuracy, and can be developed faster and more cost-effective than conventional methods of flood prediction. This study aims to enhance the accuracy of flood prediction in the Kalu Ganga river basins in Sri Lanka using ensemble of methods. The study focuses on six catchment areas such as Kalawana, Ayagama, Kuruwita, Pelmadulla, Elapatha and Kahawatta. The features considered are based on meteorological and topographical aspects. The methodology involves collecting and preprocessing the data followed by feature selection and developing predictive models. The accuracies of the models are evaluated using F1-score. The F1-score, a widely recognized measure of a model's accuracy, balances precision and recall. Specifically, it considers both false positives and false negatives, offering a nuanced evaluation of the model's performance. In the context of flood prediction, where the consequences of both false positives (incorrectly predicting a flood) and false negatives (failure to predict an actual flood) are severe, the F1-score proves to be a relevant and insightful metric. The results show that the Bagging classifier with decision tree as the estimator followed by the use of wrapper method backward feature selection and preprocessing has high F1-score in flood prediction of the Kalu Ganga river basin. This study demonstrates that ensemble of methods can effectively enhance the accuracy of flood prediction in the Kalu Ganga river basin.

**Keywords:** Flood Prediction, Bagging Classifier, F1-score, Backward Feature Selection, Decision Tree.



## ABSTRACTS

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### **A review of IoT Applications in Smart Environments: From Smart Cities to Military Integration**

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**Abstract.** Internet of Things (IoT) is a rapidly developing network of communication that enables data sharing and real-time analytics among physical objects. It has numerous applications in military operations, smart cities, environmental monitoring, purchasing, and livestock management. To provide a comprehensive overview of the topic, this study conducts a thorough review of the relevant literature and research papers. A detailed analysis of IoT applications in various fields, including smart cities, environmental monitoring, purchasing, livestock management, and military operations, is presented. The paper also examines the impact of IoT technologies on each sector, concluding that IoT integration enhances resource utilization and service delivery in the context of smart cities. IoT-driven data analysis benefits environmental monitoring by facilitating pollution control and weather forecasting. Through the use of IoT, the supply chain management and efficiency of the procurement sector have improved. IoT enables enhanced productivity and real-time animal health monitoring in the livestock sector. Remote automation and surveillance are also made possible by the use of IoT in military applications. The results highlight how IoT technologies can optimize operations, sustainability, and resource management across a wide range of domains. To ensure the best possible use of IoT in each sector, ongoing research and development are needed to address challenges related to data security and interoperability.

**Keywords:** IoT, Smart Cities, Environmental Monitoring, Procurement, Livestock Management, Military Application.

### Utilizing Deep Learning Technique for Arabic Image Captioning

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**Abstract.** The Arabic image captioning process offers a valuable avenue for delving into the components within images and the intricate interconnections they exhibit. While this subject holds significant importance in the English language realm, it faces unique challenges in the Arabic context due to the scarcity of readily available databases. In contrast, English benefits from an abundance of resources, whereas Arabic often resorts to Google translation as an imperfect alternative, leading to the introduction of errors. To mitigate this issue, a crucial step involves pre-processing the textual data. In this paper, a novel model based on encoder-decoder techniques was presented; the proposed approach involves conducting a series of experiments, categorized into two models - VGG19 and Inception-ResNet-v2. These models play a pivotal role in feature extraction from the image during the encryption phase. Additionally, a cutting-edge model named BILSTM is introduced, which capitalizes on processing word sequences to predict text; this model has demonstrated superior performance compared to LSTM and GRU models in the decoding stage. The findings of this study, as measured by the Bleu performance scale, suggested notable improvements, with scores ranging from 33 to 37.

**Keywords:** Image captioning, BI-LSTM, Deep learning, Preprocessing.

### **Performance Analysis of Textured Contact Lens IRIS Detection Based on Manual Feature Engineering**

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**Abstract.** Numerous methods exist for identifying a person using their biometric characteristics. IRIS detection systems are one of these traits. Current iris identification systems are prone to iris presentation attacks. The most challenging to spot of the several iris presentation attacks is probably the use of textured contact lenses. No specialized survey concentrating on IRIS detection, particularly Contact Lenses Iris Detection Algorithms (CLIDs), has been published in the previous five years. Therefore, the paper reviewed recent CLID algorithms-based hand-crafted features, which were grouped into two categories: CLIDs-based spatial domain features, and CLIDs-based transform domain Features. CLIDs-based hand-crafted features are techniques that use human feature extraction to detect a counterfeit IRIS image. The performance of various current CLID algorithms based on traditional Features is compared. Finally, we hope that our review has encapsulated the majority of recent CLID studies.

**Keywords:** CLID, IRIS, ML, Hand-crafted Features.

## **Proposed model for QCNN-based Sentimental Short Sentences Classification**

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**Abstract.** As social networking continues to expand, web users have been sharing their thoughts and viewpoints daily, utilizing various mediums such as texts, images, videos, and speech. However, despite this active participation, text classification remains a crucial challenge due to the sheer volume of texts received from diverse sources and individuals with different mindsets. The shared opinions often prove to be incomplete, inconsistent, and noisy, further complicated by variations in languages. To address these challenges, NLP (Natural Language Processing) and Quantum Machine Learning (QML) methods have become widely employed. This study focuses on exploring the potential of current quantum computers in enhancing the performance of natural language processing tasks. Specifically, we propose a new approach called the Quantum Convolutional Neural Network (QCNN) for sentiment analysis. Our proposed model is the first model based on QCNN at text classification field; it leverages QCNN to extract more effective features from short sentences; Thereby, improving sentiment analysis accuracy and efficiency.

**Keywords:** Natural Language Processing, Quantum Machine Learning, Quantum Convolutional Neural Network, Sentiment Analysis.

### **An Anomaly Intrusion Detection Systems in IoT Based on Autoencoder: A Review**

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**Abstract.** Devices connected to the Internet of Things are expanding quickly and producing tons of data. Simultaneously, malicious attempts to gain access to sensitive data or disrupt networks have accelerated and grown more sophisticated. As a result, cybersecurity has emerged as a critical matter in the evolution of prospective networks capable of responding to and countering such threats. Intrusions detecting systems (IDS) are crucial for IoT security. There are two types of intrusion detection systems: signature-based and anomaly-based. Signature-based work to identify known attacks. However, it will be unrealistic to rely on pre-defined threat monitoring (signature-based) due to the variety of attack types in addition to the unstructured data generated by IoT devices and their characteristics. On the other hand, anomaly-based intrusion detection is able to identify known and unknown attacks. Many anomaly-based systems were designed using autoencoder techniques to reduce the high diminution of data and identify the intrusion in the resource-constrained IoT devices. This paper proposed an in-depth review of the approaches that used an autoencoder to detect attacks in an IoT environment. The main objective of this review is to find and address the current challenges of anomaly intrusion detection systems based on autoencoders as well as to present an overview of the different types of autoencoders that are used to enhance the effectiveness of intrusion detection systems. The findings of this paper show that autoencoders achieved an encouraging result in terms of reducing the dimensionality, improving the accuracy, and detecting anomalies. However, these approaches still suffer from high training time, complexity, and detection time. A robust adaptive anomaly intrusion detection system based on an autoencoder, to reduce the high dimensionality of data and detect attacks in IoT, is much needed.

**Keywords:** IoT Applications, Anomaly Intrusion Detection, Deep Learning.

### **Comparative Analysis of ResNet50, and VGG16 Architectures for Counterfeit Logo Identification**

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**Abstract.** The unregulated proliferation of counterfeit branding in the era of digital technology poses a significant risk to the worth of brands and erodes the confidence of consumers. In order to tackle this particular difficulty, the present study focused on the domain of counterfeit logo identification, with a specific emphasis on three widely recognized international brands: Adidas, Nike, and The North Face. In this study, a comprehensive comparative analysis was performed on the VGG16 and ResNet50 deep learning architectures using advanced machine learning techniques to identify counterfeit logos. The models underwent training and validation using a carefully selected dataset that included authentic and fraudulent variations of logos from the brands. The empirical findings underscored the superior performance of the VGG16 model, which achieved an accuracy rate of 77%, outperform the 72% accuracy rate achieved by the ResNet50 model. Moreover, the VGG16 model regularly demonstrated superior performance in evaluation criteria such as precision, recall, and F1-score. The findings highlight the complexities and difficulties associated with detecting counterfeit logos, while also demonstrating the promise of artificial intelligence in protecting the integrity of brands. The findings of this study have important implications for brand protection and customer trust in the digital marketplace, considering the widespread familiarity with the companies under investigation.

**Keywords:** Fake logo, ResNet50, VGG16, Deep learning, Classification.

## ABSTRACTS

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### Assessing the Prioritization of Key Influencing Factors for Industrial IoT Readiness in SMEs

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**Abstract.** Industrial Internet of Things (IIoT) is a network of connected physical smart devices that connects and exchanges data with each other in various industrial environments. Understanding and identifying the key influencing factors are critical for SMEs to consider the readiness of IIoT. Recognizing the key influencing factors is most important as it enables SMEs and policymakers to make more informed decisions and to better plan for an effective adoption of IIoT in enhancing operations and competitiveness. This paper assesses the key prioritization factors and readiness of SMEs to use Industrial IoT (IIoT) technologies to improve their business operations. IIoT involves linking smart devices, sensors, and networks within industrial systems and environment to enable data sharing and analysis in order to improve production and efficiency. SMEs are increasingly turning to IIoT to improve their competitiveness and efficiency and to reduce cost. A detailed study has been conducted to assess the key influencing factors for the readiness of IIoT in SMEs. There is a total of forty-seven (47) influencing factors identified for the successful adoption of IIoT in SMEs. These factors are further divided into four groups based on the TOEI framework which are technology, organization, environment and individuals. These factors are prioritized based on a survey and experts' opinions after a descriptive statistics analysis to prioritize the key influencing factor for the readiness of IIoT in SMEs. Furthermore, this study will provide significant insights for SMEs and policymakers to make well-formed decisions and plans for adopting and deploying IIoT technologies in the business environment.

**Keywords:** Industrial IoT, Readiness, SMEs, Influencing Factors, Assessment, Priority.

### **A Real -Time Hand Gesture Recognition based on Media-Pipe and Support Vector Machine**

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**Abstract.** The rapid advancement of technology has led to Hand-Gesture Recognition becoming a crucial element in Human-Machine Interaction (HMI). In recent years, there has been growing interest in employing visual recognition techniques to enhance the precision of gesture discrimination. This work introduces a hand-gesture recognition system founded on visual recognition; the research encompasses three distinct scenarios. The first scenario involves the creation of HGR using 50 images representing five fingers: the thumb, index, middle, ring, and pinkie. The second scenario expands upon this by incorporating 200 images for the same set of fingers as in the first scenario to increase the size of dataset. The final scenario encompasses the previously mentioned fingers and includes counting gestures, totaling 2000 images. In all scenarios, images are gathered for both left and right hands through real-time video capture. Feature extraction relies on 21 hand landmarks inspired by actual hand joints, and the MediaPipe library, an open-source hand-tracking tool, is employed for this purpose. Lastly, the classification of hand gestures is accomplished using the Support Vector Machine (SVM) algorithm. Among the experiments conducted, the third scenario achieved the highest accuracy, reaching an impressive 97.8% for ten hand gestures instead of 97% for five hand gestures.

**Keywords:** HGR; SVM; Media-pipe; HMI; Hand landmarks.



### **The Era of Industry 5.0: An Overview of Technologies, Applications, and Challenges**

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**Abstract.** Industry 5.0 aims to leverage the collaborative potential between humans and intelligent machines, surpassing the manufacturing solutions of Industry 4.0 by achieving resource-efficient and customizable processes. This paper presents a comprehensive overview of Industry 5.0, covering its underlying technologies, significant applications, and potential challenges. The study explores diverse applications of Industry 5.0, such as intelligent healthcare, manufacturing, and supply chain management. Additionally, it examines the enabling technologies that facilitate Industry 5.0, including edge computing, the Internet of Things, digital twins, the blockchain, collaborative robots, and emerging 6G and beyond networks. The paper also highlights critical challenges and unresolved issues that require further exploration and development to realize the vision of Industry 5.0. This study's outcomes will likely benefit researchers, industry professionals, policymakers, and technology developers by providing insights into Industry 5.0, offering practical applications, and identifying areas for innovation and regulatory considerations.

**Keywords:** Industry 5.0, IR 5.0 Technologies, Cyber-Physical Systems, Digitalization, Internet of Things, Blockchain, Artificial Intelligence.

## Overview of Cybersecurity Trends in Jordan's Financial Sector

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**Abstract.** This comprehensive review paper delves into the burgeoning domain of cybersecurity challenges in Jordan's financial sector, a critical area given the sector's rapid digital transformation. The paper synthesizes existing literature to present an overview of the current state of cybersecurity in the financial industry, emphasizing the unique context of Jordan. It explores the intricate relationship between technological advancements, such as Financial Technology (FinTech) applications, and the evolving landscape of cyber threats and regulatory measures. The paper highlights how digital transformation, propelled by the adoption of technologies like blockchain and artificial intelligence, has redefined traditional banking practices, enhancing efficiency and accessibility, while also introducing new cybersecurity challenges. The review extends to examining the integration of FinTech in Islamic finance, which presents a unique blend of traditional principles and modern technology, resulting in distinct ethical and operational challenges. Additionally, the paper discusses strategic intelligence and asset management as essential components for competitive advantage in the financial sector, with cybersecurity emerging as a pivotal factor in safeguarding these aspects. The paper concludes by suggesting future directions for research and practical engagement, underscoring the need for a robust digital financial ecosystem that can effectively navigate the complex interplay of technology, security, and regulation.

**Keywords:** Cybersecurity, Financial Technology, Digital Transformation, Jordan's Financial Sector, Blockchain, Artificial Intelligence, Regulatory Compliance.

## ABSTRACTS

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### **Machine Learning-Based Predictive Models for Cardiovascular and Cerebrovascular Diseases Diagnosis and Treatment Optimization**

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**ABSTRACT.** The heart, a crucial organ responsible for pumping oxygenated blood and regulating hormones, is vital for maintaining optimal blood pressure. Any deviations in its function can lead to a variety of cardiovascular diseases (CVD). Coronary Heart Disease (CHD), a significant subtype of CVD, affects a considerable percentage of cases and can impact both men and women. These conditions, notably coronary artery disease (CAD), significantly contribute to global mortality rates. Several machine methods have been proposed for detection of cardiovascular diseases. However, more attention is required to improve the performance of these detection methods. This research seeks to utilize machine learning methods to detect myocardial infarction, a critical heart condition. It aims to address the challenge of imbalanced datasets by reviewing various strategies. Seven machine learning classifiers are applied to enhance the accuracy of predicting heart diseases. The main goal is to advance medical diagnosis and treatment accuracy using machine learning. After detailed tuning, the XGBoost model stands out with 98.50% accuracy, 99.14% precision, 98.29% recall, and an F1-score of 98.71%, significantly improving heart disease diagnosis accuracy.

**Keywords:** Machine learning, XGBoost, cardiovascular diseases, cerebrovascular diseases.

### Hybrid Filter Feature Selection for Improving Cancer Classification in High-Dimensional Microarray Data

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**Abstract:** In this study, we present a novel approach to improve cancer classification using high-dimensional microarray data. The proposed method combines a hybrid filter and a genetic algorithm-based feature selection process, incorporating Chi-square and Recursive Feature Elimination (RFE) techniques to identify critical gene expressions for cancer classification. Experiments using diverse datasets have yielded significant results. In the Lung Cancer Dataset, Logistic Regression Analysis (LR) and Support Vector Machine (SVM) achieved remarkable accuracy rates of 97.56%, with a precision and recall of 98.0%, resulting in an F1-score of 97.0%. This highlights the effectiveness of the feature selection method in enhancing classification accuracy. In the Ovarian Cancer Dataset, Gradient Boosting emerged as the top-performing classifier, achieving an accuracy of 92.85% along with precision, recall, and F1-score values of 94.0%, 93.0%, and 92.0%, respectively. These results demonstrate the versatility of the proposed feature-selection approach. This demonstrates the adaptability of the proposed feature selection technique in improving classifier performance. In summary, the hybrid filter and genetic algorithm-based feature selection method, incorporating Chi-square and RFE, proved to be a valuable tool for enhancing cancer classification in high-dimensional microarray data. The consistently high accuracy, precision, recall, and F1-score across diverse cancer datasets underscore the effectiveness and versatility of the proposed approach, holding promise for the development of more accurate cancer classification models in the future.

**Keywords:** cancer classification, hybrid Feature Selection, microarray dataset, genetic algorithm.

## ABSTRACTS

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### Machine Learning Techniques for Evaluating Student Performance

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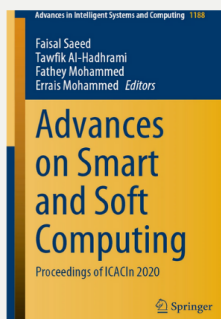
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**Abstract.** In various sectors, particularly in education, artificial intelligence has significantly influenced outcomes by deploying AI algorithms to gain valuable insights into student learning processes, emphasizing the importance of assessing students' knowledge for understanding their learning levels and improving educational strategies. Traditional assessment methods have limitations due to biases and time constraints. With advancements in artificial intelligence and machine learning, this study employs machine learning algorithms to create a predictive model identifying students with academic challenges. By utilizing diverse features, this research identifies key factors influencing academic outcomes, achieving an impressive classification accuracy of 90.91%. Logistic Regression outperformed other models like XGBoost and Gradient Boost. Integrating AI and ML techniques revolutionizes assessment methods, offering objective insights for timely interventions. This approach not only enhances students' academic journey but also creates a conducive learning environment, promoting sustainable academic success in higher education.

**Keywords:** Artificial Intelligence, Machine learning, Student performance, Performance Prediction.



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