UNIMAS
UNIVERSITI MALAYSIA SARAWAK

FACULTY OF
COMPUTER SCIENCE &
INFORMATION TECHNOLOGY

MD
Premier Digital
Tech Institution

Conference
PROGRAMME BOOK

CITA

The **14**TH International Conference on
INFORMATION TECHNOLOGY IN ASIA
(CITA 2025)

*"Embracing Disruptive Technologies
for a Transformative Digital Future"*

5TH - 6TH AUGUST 2025
BORNEO CULTURES MUSEUM
KUCHING, SARAWAK

CONTENTS

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MESSAGE FROM THE MINISTER

Yang Berhormat Dato Sri Roland Sagah Wee Inn
Minister of Education, Innovation and Talent Development, Sarawak

Salam Sejahtera and warm greetings to all esteemed guests, speakers, and participants,

It is an honor to address you at the 14th International Conference on Information Technology in Asia (CITA '25) and the 29th International Conference on Asian Language Processing (IALP '25). This gathering reflects our commitment to education, innovation, and technology, marking a significant step toward Sarawak's vision of becoming a high-income state by 2030.

As we navigate the complexities of the Digital Era, Sarawak faces both challenges and opportunities. The rapid growth of artificial intelligence (AI) offers us unmatched potential to advance our digital transformation and develop human capital. By harnessing AI, we can foster innovative, creative, and critical thinking skills among our youth.

Our government is dedicated to bridging the digital divide, ensuring that all Sarawakians, particularly in rural areas, can participate in the digital economy. This initiative is part of the Sarawak Digital Economy Strategy 2018-2022, aimed at integrating digital technologies across various sectors.

Education is the cornerstone of our progress. Collaborating closely with Malaysia's Ministry of Education, we promote STEM education and enhance English language proficiency to prepare our youth for future workforce demands. The IALP conference highlights the importance of language in cultural preservation and communication, reinforcing our diverse heritage.

CITA 2025's theme, "Embracing Disruptive Technologies for a Transformative Digital Future," provides a vital platform for industry and academia to converge. By fostering collaborations, we pave the way for innovative solutions to real-world challenges.

As we embark on this journey of digital transformation, we must prioritize sustainable development and social inclusivity. By investing in education and talent development, we prepare our youth to become leaders and innovators, shaping Sarawak's future.

I encourage all of you to engage in meaningful discussions and collaborate on solutions that will lead Sarawak toward a prosperous and inclusive future.

Thank you, and I wish you all a successful and inspiring conference.

MESSAGE FROM
THE VICE CHANCELLOR, UNIMAS

YBhg Prof. Dr. Ahmad Hata Rasit

Assalamu'alaikum, Warahmatullahi Wabarakatuh, and Salam UNIMAS Lestari.

Welcome to the 14th International Conference on Information Technology in Asia (CITA 2025) and the 29th International Conference on Asian Language Processing (IALP 2025)! It's a real honour for UNIMAS to host these important events, especially since we're part of the BIMP-EAGA Knowledge Bridge.

This year, UNIMAS is super excited to be part of the BIMP-EAGA initiative. It's all about sharing knowledge and working together on research projects among the member countries. The Knowledge Bridge is like a mobility program that helps strengthen cultural and academic ties, especially in Computer Science and Information Technology. This is all in line with the BIMP-EAGA Vision 2025, which says that digital connectivity and innovation are key to regional development.

At the Faculty of Computer Science and Information Technology, we're committed to tackling real-world challenges through seven dynamic research clusters. These initiatives have gotten us some great grants and recognition, which shows how dedicated we are to innovation and collaboration.
CITA and IALP are not just conferences; they're platforms where we can share ideas and learn from each other. We see these events as ongoing conversations within the BIMP-EAGA community, building a global network of researchers and industry leaders who are all about driving progress.

Let's make the most of this opportunity to inspire each other and shape a better digital future together. I wish you all a fantastic and inspiring conference.

Thank you.

MESSAGE FROM THE DEAN

Prof. Dr. Jane Labadin

It is with great pleasure that we welcome you to the 14th International Conference on Information Technology and Multimedia (CITA 2025) and the 29th International Conference on Asian Language Processing (IALP 2025), hosted jointly for the first time by Universiti Malaysia Sarawak (UNIMAS) in the culturally vibrant land of Sarawak.

This joint gathering of CITA and IALP marks a significant milestone—uniting two dynamic academic communities under one roof to spark meaningful dialogue, foster cross-disciplinary research, and explore transformative innovations at the intersection of information technology, multimedia, and languages.

CITA 2025 carries forward its commitment to shaping future societies through digital innovation. Guided by the theme "Embracing Disruptive Technologies for a Transformative Digital Future", the conference aims to highlight forward-thinking solutions in areas of Computing such as AI, IoT, multimedia systems, and smart technologies that will define the next wave of human advancement.

In parallel, IALP 2025, held in collaboration with the Chinese and Oriental Languages Information Processing Society (COLIPS), serves as a vital platform for advancing research in computational linguistics, natural language processing, and speech technologies. It seeks to preserve and promote Asia's rich linguistic diversity while bridging the gap between language and digital society.

We are deeply honoured by the participation of renowned plenary, keynote, and invited speakers. Their expertise, along with the contributions of our global participants, will no doubt enrich our shared journey of knowledge, innovation, and collaboration.

To all attendees, we invite you to immerse yourselves fully in the sessions, connect across disciplines, and experience the warmth and hospitality of Sarawak.

Welcome to CITA 2025 and IALP 2025—may your time here be inspiring, fruitful, and unforgettable.

MESSAGE FROM THE CONFERENCE CHAIR

Assoc. Prof. Dr. Stephanie Chua

It is my great pleasure to welcome all participants to the 14th International Conference on Information Technology in Asia (CITA'25), a biennial event proudly organised by the Faculty of Computer Science and Information Technology (FCSIT), Universiti Malaysia Sarawak (UNIMAS). We are honoured to host this year's conference at the Borneo Cultures Museum in the vibrant city of Kuching, Sarawak.

Themed "Embracing Disruptive Technologies for a Transformative Digital Future", CITA'25 provides a dynamic platform for researchers, engineers, academics, industry experts, and postgraduate students to engage in meaningful dialogue, share groundbreaking research, and explore innovative solutions in the ever-evolving field of Information Technology. The conference reflects our commitment to not only keeping pace with technological advancements but also shaping their direction in ways that are responsible, inclusive, and impactful.

This year, we are proud to feature a rich programme that spans a diverse array of topics—ranging from Artificial Intelligence, Big Data, and Cloud Computing to Cybersecurity, Smart and Green Technologies, and emerging areas such as Gamification, Special Education Technologies, and the Responsible Web. The inclusion of special tracks on Business Intelligence and Education Technologies further enhances the relevance and reach of this conference in addressing current global challenges.

I would like to extend my heartfelt thanks to all contributors—authors, reviewers, speakers, and participants—for their invaluable support. I also wish to acknowledge the dedication of the organizing committee and partners who have worked tirelessly to make CITA'25 a success.

May this conference spark new collaborations, inspire transformative ideas, and deepen our collective resolve to harness disruptive technologies for the betterment of society. I encourage everyone to take full advantage of the intellectual exchange, networking opportunities, and cultural experiences that CITA'25 and Kuching have to offer.

Welcome to CITA'25!

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PLENARY SPEAKER

Prof. Ts. Dr. Ali bin Selamat

Connecting the Dots in Trustworthy AI: Bridging Ethics, Regulation, and Explainability for ASEAN's Digital Future

This keynote addresses the critical challenge of building trustworthy AI systems in Southeast Asia's rapidly evolving digital landscape. With only 46% of global users trusting AI despite 66% relying on its outputs, the trust paradox presents both challenges and opportunities for the ASEAN region. This presentation connects the fundamental elements of trustworthy AI from abstract ethical principles to concrete implementation strategies examining how Southeast Asia's unique cultural context and regulatory approach position the region for leadership in responsible AI development. The keynote explores six interconnected themes: (1) the convergence of global AI ethics frameworks, including UNESCO's standards and Singapore's innovative governance models; (2) the contrasting regulatory landscapes between the EU's prescriptive approach and Asia's adaptive, principles-based frameworks; (3) the evolution of Explainable AI (XAI) technologies and their critical role in building stakeholder trust; (4) successful regional implementations, including Singapore's AI Verify framework and Gojek's privacy-preserving fraud detection systems; (5) Southeast Asia's distinctive challenges, from linguistic diversity to the digital divide, alongside unique advantages in cultural AI acceptance; and (6) practical strategies for measuring and building AI trust across diverse stakeholder groups. Drawing on recent developments including Malaysia's National AI Guidelines (2024) and ASEAN's collaborative frameworks, this presentation demonstrates how trustworthy AI serves not as a constraint on innovation but as an enabler of sustainable digital transformation. The keynote concludes with actionable recommendations for researchers, policymakers, and industry leaders to champion responsible AI development that reflects regional values while meeting global standards, ultimately positioning Southeast Asia as a model for trustworthy AI implementation worldwide.

BIOGRAPHY

The Plenary Speaker for CITA'25 is Prof. Ts. Dr. Ali bin Selamat, Deputy Vice-Chancellor (Student Affairs and Alumni) at Universiti Teknologi Malaysia (UTM). He also serves as the Head of the Computing and Artificial Intelligence Cluster at Akademi Profesor Malaysia. A highly respected academic, Prof. Ts. Dr. Ali possesses extensive expertise in artificial intelligence, machine learning, software engineering, information retrieval, pattern recognition, neural networks, soft computing, computational collective intelligence, strategic management, key performance indicators and knowledge management. To date, he has published over 400 research papers, achieving an H-index of 85 and accumulating more than 23,000 citations in the Web of Science. In recognition of his impactful scholarship, he was listed among the World's Top 2% Scientists in the 2023 single-year impact category by Stanford University in collaboration with Elsevier. Prof. Ts. Dr. Ali has also played a leading role in national academic initiatives, including his previous appointment as Deputy Head of the Science, Technology & Innovation Cluster (Computing & Innovation) under the Ministry of Higher Education. He previously served on the editorial board of Knowledge-Based Systems (Elsevier) and was Chair of the IEEE Computer Society Malaysia.

KEYNOTE SPEAKER

Prof. Dr. Patrick Then

Sarawak Sovereign AI

The Sarawak AI Centre (SAIC) is a strategic pillar in advancing Sarawak's vision of sovereign AI—artificial intelligence that is developed, governed, and applied in ways that reflect local priorities, ethical values, and long-term sustainability. SAIC plays a critical role in supporting both the Post COVID-19 Development Strategy 2030 (PCDS 2030) and the Sarawak Digital Economy Strategy 2030 (SDE2030), by enabling innovation, strengthening digital infrastructure, and fostering inclusive socioeconomic growth. At the heart of this vision is DeepSAR, Sarawak's flagship AI research and innovation programme, which brings together multidisciplinary teams to develop scalable, high-impact AI solutions tailored to the needs of the state. DeepSAR drives applied research in strategic sectors identified under PCDS 2030—such as agriculture, energy, education, healthcare, and rural development—ensuring that AI addresses real-world challenges and creates tangible value for Sarawakians. For researchers, SAIC and DeepSAR offer a collaborative platform to push the boundaries of AI through responsible, open, and high-impact science, while also nurturing local talent and advancing capabilities in data, computation, and algorithmic transparency—key priorities under SDE2030. For the public, SAIC works to demystify AI and build trust in its application. Through inclusive outreach, digital literacy programmes, and ethical policy design, the Centre ensures that AI is not only accessible, but actively contributes to a fair, inclusive, and sustainable future. By developing its own AI capacity through SAIC and DeepSAR, Sarawak is not simply adapting to global technological change—it is actively shaping a digital future that is resilient, locally driven, and uniquely Sarawakian.

BIOGRAPHY

Prof. Patrick Then assumed the Chief Executive Officer of state-owned Sarawak Artificial Intelligence Centre (SAIC) since March 2025. SAIC aims to accelerate Sarawak economic growth by leveraging AI technologies. SAIC conducts high-impact research and development for Sarawak's needs, and advises policymakers on AI governance, policy, audit, and talent development. Before that, he led School of ICT as Head of School, Centre for Digital Futures as Director, Swinburne University of Technology Sarawak. As SAIC CEO, he continues mentoring researchers and academics in academia. He has been recognized as eminent researcher in health informatics in the region collaborating with prominent cardiologists and clinicians in Clinical Research Centre Sarawak General Hospital in Malaysia and the National Institutes of Health, Ministry of Health Malaysia. He has published papers in high impact journals and proceedings. He is a strong advocate of transdisciplinary research where he translated artificial intelligence techniques into healthcare, manufacturing and other applications. He is a sought-after keynote speaker in IT and cardiology conferences in Europe, India, Indonesia and South Korea. He is the holder of multiple patents and software copyrights that have been translated into commercial product. He is a highly recognised digital health Key Opinion Leader by Ministry of Health Malaysia. He is an elected fellow of the European Society of Cardiology, fellow of the Society for Design and Process Science USA, Senior member of Australian Computer Society, Senior member of IEEE, and Board member of Sarawak Development Institute.

INVITED SPEAKER

Mr. Muhammad Usman

AI beyond LLM training : building infrastructure around LLM

This talk will explore the critical concept of Community-Centric Sovereign AI, focusing on empowering local communities to control and benefit from AI technologies. We will delve into key areas such as data governance models that prioritize privacy and local control, the development of open-source frameworks for localized AI infrastructure, and the establishment of robust ethical AI principles to ensure trustworthy and equitable deployment. We shall look beyond LLM training, focusing on many other aspects besides LLM training and fine tuning. Furthermore, the discussion will cover strategies for protecting community interests by mitigating algorithmic bias, strengthening cybersecurity, and preventing "AI colonialism." Finally, we will examine approaches to fostering local control and decision-making through decentralized AI architectures, community-led development initiatives, and economic models that ensure AI's value remains within the community. The goal is to provide a comprehensive understanding of how communities can harness AI as a tool for self-determination and sustainable development.

BIOGRAPHY

Mr. Muhammad Usman is a TEDx speaker, self-taught AI engineer, and a leading advocate for ethical and community-driven technology. As the AI Integration Lead at Embedded LLM, he specialises in designing and implementing open-source AI solutions that empower organisations and local communities. With deep expertise in both finance and artificial intelligence, Mr. Usman champions the concept of "Sovereign AI," driving initiatives that enable communities to shape and benefit from AI technologies on their own terms. In his upcoming talk, "AI Beyond LLM Training: Building Infrastructure Around LLMs," Mr. Usman will explore the critical concept of Community-Centric Sovereign AI, focusing on empowering local communities to control and benefit from AI technologies. The session will delve into key areas such as data governance models that prioritise privacy and local control, the development of open-source frameworks for localised AI infrastructure, and the establishment of robust ethical AI principles to ensure trustworthy and equitable deployment. Looking beyond LLM training and fine-tuning, the talk will highlight the many other essential components needed to build resilient AI ecosystems. Furthermore, Mr. Usman will discuss strategies for protecting community interests by mitigating algorithmic bias, strengthening cybersecurity, and preventing "AI colonialism". The session will also examine approaches for fostering local control and decision-making through decentralised AI architectures, community-led development initiatives, and economic models that ensure AI's value remains within the community. The goal is to provide a comprehensive understanding of how communities can harness AI as a tool for self-determination and sustainable development.

DAY 1 (5TH AUGUST 2025)

Time	Activity	Venue
08:00 – 09:00	Registration, Arrival of participants & Dean of FCSIT	Borneo Cultural Museum Foyer
09:00 – 09:30	**Breakfast at Museum Restaurant**	
09:30 – 09:35	Housekeeping Announcement	Auditorium
09:35	**Welcoming Speech** by *Professor Dr. Jane Labadin*, Dean of FCSIT & Conference Advisor The 14th International Conference on Information Technology in Asia (CITA) 2025	Auditorium
09:50	Photo Session	Auditorium
10:00 – 11.00	**CITA25 Plenary Session** Connecting the Dots in Trustworthy AI: Bridging Ethics, Regulation, and Explainability for ASEAN's Digital Future by *Prof Ts Dr Ali Selamat, Deputy Vice Chancellor of Universiti Teknologi Malaysia (UTM)*	Auditorium
11:00 – 12:00	**IALP25 Plenary Session** Mesolitica's Journey in Developing Malaysia's Large Language Model (MaLLaM 🌙) by *Mr Ahmad Khalil bin Mohamad Nooh (Khalil Nooh), Co-Founder and CEO of Mesolitica*	Auditorium
12:00 – 13:00	**Lunch at Museum Restaurant**	

	CITA25 Activity	Venue	Time	IALP25 Activity	Venue
13:00 – 14:00	**Keynote Session** Sarawak Sovereign Artificial Intelligence by *Prof Dr Patrick Then, Chief Executive Officer, Sarawak Artificial Intelligence Centre*	Room 3	13:00 – 15:00	**Parallel Session 1**	Func-Room A Func-Room B
14:00—15:00	**Parallel Session 1**	Room 3			
15:00 – 15:20	**Tea Break at Museum Restaurant**		15:00 – 15:20	**Tea Break at Museum Restaurant**	
15:20 – 17:00	**Parallel Session 2**	Room 3	15:20 – 17:00	**Parallel Session 2**	Func-Room A Func-Room B
	Poster Presentation CITA Judging Time (13:00 – 16:00)	Poster Hall (Outside Room1&2)		**Poster Presentation IALP** Judging Time (13:00 – 16:00)	Func-Room B • Poster 1-14:20 • Poster 2-14:30 • Poster 3-14:40
17:00	**End of Day 1**				

DAY 2 (6ᵀᴴ AUGUST 2025)

Time	CITA25 Activity	Venue	Time	IALP25 Activity	Venue
09:00 – 10:00	**Parallel Session 3**	Room 1		**Parallel Session 3**	Func-Room A Func-Room B
	Poster Exhibition (09:00 – 10:00)	Poster Hall (Outside Room 1&2)			
10:00 – 10:30	**Morning Break at Museum Restaurant**				
10:30 – 11:30	**Invited Speaker Session** AI beyond LLM training: Building infrastructure around LLMs *by Mr Muhammad Usman, AI Integration Lead, Embedded LLM*	Room 3	10:30 – 11:30	**Keynote Session** Reinforcement Learning for Text-to-speech Synthesis *by Professor Wu Zhizheng, The Chinese University of Hong Kong, Shenzhen*	Func-Room A
11:40 – 13:00	**Parallel Session 4**	Room 3	11:40 – 13:00	**Parallel Session 4**	Func-Room A Func-Room B
	Poster Exhibition (10:30 – 13:00)	Poster Hall (Outside Room 1&2)			
13:00 – 14:00	**Lunch at Museum Restaurant**				
14:00 – 15:40	**Parallel Session 5**	Room 3		**Parallel Session 5**	Func-Room A Func-Room B
	Poster Exhibition (14:00 – 15:40)	Poster Hall (Outside Room 1&2)			
15:40 – 16:00	**Tea Break at Museum Restaurant**				
16:00	**End of Conference**		16:00 – 16:30	**IALP25 Handing Over Ceremony**	Func-Room A
			16:30	**End of Conference**	

Note: Func-Room A & Func-Room B at Level 1; Room 1 & Room 3 at Level 2, Poster Hall (Outside Room1&2) at Level 2

LAUNCHING CEREMONY AND DINNER EVENT

The 14th International Conference on Information Technology in Asia (CITA'25)

Date: 5th August 2025, Tuesday
Venue: Ranyai Ballroom, The Waterfront Hotel
Time: 7:00 pm- 10:30 pm

7.00 pm	Arrival of Invited Guests
7.10 pm	Arrival of *Yang Berbahagia Profesor Dr. Ahmad Hata bin Rasit* Vice Chancellor, Universiti Malaysia Sarawak (UNIMAS)
7.20 pm	Arrival of *Yang Berhormat Dato Sri Roland Sagah Wee Inn* Minister of Education, Innovation and Talent Development, Sarawak
7.30 pm	"Negaraku" and "Ibu Pertiwiku" Do'a Recital **Welcoming Remarks by** *Professor Haizhou Li* President of Chinese and Oriental Languages Information Processing Society (COLIPS) & IEEE Signal Processing Society and Honorary Chair of The 29th International Conference on Asian Language Processing (IALP) 2025 **Distinguished Speech by** *Yang Berbahagia Profesor Dr. Ahmad Hata bin Rasit* Vice Chancellor, Universiti Malaysia Sarawak (UNIMAS) **Inaugural Speech and Launching by** *Yang Berhormat Dato Sri Roland Sagah Wee Inn* Minister of Education, Innovation and Talent Development, Sarawak Launching Gimmick and Montage **Dinner Performances and Activities** Token of Appreciation Conference Award Presentation Souvenir Presentation Photo Session
10.30 pm	End of Event

PARALLEL SESSION 1 (DAY 1) – 5TH AUGUST 2025

Location: Room 3
Chairperson: Dr Liew Siaw Hong

Time	Title	Authors	Institution
14:00 – 14:20	Rural School Network Infrastructure Analysis and Redesign for Meaningful Connectivity (Paper 19)	Marcella Peter*, Khairunnisa Ibrahim, Gary Chee-Wyai Loh, Kim-Mey Chew	University of Technology Sarawak (UTS)
14:20 – 14:40	Leveraging netStethoscope for Enhanced Network Monitoring in Rural Malaysia (Paper 47)	Brandon Chong Kian Hua*, Tariq Zaman, Khairuddin Ab Hamid, Gary Loh Chee Wyai, Cat Kutay	University of Technology Sarawak (UTS)
14:40 – 15:00	The Role of AI-Driven Support Systems in Reducing Nurse Turnover: A Systematic Review of Effectiveness and Perceptions (Paper 27)	Sin Yee Lee*; Ee Xion Tan	IMU University
15:00 – 15:20	Tea Break at Museum Restaurant		

*Note: *Presenter*

PARALLEL SESSION 2 (DAY 1) – 5TH AUGUST 2025

Location: Room 3
Chairperson: Ts. Dr Chew Kim Mey

Time	Title	Authors	Institution
15:20 – 15:40	Brush Buddies: Augmented Reality Dental Hygiene Interactive Book to Promote Oral Health Care Among Young Learners (Paper 9)	Salyani Osman*, Muhammad Hafizuddin Norizan, Norazimah Awang, Amalia Mohamad, Azaliza Zainal, Marliza Abdul Malik	Universiti Kuala Lumpur
15:40 – 16:00	ARRANGE: An Augmented Reality-Powered Mobile Application for Interactive Interior Design (Paper 61)	Ain Nazihah Pakasa*, Nurlaila Rosli, Hael Rabbani Joseph	iCATS University College
16:00 – 16:20	A Reinforcement Learning-Based Dynamic Adaptive Gamification (DAG) Method for Online Employee Training (Paper 46)	Yogeswari Shabadurai*, Fang-Fang Chua, Tek-Yong Lim	Multimedia University (MMU)
16:20 – 16:40	Gamification of Regional Tourism Engagement: Analysis and Design of a Web-Based Information System (Paper 48)	Johannes Hamonangan Siregar*, Rufman Iman Akbar, Augury El Rayeb, Chaerul Anwar, Suriati Khartini Jali, Mohamad Imran Bandan, Lim Phei Chin, Abby Lian Hendrick	Universitas Pembangunan Jaya
16:40 – 17:00	Comparative Study of Fusion Techniques for Multimodal Fake News Detection (Paper 43)	Idza Aisara Norabid*, Noor Hafhizah Abd Rahim, Masita Abdul Jalil	Universiti Malaysia Terrengganu (UMT)
17:00	End of Day 1		

Note: *Presenter

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PARALLEL SESSION 3 (DAY 2) – 6TH AUGUST 2025

Location: Room 1 [Online]
Join Zoom Meeting: https://unimas-my.zoom.us/j/95176549323
pwd=hLRFy8xXIjeBsQ6Y8tMWajBvEKDiAX.1

Meeting ID: 951 7654 9323   **Passcode:** 676296   **Time:** Aug 6, 2025 08:00 AM Singapore

Chairperson: Ts. Ahmad Hadinata Fauzi

Time	Title	Authors	Institution
08:40 – 09:00	From Play to Plate: Usability Testing of the All You Can Eat (AYCE) Educational Game (Paper 6)	Nooralisa Mohd Tuah*, Soffri Yussof, Noreena Yi-Chin Liu, Aleksei Lavrov, Anna Lavrova, Aleksandr Volosiuk, Artem Smolin, Andrei Balkanskii	Universiti Malaysia Sabah
09:00 – 09:20	Signal Processing and Broadband Service Quality in Public Higher Education Institutions: Factors Influencing User Experience and Adoption (Paper 7)	Shelena Soosay Nathan*, Sani Inusa Milala, Siti Noraiza Ab Razak, Mizani Mohamad Madon	Universiti Tun Hussein Onn Malaysia (UTHM)
09:20 – 09:40	Smart Assistance for the Disabled: Design and Implementation of an Accessible Employment Service Platform Based on GPT Technology (Paper 50)	Chen, Xiangdong*; Cui, Heng; Wang, Fan; Pan, Tianshengnan	Nanjing Normal University of Special Education (NNUSE)
09:40 – 10:00	Positional analysis using Monocular Relative Depth and Angular Estimation (Paper 12)	Omkar Jois*, Anup Prakash, Aadithya H Rao, Shreya B A, Shylaja S S	PES University
10:00 – 10:30	Morning Break at Museum Restaurant		

*Note: *Presenter*

PARALLEL SESSION 4 (DAY 2) – 6TH AUGUST 2025

Location: Room 3
Chairperson: Ts. Dr Chiu Po Chan

Time	Title	Authors	Institution
11:40 – 12:00	Enhancing Feature Selection Stability with a Hierarchical Whale Optimization Algorithm (Paper 44)	Li Yu Yab*, Noorhaniza Wahid, Rahayu A Hamid	Universiti Tun Hussein Onn Malaysia (UTHM)
12:00 – 12:20	A Comparative Analysis of Topic Modelling Techniques for Malaysian Business News Data: LDA, NMF, Top2Vec, and BERTopic (Paper 35)	Vadrianey Asas*, Sarah Samson Juan, Vianney Camelie Kerbun, Stephanie Chua, Jane Labadin, Evan Lau	Universiti Malaysia Sarawak (UNIMAS)
12:20 – 12:40	Comparative Analysis of Lightweight BERT Models and Ensemble Benefits for Extractive Q&A (Paper 40)	Allistair Nallie anak Konsil*, Stephanie Chua, Jacey Lynn Minoi	Universiti Malaysia Sarawak (UNIMAS)
12:40 – 13:00	Anchor-Point Based Euclidean Reduction for Enhanced Instance-based Classification (Paper 51)	Mohammad Hossin*; Abdul Muqtasid Rushdi	Universiti Malaysia Sarawak (UNIMAS)
13:00 – 14:00	Lunch at Museum Restaurant		

*Note: *Presenter*

PARALLEL SESSION 5 (DAY 2) – 6TH AUGUST 2025

Location: Room 3
Chairperson: Madam Hamizan Sharbini

Time	Title	Authors	Institution
14:00 – 14:20	Unveiling Patterns in Movies and TV Shows on Netflix: A Clustering-Based Analysis (Paper 29)	Xue Kang Chok*, Siew Mooi Lim, Qi Xiang Choo, Hui Ying Chan	TAR UMT
14:20 – 14:40	YOLOv12-ECA: An Efficient Attention-Enhanced Detector for Real-Time UAV-Based Pothole Detection (Paper 58)	Siti Fairuz Mat Radzi*, Mohd Amiruddin Abd Rahman, Muhammad Khairul Adib Muhammad Yusof	Universiti Putra Malaysia (UPM)
14:40 – 15:00	Pheromone-Guided University Timetable Construction using Ant Colony Optimization: A Case Study (Paper 60)	Mohammad Hossin*, Abdul Muqtasid Rushdi, Nooralisa Mohd Tuah	Universiti Malaysia Sarawak (UNIMAS)
15:00 – 15:20	Real-time Bahasa Isyarat Malaysia Recognition System for Greeting Gestures (Paper 54)	Lim Phei Chin*, Tyng Xin Sherene Saw, Suriati Khartini Jali, Johari Abdullah	Universiti Malaysia Sarawak (UNIMAS)
15:20 – 15:40	Exploring Large Language Models in Gamified Environments: A Systematic Literature Review (Paper 63)	Lleyton Geboh Leslie*; Nurfauza Jali, Sadok Ben Yahia, Cheah Wai Shiang, Syahrul Nizam Junaini	Universiti Malaysia Sarawak (UNIMAS)
15:40 – 16:00	Tea Break at Museum Restaurant		
16:00	End of Conference		

*Note: *Presenter*

PARALLEL SESSION ABSTRACTS

PAPER ID: 6

Title: From Play to Plate: Usability Testing of the All You Can Eat (AYCE) Educational Game

Authors: Nooralisa Mohd Tuah*, Soffri Yussof, Noreena Yi-Chin Liu, Aleksei Lavrov, Anna Lavrova, Aleksandr Volosiuk, Artem Smolin, Andrei Balkanskii

Abstract:
The use of games as educational aids has grown in popularity due to their ability to engage learners through interactive and immersive experiences, making complicated subjects more accessible and fun. Young children will benefit from this game. Given the rising obesity rates in Malaysia and the growing prevalence of diverse fusion cuisines, it is imperative to address unhealthy eating habits among young children, a pivotal age group for shaping long-term nutritional behaviors. This study explores the usability and effectiveness of the All You Can Eat (AYCE) game as an educational tool for promoting healthy eating habits among young children. The game employs interactive, gamified learning to engage users in making informed nutritional choices. Participants were assessed using the System Usability Scale (SUS) to quantitatively measure the game's usability, including perceived ease of use, efficiency, and satisfaction. Additional measures evaluated cognitive load and comprehension of healthy eating concepts. Results indicated that the AYCE game successfully engaged users while effectively conveying key nutritional concepts. The game was well-received, with participants reporting high levels of usability and satisfaction. These findings suggest that gamified educational tools like AYCE can be valuable in promoting healthy eating habits among young adults. Further research will explore the long-term impact of such tools on behaviour change and nutritional knowledge retention.

PAPER ID: 7

Title: Signal Processing and Broadband Service Quality in Public Higher Education Institutions: Factors Influencing User Experience and Adoption

Authors: Shelena Soosay Nathan*, Sani Inusa Milala, Siti Noraiza Ab Razak, Mizani Mohamad Madon

Abstract:
The broadband quality gap between urban and suburban universities limits digital access and learning opportunities. Despite technological advancements, suburban students report lower satisfaction with internet services, affecting their academic experiences. This study examines the Quality of Experience (QoE) in both settings, emphasizing the need for digital equity in higher education. A quantitative approach using surveys and chi-square tests analyzed broadband satisfaction among students and faculty. Findings revealed significant disparities: urban universities had higher satisfaction, while suburban institutions faced widespread dissatisfaction. Statistical analysis confirmed these differences, with a Pearson Chi-Square value of 90.248 and a p-value of 0.000. However, 33.3% of the cells had expected counts below five, requiring careful interpretation. The study concludes that digital inequities persist, with suburban universities struggling with inadequate broadband infrastructure. Addressing these gaps requires targeted investments, policy interventions, and collaboration among stakeholders to ensure equitable digital access and inclusive education.

PARALLEL SESSION ABSTRACTS

PAPER ID: 9

Title: Brush Buddies: Augmented Reality Dental Hygiene Interactive Book to Promote Oral Health Care Among Young Learners

Authors: Salyani Osman*, Muhammad Hafizuddin Norizan, Norazimah Awang, Amalia Mohamad, Azaliza Zainal, Marliza Abdul Malik

Abstract:
Dental hygiene is crucial for maintaining healthy teeth and gums and preventing oral diseases. However, many children in Malaysia experience oral health issues like tooth decay due to a lack of awareness and improper brushing habits. While efforts exist to promote dental hygiene, there is a need for innovative tools. This study introduces Brush Buddies, a six-page augmented reality (AR) supported book designed using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) to ensure in delivering an effective learning. The book incorporates AR markers that trigger 3D animations and visuals to teach proper brushing techniques in an engaging and interactive manner. By combining traditional reading with AR technology, Brush Buddies addresses the educational needs of tech-savvy children. The ADDIE model guided each phase, from analyzing dental hygiene gaps to evaluating the book's impact. Results from usability and motivation evaluations shows Brush Buddies successfully stimulates students' interest in studying oral hygiene by offering engaging augmented reality content that promotes healthy oral hygiene practices for their everyday lives.

PAPER ID: 12

Title: Positional analysis using Monocular Relative Depth and Angular Estimation

Authors: Omkar Jois*, Anup Prakash, Aadithya H Rao, Shreya B A, Shylaja S S

Abstract:
Monocular depth estimation methods like MiDaS have demonstrated significant advancements in inferring scene geometry from a single image. However, they suffer from scale ambiguity, spatial inconsistency, and unreliable absolute depth estimates, making them unsuitable for precise localization tasks. This paper introduces an approach that combines relative depth estimation with an angular positioning algorithm, enabling accurate person localization within a known environment using a single camera. Unlike existing methods, our approach incorporates prior scene knowledge and a dedicated calibration step to refine depth scaling and positional accuracy. Using geometric constraints, camera parameters, and depth gradients, our method effectively mitigates scale inconsistencies and enhances spatial precision.

PARALLEL SESSION ABSTRACTS

PAPER ID: 19

Title: Rural School Network Infrastructure Analysis and Redesign for Meaningful Connectivity

Authors: Marcella Peter*, Khairunnisa Ibrahim, Gary Chee-Wyai Loh, Kim-Mey Chew

Abstract:
Access to reliable Internet connectivity is essential for digital education, particularly in rural schools. Despite Malaysia's broadband penetration rate of 41.9% for fixed broadband and 124.1% for mobile broadband, many rural schools still experience slow, inconsistent or non-existent internet connections due to infrastructure limitations and poor signal reception. These challenges hinder effective digital learning, creating a significant digital divide between urban and rural students. This study examines the network infrastructure of a rural Malaysian school and proposes a redesign framework to enhance meaningful connectivity. A three stage methodology is applied, consisting of network exploration, infrastructure optimization, and validation through speed testing. The results of a pilot study indicate notable improvements in internet performance. For example, in Location 2, the download speed increased from 1.93 Mbps to 49.01 Mbps, while the upload speed improved from 0 to 18.73 Mbps. Similarly, Location 11 experienced a surge from 5.56 Mbps to 51.31 Mbps in download speed and from 0 Mbps to 19.18 Mbps in upload speed. The findings emphasize the importance of modem placement, fiber optic expansion, and line-of-sight optimization. Addressing these challenges provides a scalable and effective model for improving digital access in rural schools, contributing to sustainable digital inclusion.

PAPER ID: 27

Title: The Role of AI-Driven Support Systems in Reducing Nurse Turnover: A Systematic Review of Effectiveness and Perceptions

Authors: Sin Yee Lee*; Ee Xion Tan

Abstract:
High nurse turnover significantly affects healthcare quality worldwide. Artificial intelligence (AI) support systems offer promising solutions to enhance clinical workflows and improve nurse job satisfaction. This systematic review examines AI's effectiveness in reducing nurse turnover and explores nurses' perceptions. We searched PubMed, EBSCOhost, Scopus, and ScienceDirect (2020–2025) using keywords including AI, nurse turnover, and job satisfaction. After screening, we included seventeen studies (involving over 2,000 participants) and assessed risk of bias using ROBIS. Results indicate AI systems (e.g., personalized burnout interventions, smart scheduling) reduced burnout by 30% and improved satisfaction by 21%. Nurses reported administrative benefits but expressed reliability concerns. Successful implementation requires addressing concerns through training and ethical guidelines. Future research should examine long-term impacts and cost-effectiveness.

PAPER ID: 29

Title: Unveiling Patterns in Movies and TV Shows on Netflix: A Clustering-Based Analysis

Authors: Xue Kang Chok*, Siew Mooi Lim, Qi Xiang Choo, Hui Ying Chan

Abstract:
This study presents a comprehensive analysis of Netflix's content library using four distinct clustering methodolo- gies: Latent Dirichlet Allocation (LDA), hierarchical clustering, spectral clustering, and K-Prototypes clustering. By applying these complementary approaches, we uncover different patterns in content organisation and categorisation. LDA topic modelling identified three distinct thematic areas in content descriptions, while hierarchical clustering revealed five clusters with over- lapping themes. Spectral clustering, using Nearest Neighbours affinity and unnormalised Laplacian regularisation, distinguished three clusters based on geographical origin and content maturity. K-Prototypes clustering identified five segments characterised by distinct format, duration, and regional patterns. Our findings demonstrate the multi-dimensional nature of Netflix's content library and provide insights into content strategy and categori- sation. The results suggest that Netflix maintains a carefully balanced portfolio of content that spans different formats, re-gions, and themes, catering to diverse audience preferences. These insights could inform content acquisition strategies and improve recommendation systems for streaming platforms.

PAPER ID: 35

Title: A Comparative Analysis of Topic Modelling Techniques for Malaysian Business News Data: LDA, NMF, Top2Vec, and BERTopic

Authors: Vadrianey Asas*, Sarah Samson Juan, Vianney Camelie Kerbun, Stephanie Chua, Jane Labadin, Evan Lau

Abstract:
This paper examines the performance of topic modelling techniques on a newly compiled dataset of Malaysian business news, aiming to address the challenge of extracting meaningful insights from unstructured data. We compare traditional methods, such as Latent Dirichlet Allocation (LDA) and Non-Negative Matrix Factorization (NMF), with emerging methods or models, including Top2Vec and BERTopic. Each model is trained or fine-tuned on five yearly datasets (2019-2023) to account for temporal variations. Our goal is to identify the most effective technique for topic discovery in this domain. The dataset includes 35,667 articles collected through web scraping from New Straits Times (Malaysia) and other Malaysian news portals. The results show that NMF consistently achieves the highest coherence scores, ranging between 0.65 until 0.80, which indicate strong topic quality andinterpretability. On the other hand, Top2Vec performs the worst, while LDA and BERTopic produce inconsistent results. These findings provide useful guidance, particularly the strengths and limitations of each technique, for researchers and NLP practitioners applying topic modelling to similar textual corpora.

PARALLEL SESSION ABSTRACTS

PAPER ID: 40

Title: Comparative Analysis of Lightweight BERT Models and Ensemble Benefits for Extractive Q&A

Authors: Allistair Nallie anak Konsil*, Stephanie Chua, Jacey Lynn Minoi

Abstract:
Bidirectional Encoder Representations from Transformers (BERT) models have excelled in natural language processing (NLP) tasks, but their complexity poses challenges in computational resources and memory. Model compression techniques address these issues, enabling efficient deployment on resource-constrained devices. This paper compares models that apply knowledge distillation for BERT compression. Knowledge distillation transfers knowledge from a large teacher model to a smaller student model, balancing compression and accuracy. Experimental results on the Stanford Question Answering Dataset (SQuAD) and a custom dataset show the effectiveness of this technique. An ensemble of compressed models using simple averaging and z-score normalization achieved the highest performance among our evaluated models, with a F1 score of 85.32 and an exact match (EM) score of 67.23, surpassing individual models. Our findings provide insights into selecting compression methods for efficient BERT deployment in real-world NLP applications.

PAPER ID: 43

Title: Comparative Study of Fusion Techniques for Multimodal Fake News Detection

Authors: Idza Aisara Norabid*, Noor Hafhizah Abd Rahim, Masita Abdul Jalil

Abstract:
The rapid spread of fake news across social media platforms has intensified the need for robust detection mechanisms. Recent advances emphasize multimodal approaches that integrate textual and visual information to enhance classification performance. This paper presents a comparative study of various fusion techniques, namely concatenation, average pooling, and multi-head attention, for multimodal fake news detection. A subset of the Fakeddit dataset comprising 7,475 samples was utilized, combining BERT for text feature extraction and ResNet architectures for image feature extraction. Experimental results demonstrate that all tested fusion methods effectively integrate multimodal features, with average pooling and multi-head attention achieving the highest accuracy. Notably, BERT combined with ResNet18 using average pooling attained an accuracy of 76%. The findings highlight the importance of selecting suitable fusion strategies based on the trade-off between accuracy and computational efficiency, offering a useful guidance for building more effective multimodal fake news detection systems.

PARALLEL SESSION ABSTRACTS

PAPER ID: 44

Title:Enhancing Feature Selection Stability with a Hierarchical Whale Optimization Algorithm

Authors: Li Yu Yab*, Noorhaniza Wahid, Rahayu A Hamid

Abstract:
This paper proposes HiWOA, a Hierarchical Whale Optimization Algorithm designed to improve feature selection stability in high-dimensional datasets. HiWOA integrates the social hierarchy structure of the Grey Wolf Optimizer (GWO) into the Whale Optimization Algorithm (WOA) and employs an arcsine-based control parameter to enhance the balance between exploration and exploitation. The method applies a filter-based approach, using mutual information to evaluate the relevance of features with respect to class labels. Stability is defined through the exploration-to-exploitation ratio and the Modified Kuncheva's Consistency Index (MKCI), which measures the consistency of selected features across 30 independent runs. Experiments on six high-dimensional biomedical datasets demonstrate that HiWOA achieves superior performance by selecting fewer features, yielding higher MKCI values, and maintaining better classification accuracy with Decision Tree and SVM classifiers compared to WOA and three other variants (OWOA, mWOA, EWOA). The results indicate that incorporating stability into metaheuristic design significantly enhances the effectiveness of filter-based feature selection.

PAPER ID: 46

Title: A Reinforcement Learning-Based Dynamic Adaptive Gamification (DAG) Method for Online Employee Training

Authors: Yogeswari Shabadurai*, Fang-Fang Chua, Tek-Yong Lim

Abstract:
In times where working remotely and online work environments are on the rise; the traditional employee training method struggles to stay motivated and engaged. Gamification has emerged as a widely used motivational approach that can be tailored to user preferences to improve user engagement. While various machine learning techniques have been applied to gamification, the use of reinforcement learning for real-time adaptive personalization in employee training contexts remains comparatively underutilized. Therefore, this study presents a Reinforcement Learning–Based Dynamic Adaptive Gamification (DAG) method designed to enhance online employee training through real-time adaptation and personalization. The proposed approach leverages data-driven decision making, iterative feedback mechanisms, and personalization algorithms to optimize the training experience. The methodology comprises three key phases: (A)System design, (B)Implementation consisting the Adaptation and Personalization processes such as game interaction, ongoing feedback and (C)Evaluation. The results indicate the effectiveness of the DAG method in improving user engagement and increasing user retention in online training environment.

PARALLEL SESSION ABSTRACTS

PAPER ID: 47

Title: Leveraging netStethoscope for Enhanced Network Monitoring in Rural Malaysia

Authors: Brandon Chong Kian Hua*, Tariq Zaman, Khairuddin Ab Hamid, Gary Loh Chee Wyai, Cat Kutay

Abstract:
Monitoring the Mandatory Standards for Quality of Service (MSQoS) serves as a key mechanism to ensure the delivery of quality telecommunication services. However, assessing MSQoS in remote and rural communities remains a persistent challenge due to logistical, infrastructural, and environmental constraints. This research presents the development of enhanced tools netStethoscope and myspeed.site designed for network monitoring and Quality of Service (QoS) performance evaluation. The study describes the process of passive network measurement, crowdsourced data collection, and integrates Geographic Information System (GIS)-based visualization to provide a more granular and community-driven approach for assessing broadband quality. Aligned with Malaysian Communications and Multimedia Commission (MCMC)'s regulatory benchmarks, this study evaluates key performance indicators such as latency, packet loss, jitter, and throughput, ensuring compliance with national and international standards. The research methodology incorporates comparative analysis of existing QoS measurement platforms, including Measurement Lab (M-Lab), Ookla's Speedtest, and CIRA's Internet Performance Test, to assess their capabilities and limitations. Hardware implementations leveraging Raspberry Pi Zero were iteratively refined to support passive monitoring without active user intervention. Findings indicate that myspeed.site and netStethoscope offer a scalable, decentralized alternative to traditional monitoring, addressing infrastructure gaps and policy formulation challenges in Malaysia's digital landscape. This study contributes to improving broadband transparency, informing policy decisions, and bridging Sarawak's digital divide through community-driven insights and next-generation monitoring strategies.

PAPER ID: 48

Title: Gamification of Regional Tourism Engagement: Analysis and Design of a Web-Based Information System

Authors: Johannes Hamonangan Siregar*, Rufman Iman Akbar, Augury El Rayeb, Chaerul Anwar, Suriati Khartini Jali, Mohamad Imran Bandan, Lim Phei Chin, Abby Lian Hendrick

Abstract:
Regional tourism often faces challenges in achieving deep and lasting tourist engagement. Gamification has emerged as a promising strategy to enhance user participation across various sectors, including tourism. This study explores the application of gamification in promoting regional tourism and presents the design of a web-based information system, NusaQuest, tailored to the context of West Java, Indonesia. A structured three-phase methodology—Requirement Analysis, System Design, and Prototype Implementation—was used to guide the development. The resulting prototype integrates educational tourism content with interactive game mechanics, such as Snakes and Ladders and the Nuca card game, aligned with key tourism sectors. While the platform was internally tested for usability, formal user evaluation and impact analysis will be conducted in future work. This paper contributes design insights and demonstrates the feasibility of gamification as a tool for enhancing regional tourism engagement.

PARALLEL SESSION ABSTRACTS

PAPER ID: 50

Title: Smart Assistance for the Disabled: Design and Implementation of an Accessible Employment Service Platform Based on GPT Technology

Authors: Chen, Xiangdong*; Cui, Heng; Wang, Fan; Pan, Tianshengnan; LIM, PheiChin

Abstract:
Currently, the disabled population faces issues such as limited job search channels, insufficient skill matching, and social prejudice in the job market. In response to the "14th Five-Year Plan" for the protection and development of the disabled in China, this paper designs and implements an accessible employment service platform based on GPT technology - "Smart Assistance for the Disabled". This platform integrates artificial intelligence, big data analysis, and accessible design to offer personalized job recommendations, intelligent skill training, and multimodal interaction assistance tools. It also builds a comprehensive employment service system through policy interpretation, enterprise cooperation, and psychological support modules. The platform adheres to the WCAG 2.1 standard to ensure accessible access for visually impaired, hearing impaired, and other users. Experiments show that the platform significantly improves the job search efficiency and employment quality of the disabled, providing an innovative solution for high - quality employment for the disabled.

PAPER ID: 51

Title: Anchor-Point Based Euclidean Reduction for Enhanced Instance-based Classification

Authors: Mohammad Hossin*; Abdul Muqtasid Rushdi

Abstract:
Instance-based learning algorithms are appreciated for their simplicity and effectiveness but often face challenges related to memory usage and scalability, as they rely on the entire dataset for classification. Prototype selection (PS) approaches aim to reduce dataset size by identifying a representative subset of instances that preserve or improve classification performance. In this work, we propose an innovative reduction method called Anchor-Point Based Euclidean Reduction (APBER), which utilizes the mean of each column (MEC) as an anchor point and extends the use of Euclidean distance to selectively identify key prototypes within each class. Experiments on 21 datasets from the KEEL repository show that APBER-MEC achieves significantly higher classification accuracy than k-Nearest Neighbors (k-NN). Although APBER-MEC outperforms other reduction methods, these differences are not statistically significant. While the reduction rate of APBER-MEC is less competitive compared to methods like DROP3 and ATISA1, it is almost comparable to ENN and RIS1. Despite having a lower reduction rate, APBER-MEC achieves better classification accuracy than these methods, demonstrating a favorable balance between dataset reduction and performance. Overall, APBER-MEC demonstrates strong potential as a scalable and accurate approach for enhancing instance-based classifiers in large-scale data environments.

PARALLEL SESSION ABSTRACTS

PAPER ID: 54

Title: Real-time *Bahasa Isyarat Malaysia* Recognition System for Greeting Gestures

Authors: Lim Phei Chin*, Tyng Xin Sherene Saw, Suriati Khartini Jali, Johari Abdullah

Abstract:
Addressing the communication gap between the deaf and hard-of-hearing community and the public remains a significant challenge. Most systems focus on static sign language, primarily through fingerspelling that spells out words, which can be inefficient for conveying more complex information. This work introduces a real-time Bahasa Isyarat Malaysia recognition system specifically designed to interpret ten common greeting gestures. It aims to enhance communication efficiency, enabling users to express themselves more effectively through dynamic hand motions rather than relying on static representations. To achieve real-time sign language recognition, Convolutional Neural Network model with VGG-16 serves as the foundation architecture that is complemented by MediaPipe for accurate hand detection. The dataset used to train and evaluate the system was meticulously collected from approximately 30 participants at the Penang Deaf Association. Modelling experimentation resulted 80.57% for its average validation accuracy and 71.79% for its average training accuracy. As for real-time testing, the model is tested on ten testers where the model achieved an approximate average accuracy of 69.44%. The model still faces several limitations such as latency and computation constraints which still need to be improved.

PAPER ID: 58

Title: YOLOv12-ECA: An Efficient Attention-Enhanced Detector for Real-Time UAV-Based Pothole Detection

Authors: Siti Fairuz Mat Radzi*, Mohd Amiruddin Abd Rahman, Muhammad Khairul Adib Muhammad Yusof

Abstract:
Recent YOLO models, e.g., YOLOv8 through YOLOv11, have advanced object detection accuracy, but often at the cost of increased inference time and computational complexity, which limits their suitability, especially for realtime UAV-based applications. A recently introduced YOLOv12 improves efficiency and speed, yet its accuracy in challenging environments can still be enhanced. This paper proposes an improved pothole detection framework, YOLOv12-ECA, which integrates the Efficient Channel Attention (ECA) mechanism into the YOLOv12 architecture. The proposed model enhances feature channel prioritization, leading to better detection performance while preserving YOLOv12's real-time capabilities. Experimental results demonstrate that YOLOv12-ECA outperforms baseline YOLOv12 and other state-of-the-art detectors, including Faster RCNN-SqueezeNet, YOLOv8x, YOLOv9e, YOLOv10x, YOLOv11x, RDD-YOLO, and RT-DETR. The YOLOv12l-ECA version has the best detection accuracy (mAP@0.50 = 0.788), a quick processing time (7.0 ms), and a reasonable computing cost (88.1 GFLOPs). These results highlight the effectiveness of integrating the ECA module in improving localization and classification under varied road conditions, supporting the development of efficient and scalable automated road inspection systems for smart city infrastructure monitoring.

PARALLEL SESSION ABSTRACTS

PAPER ID: 60

Title: Pheromone-Guided University Timetable Construction using Ant Colony Optimization: A Case Study

Authors: Mohammad Hossin*, Abdul Muqtasid Rushdi, Nooralisa Mohd Tuah

Abstract:
University course timetabling is an NP-hard problem that involves assigning courses to times and venues while satisfying constraints and minimizing violations. This task is especially challenging for specific institutions. In this work, we introduce an enhanced Ant Colony Optimization (ACO) approach, called the University Course Timetabling Problem Ant System (UCTP-AS), designed to address these complexities proficiently. It uses priority-based courses to prioritize courses based on enrolment of student batches, violation-aware heuristics to guide the search toward feasible solutions, and explicit soft constraint integration to actively consider soft constraints during timetabling construction. The integration of pheromone trails, heuristic information, and these strategic mechanisms enables the UCTP-AS to effectively navigate the search space and generate high-quality timetables. Tested on the FCSIT 2018/2019 dataset, UCTP-AS produces feasible timetables with an 11% to 13% variation in solutions across four different iteration conditions. It can generate near-optimal timetables with as few as four violations (HC=0, SC=4), especially with longer iterations. Even in shorter runs, it consistently finds feasible timetables. These results suggest that UCTP-AS is a promising approach for tackling complex university timetabling challenges in practical settings.

PAPER ID: 61

Title: ARRANGE: An Augmented Reality-Powered Mobile Application for Interactive Interior Design

Authors: Ain Nazihah Pakasa*, Nurlaila Rosli, Hael Rabbani Joseph

Abstract:
Design ARRANGE is a mobile application designed to help users visualize and arrange furniture using Augmented Reality (AR). Developed for Android devices, it allows users to interact with 3D furniture models in real-time through their phone cameras, making it easier to plan and design interior spaces without physically moving items. The application aims to solve common interior design problems such as difficulty in visualizing layouts, inaccurate measurements, time-consuming rearrangements, and the cost of professional services. Using tools like ARCore, Vuforia SDK, and Firebase, ARRANGE offers features such as surface detection, object scaling, rotation, and saving room layouts. It provides a user-friendly experience for both individuals and professional designers by enabling easy furniture placement, profile management, and room customization. The system was developed using the Agile methodology, incorporating sprints, user feedback, and continuous testing to ensure performance and reliability. User testing revealed that the app was user-friendly, with participants accomplishing key tasks effectively and providing affirmative comments on the interface and interaction design. Despite some limitations like a limited furniture model library and occasional feedback delays, ARRANGE shows strong potential in making interior design more interactive, accurate, and accessible. Future improvements will focus on expanding model options, enhancing performance, and supporting multi-platform usage.

PARALLEL SESSION ABSTRACTS

PAPER ID: 63

Title: Exploring Large Language Models in Gamified Environments: A Systematic Literature Review

Authors: Lleyton Geboh Leslie*; Nurfauza Jali, Sadok Ben Yahia, Cheah Wai Shiang, Syahrul Nizam Junaini

Abstract:
This review uniquely synthesises recent advances (2020–2025), highlighting how the integration of Large Language Models (LLMs), such as GPT-3.5, significantly alters traditional gamification methods by enabling dynamic and adaptive interactions, surpassing previous static engagement models. While traditional gamification primarily emphasised points, badges, and rewards, LLMs now facilitate more interactive experiences such as dynamic storytelling, realistic behaviour simulations, and personalised user interactions. This systematic literature review examines the integration methods of LLMs within gamified systems, identifies specific elements that are enhanced by their adoption, and critically assesses the benefits and challenges associated with them. A total of 718 articles retrieved from prominent databases (Scopus, IEEE Xplore, ScienceDirect, and ACM Digital Library) were screened, and 27 met the criteria for a comprehensive review. Key applications identified include interactive narratives, behavioural simulations, intelligent non-player characters (NPCs), and adaptive educational feedback. Despite significant benefits, major challenges remain, notably content hallucination, ethical considerations, and inconsistent outputs. Overall, this review emphasises the growing transformative influence of LLMs on gamified environments, offering critical insights for future research directions and practical design strategies.

POSTER ABSTRACTS

POSTER ID: 3

Title: Potato Leaf Disease Detection Using ResNet-50: A Deep Learning and Real-Time Deployment Approach

Authors: Cahyono Budy Santoso

Abstract:
This study presents a deep learning-based framework for the detection of potato leaf diseases using the ResNet-50 convolutional neural network architecture. The primary objective is to develop a reliable, accurate, and efficient system that can be integrated into real-time agricultural tools, particularly in resource-limited environments. The methodology consists of three main stages: data collection, model training, and evaluation. A dataset comprising 2,152 high-resolution and well-labeled images was compiled, representing three categories: Potato__Early_blight, Potato__Late_blight, and Potato__healthy. Transfer learning was employed by utilizing pre-trained ResNet-50 weights, allowing for optimized performance despite limited training data. The model was evaluated using standard classification metrics, including accuracy, precision, recall, and F1-score. Results show that ResNet-50 achieved outstanding performance with a test accuracy of 99.31%, precision of 99.34%, recall of 99.31%, and F1-score of 99.31%. These metrics indicate strong generalization capability and minimal misclassification. The trained model is highly suitable for deployment on mobile or embedded systems using frameworks like TensorFlow Lite, enabling real-time detection in agricultural settings. The novelty of this research lies in integrating an advanced deep learning model with practical deployment strategies tailored for real-world agricultural constraints. This system can aid farmers in early disease detection, leading to reduced crop losses and increased productivity. Future work may explore multi-crop classification and real-time video-based monitoring for broader implementation in precision agriculture.

POSTER ID: 4

Title: Development of IoT-based Smart Home Model

Authors: Rufman Iman Akbar E.

Abstract:
This study develops an Internet of Things (IoT)-based Smart Home prototype to investigate the integration and effectiveness of various smart devices in enhancing home security, convenience, and efficiency. Employing the Action Research methodology, the research follows five systematic phases: identifying problems, developing solutions, field implementation, result evaluation, and adjustments for subsequent iterations. Conducted in Taman Permata Bintaro district, South Tangerang, Indonesia, the initial phase involved installing multiple IoT devices, including smart plugs, CCTV cameras, lamps, locks, doorbells, environmental sensors, thermostats, heaters, and major appliance controllers. A total of 30 respondents evaluated device performance, resulting in smart CCTV and smart locks being highly favored due to security priorities. Subsequent iterations refined the installation, emphasizing optimal device positioning and enhanced usability, thus achieving increased user satisfaction. Final results highlighted that essential smart home components preferred by users encompassed smart CCTV, smart doorbells, smart locks, smart plugs, smart lamps, and home appliance controllers. Respondents emphasized security and comfort as critical factors, reflecting user priorities in smart living applications. The study concluded that these selected devices form the fundamental infrastructure required for practical and effective smart home systems. This research underscores the value of IoT technologies in domestic environments, offering significant insights into user-centric smart living solutions, and proposes foundational smart home device configurations to optimize residential convenience and security.

POSTER ABSTRACTS

POSTER ID: 7

Title: Nusa Quest: A Design Framework for the Gamification in Tourism

Authors: Johannes Hamonangan Siregar; Augury El Rayeb; Muhammad Shalrizky; Muhammad Reyki Almadani

Abstract:
This research aims to develop and test the effectiveness of a web-based Snakes and Ladders gamification for tourism information delivery. The gamification is designed to provide an interactive and enjoyable learning experience for users while introducing them to various aspects of a region's tourism, such as culinary delights, land and sea tourist attractions, and local traditional games. The methodology employed in this study is the software development method using the waterfall model. The Snakes and Ladders gamification was developed using appropriate web front-end and back-end technologies. User testing was conducted to evaluate the gamification's effectiveness in delivering information and enhancing user engagement. The results of this research demonstrate that the web-based Snakes and Ladders gamification is effective in conveying tourism information engagingly and interactively. Users showed a high level of engagement and provided positive feedback on the gaming experience. The gamification also proved to enhance user understanding of the presented tourism information. In conclusion, the web-based Snakes and Ladders gamification is an effective medium for delivering tourism information. It can increase user engagement, provide an enjoyable learning experience, and improve understanding of tourism information. This research recommends further development of this gamification by adding more interactive features and expanding the scope of tourism information.

POSTER ID: 9

Title: MINDCHECK: A Mobile Application for Mental Health Self-Assessment and Support with Gamification

Authors: Nurul Amirah Lotfi Nor, Nurul Fazmidar Mohd Noor, Haslina Muhamad

Abstract:
Addressing the critical need for accessible mental health support in Malaysia, this research introduces MINDCHECK, a gamified mobile application designed to overcome barriers such as stigma, lack of self-assessment tools, and reluctance to share personal experiences. To enhance clarity and specificity, rephrase the objectives to be more concrete and measurable. The objectives are to: 1) Identify and analyse the limitations of current mental health assessment methods 2) Develop a mobile application with gamification features tailored for young adults in Malaysia; and 3) Evaluate the impact of gamification on user engagement and mental health awareness. Employing a mixed-methods approach, we conducted surveys and in-depth interviews, leveraging expertise from psychology, interviews provided insights into clinical diagnosis tools, such as the Depression Anxiety and Stress Scale (DASS), and revealed various treatment approaches for different mental health states. Ultimately, our findings underscore the potential of gamified applications to enhance mental health awareness and provide users with valuable self-assessment tools. By making mental health assessment more engaging and accessible, these applications can play a crucial role in encouraging timely intervention and the adoption of proactive self-care practices. The integration of gamification not only increases user engagement but also helps to normalize conversations around mental health, reducing stigma and fostering a more supportive environment for individuals seeking help. Furthermore, the availability of self-assessment tools empowers users to better understand their own mental health status, enabling them to make informed decisions about their well-being and seek professional help when needed.

POSTER ABSTRACTS

POSTER ID: 10

Title: Adaptive Speech Emotion Recognition via Reinforcement Learning

Authors: Lim Siew Mooi

Abstract:
Despite decades of research, traditional Speech Emotion Recognition (SER) approaches, built on static feature extraction and fixed classification models, consistently struggle to generalize across the diverse and dynamic nature of real-world emotional speech. Addressing this critical limitation, we propose a novel and comprehensive reinforcement learning (RL) driven framework for SER, advancing human-computer interaction by enabling systems to perceive and respond to human emotions with greater sensitivity, adaptability, and intelligence. High-quality acoustic representations are automatically extracted using the pre-trained Wav2Vec2 model and serve as structured, temporally rich inputs to a custom-designed Gymnasium environment, EmotionEnv. Within this interactive environment, an RL agent selects discrete emotion labels as actions and receives scalar rewards based on classification accuracy, thereby continuously refining its policy through episodic feedback. We systematically evaluate four state-of-the-art RL algorithms: Proximal Policy Optimization (PPO), Advantage Actor-Critic (A2C), Deep Q-Network (DQN), and Quantile Regression DQN (QRDQN) incorporating entropy regularization and epsilon-greedy exploration to accelerate convergence, enhance policy robustness, and improve generalization capabilities. By formulating SER as a continuous, sequential decision-making process rather than a static classification task, our approach enables dynamic adaptation to emotional variability and outperforms traditional methods in terms of flexibility and learning efficiency. Experimental findings demonstrate that reinforcement learning not only enhances emotion classification accuracy but also establishes a scalable, autonomous pathway toward next-generation, human-centered, SER-AI systems. This work marks a significant leap toward substantially adaptive, resilient, and intelligent emotion recognition technologies for real-world applications.

POSTER ID: 11

Title: Simulation-Based Reinforcement Learning for Climate-Variable Irrigation Optimisation and Water-Use Efficiency in Corn Production

Authors: Lim Siew Mooi

Abstract:
This study employs simulation as a foundational tool to design and evaluate a reinforcement learning (RL) environment aimed at optimising irrigation strategies for corn production under climate variability. The objective is to enhance water-use efficiency while maintaining or improving yield outcomes, addressing a critical agricultural challenge in the face of increasing environmental uncertainty. We developed a Gymnasium-compatible simulation environment replicating a 120-day corn growing season across five key phenological stages. The state space comprises six continuous variables: soil moisture, day in season, growth stage, temperature, rainfall, and next-day rainfall probability. The action space includes four discrete irrigation levels tailored to regional needs. To reflect diverse climate impacts, the environment simulates three distinct regions: arid, temperate, and tropical, using stochastic weather models. A reward function integrates soil moisture optimisation, rainfall-based irrigation penalties, and yield-impact incentives, ensuring policy learning is sensitive to both agronomic and environmental factors. Four RL algorithms—Q-learning, Deep Q-Network (DQN), Proximal Policy Optimisation (PPO), and Advantage Actor-Critic (A2C)—were benchmarked against a fixed-schedule baseline. RL-based policies achieved 15–30% higher water-use efficiency, with maximum gains in temperate regions. Yield potentials ranged from 0.92 to 1.54, with optimised policies delivering up to 0.037 yield units per mm of water. The learnt policies adapted effectively to rainfall events, reducing unnecessary irrigation by 40%. This simulation-driven RL framework offers a scalable solution for smart irrigation systems and farmer decision-support tools. Future directions include field-data calibration and transfer learning for real-world applicability.

FLOOR PLAN (BORNEO CULTURES MUSEUM) LEVEL 1

Etika Muzium
Museum Etiquette

Selamat datang ke Borneo Cultures Museum. Kami berharap agar setiap pengunjung boleh memberi kerjasama bagi memastikan keselesaan semua. Keselamatan pengunjung dan artifak dalam bangunan ini adalah keutamaan kami.
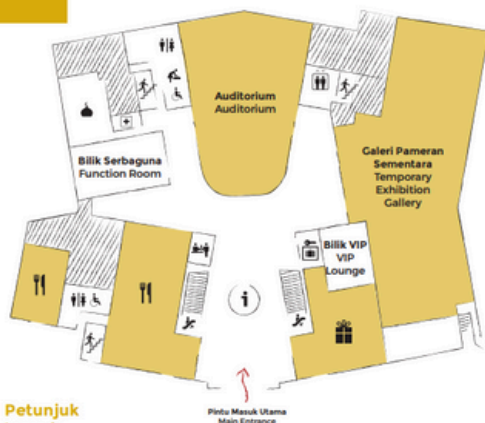
Welcome to the Borneo Cultures Museum. Help make the museum as pleasant as possible for every visitor. We prioritise the safety of visitors and artefacts in this building.

Dilarang merokok
No smoking

Dilarang menyentuh objek
No touching of objects

Dilarang membawa makanan, minuman atau gula-gula getah
No food, drinks or gums

Dilarang membawa payung
No umbrellas

Dilarang berlari, menolak atau berasak-asak
No running, pushing or shoving

Dilarang membawa haiwan peliharaan
No pets

Dilarang membawa objek tajam
No sharp objects

Dilarang mengambil gambar menggunakan *flash* atau tripod
No flash photography or tripods

Amalkan penjarakan sosial
Practise social distancing

Kanak-kanak bawah 12 tahun memerlukan pengawasan orang dewasa
Children under 12 must be accompanied by an adult
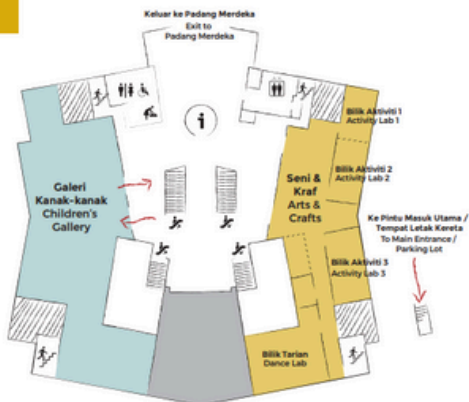

ARAS LEVEL 1 — Lobi / Lobby

Auditorium
Auditorium

Bilik Serbaguna
Function Room

Galeri Pameran Sementara
Temporary Exhibition Gallery

Bilik VIP
VIP Lounge

Pintu Masuk Utama
Main Entrance

Petunjuk
Legend

Tangga Kecemasan — Emergency Stairs

Tandas — Toilet

Bilik Penjagaan Bayi — Nursing Room

Lif — Elevator

Kedai Cenderamata — Museum Shop

Restoran / Kantin — Restaurant / Canteen

Kaunter Informasi — Information Counter

Kaunter Tiket — Ticket Counter

Bilik Lokar — Locker Room

Surau — Prayer Room

Bilik Rawatan Kecemasan — First Aid Room

FLOOR PLAN (BORNEO CULTURES MUSEUM) LEVEL 2 & 3

ARAS LEVEL 2

Galeri Kanak-kanak & Seni dan Kraf
Children's Gallery & Arts and Crafts

Keluar ke Padang Merdeka
Exit to
Padang Merdeka

Galeri
Kanak-kanak
Children's
Gallery

Seni &
Kraf
Arts &
Crafts

Bilik Aktiviti 1
Activity Lab 1

Bilik Aktiviti 2
Activity Lab 2

Ke Pintu Masuk Utama /
Tempat Letak Kereta
To Main Entrance /
Parking Lot

Bilik Aktiviti 3
Activity Lab 3

Bilik Tarian
Dance Lab

Di **Galeri Kanak-kanak**, kami menawarkan pengalaman yang unik untuk seisi keluarga. Dalam pameran *Love Our Rivers*, kanak-kanak akan mengembara bersama *River Guardians* untuk belajar tentang sungai-sungai yang terdapat di Sarawak dan cara untuk menjaga kebersihannya.

Galeri Seni dan Kraf ialah ruang aktif untuk bengkel seni, kraf dan persembahan. Untuk maklumat lanjut mengenai program dan tempahan, anda boleh menghubungi pihak Jabatan Muzium Sarawak di museum@sarawak.gov.my.
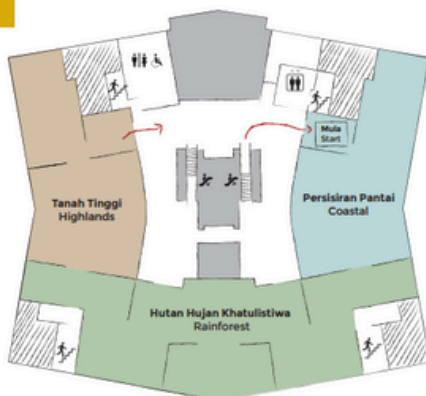
The **Children's Gallery** offers a distinct experience for families. In the Love Our Rivers exhibition, children go on an adventure with the River Guardians to learn about the rivers of Sarawak and how to keep them clean.

The **Arts and Crafts Gallery** is an active space for workshops on arts, crafts and performances. For more info on programmes and bookings, you may contact Sarawak Museum Department at museum@sarawak.gov.my.
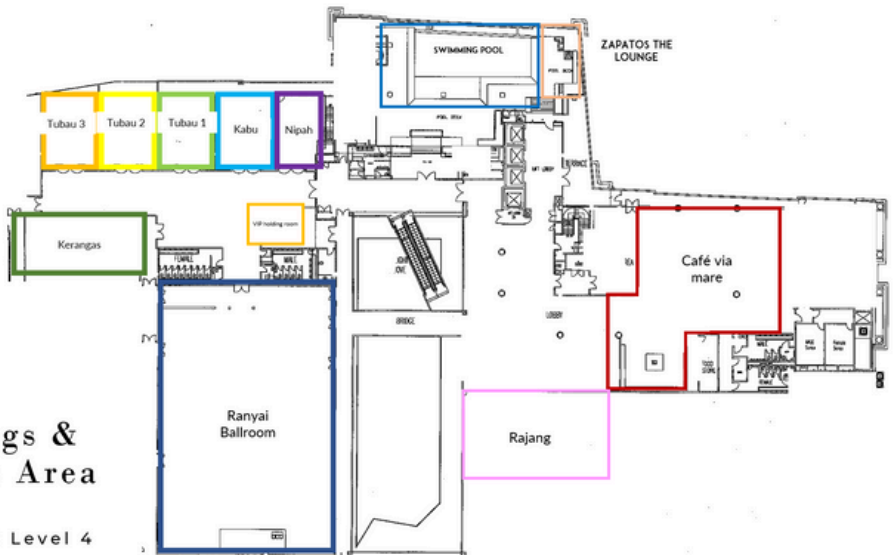
ARAS LEVEL 3

Keharmonian Alam dan Manusia
In Harmony with Nature

Mula
Start

Tanah Tinggi
Highlands

Persisiran Pantai
Coastal

Hutan Hujan Khatulistiwa
Rainforest

Galeri 'Keharmonian Alam dan Manusia' membolehkan anda mempelajari kisah tentang komuniti yang tinggal di kawasan persisiran pantai, hutan hujan khatulistiwa dan tanah tinggi di Sarawak. Selamilah kisah mereka, amati spesimen zoologi dan rasai pengalaman yang mengasyikkan dalam pameran ini.

In the 'In Harmony with Nature' gallery, you will encounter stories of the people who live in the coastal, rainforest and highland regions of Sarawak. Listen to stories, see zoological specimens and immerse yourself in the environments in this exhibition.

FLOOR PLAN (THE WATERFRONT HOTEL)