Conference Program

2025 10th International Conference on Information and Network Technologies (ICINT 2025)

March 12-14, 2025

Melbourne, Australia

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Vitor Santos, Universidade Nova de Lisboa, Portugal

Wasi Haider Butt, National University of Science and Technology, Pakistan

William P. Rey, Mapua University, Philippines

Welcome Message

It is our great pleasure to welcome you to the 2025 10th International Conference on Information and Network Technologies (ICINT 2025), to be held from March 12–14 in Melbourne, Australia. We are delighted to host participants from a diverse array of countries—Japan, China, Malaysia, Qatar, Poland, the USA, Denmark, Australia, Pakistan, the Philippines, Sri Lanka, Austria, Bangladesh, and many more—underscoring ICINT's global reach and significance as a premier platform for international academic exchange.

Co-sponsored by La Trobe University and IEEE, and technically supported by the University of the Ryukyus, ICINT 2025 aims to serve as a leading international forum for researchers, practitioners, and professionals from academia, industry, and government. Together, we will share and discuss the latest research findings, technological advancements, and practical applications in the fields of information and network technologies.

In response to the rapid evolution of these technologies, this year's conference focuses on three key themes:

1. Multi-Sensor Processing and Signal Processing
2. Digital Communication Technology and Development
3. Advanced Information Systems and Data Management

These topics embody the forefront of research and innovation, propelled by breakthroughs in big data, artificial intelligence, and 5G/6G networks. At ICINT 2025, we offer an invaluable forum where scholars from around the globe can converge to exchange transformative ideas and showcase pioneering research. The conference is designed to foster dynamic debates, spark interdisciplinary collaborations, and explore cutting-edge advancements, including the integration of quantum computing, the evolution of cybersecurity in an increasingly digital world, and the transformative potential of the Internet of Things and digital twins. By uniting established experts with emerging voices, ICINT 2025 will catalyze new insights and partnerships, pushing the boundaries of both theoretical and practical applications to shape the future trajectory of information and network technologies.

We are honored to feature several distinguished keynote speakers:

- Prof. Rajkumar Buyya, University of Melbourne, Australia (IEEE Fellow; Director, Cloud Computing and Distributed Systems (CLOUDS) Laboratory)
- Prof. Jiankun Hu, University of New South Wales, Australia (IEEE Fellow; Senior Area Editor, IEEE Transactions on Information Forensics and Security)
- Prof. Jiong Jin, Swinburne University of Technology, Australia (World Top 2% Scientist since 2019, Stanford University's List; Acting Associate Dean (Research), School of Science, Computing and Engineering Technologies)

Additionally, five invited speakers from various regions will share their expertise, enriching the conference with valuable global perspectives.

Over the course of the conference, we will host keynote speeches, invited talks, parallel sessions, and a site visit. Each presentation during the parallel sessions will be evaluated by session chairs, with top presenters receiving certificates to recognize their excellent work. As a token of our appreciation to all paper submitters, attending scholars, and invited speakers, we have prepared welcome gifts and conference memorabilia for on-site participants to enhance your overall experience.

Once again, thank you for your support and participation. It is through our collective efforts that ICINT has become a key academic platform for advancing information and network technologies. We look forward to the fruitful discussions, new partnerships, and exciting discoveries that wil l arise in Melbourne.

On behalf of the Organizing Committee, we wish ICINT 2025 every success and look forward to seeing you soon!

General Chair of the ICINT 2025 Conference

Wei Xiang

La Trobe University, Australia

Useful Information

Conference Venue

Rendezvous Hotel
Address: 328 Flinders Street, Melbourne, Victoria, 3000, Australia
Website: https://rendezvousmelbourne.com.au/

Time Zone:

GMT+11

Average Temperature of Melbourne in March

- ✧ Average daily minimum temperature: 59°F (15°C)
- ✧ Average daily maximum temperature: 77°F (25°C)

Bank and Foreign Exchange

Currency: Australian Dollar (AUD)

Important Phone Numbers

Fire: 000 Medical Emergency: 000 Police: 000

Important Notes:

Please take care of your belongings during the conference. The conference organizer does not assume any responsibility for the loss of personal belongings of the participants.
Please wear delegate badge during the conference. There will be NO access for people without a badge. Never discard your badge at will.
Accommodation is not provided. Early reservation is suggested to be made for delegates.
Please show the badge and meal coupons during lunch and dinner.
Don’t stay too late in the city and don’t be alone in the remote area. Be aware of the strangers who offer you service, signature of charity, etc., at scenic spots. More Tourist Information and Security tips are available online.

Virtual Meeting Software

ZOOM Download Link: https://zoom.us/download
ZOOM Using & Presentation Instruction:
www.icint.org/kits.rar

Rename Screen Name Before Entering the Room	Examples
Authors: Paper ID-Name	MB101- John Smith
Delegate: Delegate- Name	Delegate- John Smith
Keynote Speaker: Keynote-Name	Keynote- John Smith
Committee Member: Committee-Name	Committee- John Smith

Materials Prepared by the Presenters

✧ **Oral Presentation:**

PowerPoint or PDF files

PowerPoint Background Template: www.icint.org/kits.rar

Duration of Each Presentation

✧ Keynote Speech: 45 Minutes of Presentation including Q&A.

- Invited Speech: 25 Minutes of Presentation including Q&A.
- Regular Oral Presentation: 15 Minutes of Presentation including Q&A.

- **Note**

✧ The regular oral presentation time arrangement is for reference only. In case any absence or some presentations are less than 15 minutes, please join your session before it starts.

An excellent presentation will be selected from each session which will be announced and awarded an excellent presentation certificate.

Keynote Speaker I

09:05-09:50, Thursday, March 13 (GMT+11), Melbourne Time

Meeting Room: The President's Room, First Floor

Zoom Link: https://us02web.zoom.us/j/85456447819 Password: ICINT2025

Prof. Rajkumar Buyya

IEEE Fellow
Redmond Barry Distinguished Professor
Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory

University of Melbourne, Australia

Speech Title: Neoteric Frontiers in Cloud and Quantum Computing

Abstract: The twenty-first-century digital infrastructure and applications are driven by Cloud computing and Internet of Things (IoT) paradigms. The Cloud computing paradigm has been transforming computing into the 5th utility wherein "computing utilities" are commoditized and delivered to consumers like traditional utilities such as water, electricity, gas, and telephony. It offers infrastructure, platform, and software as services, which are made available to consumers as subscription-oriented services on a pay-as-you-go basis over the Internet. Its use is growing exponentially with the continued development of new classes of applications such as AI-powered models (e.g., ChatGPT) and the mining of crypto currencies such as Bitcoins. To make Clouds pervasive, Cloud application platforms need to offer (1) APIs and tools for rapid creation of scalable and elastic applications and (2) a runtime system for deployment of applications on geographically distributed Data Centre infrastructures (with Quantum computing nodes) in a seamless manner. This keynote presentation will cover (a) 21st century vision of computing and identifies various emerging IT paradigms that make it easy to realize the vision of computing utilities; (b) innovative architecture or creating elastic Clouds integrating edge resources and managed Clouds, (c) Aneka 6G, a 6th generation Cloud Application Platform, for rapid development of Big Data/AI applications and their deployment on private/public Clouds driven by user requirements, (d) experimental results on deploying Big Data/IoT applications in engineering, health care (e.g., COVID-19), deep learning/Artificial intelligence (AI), satellite image processing, and natural language processing (mining COVID-19 literature for new insights) on elastic Clouds, (e) QFaaS: A Serverless Function-as-a-Service Framework for Quantum Computing, and (f) new directions for emerging research in Cloud and Quantum computing.

Bio: Dr. Rajkumar Buyya is a Redmond Barry Distinguished Professor and Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory at the University of Melbourne, Australia. He

is also serving as the founding CEO of Manjrasoft, a spin-off company of the University, commercializing its innovations in Cloud Computing. He has authored over 850 publications and seven textbooks including "Mastering Cloud Computing" published by McGraw Hill, China Machine Press, and Morgan Kaufmann for Indian, Chinese and international markets respectively. Dr. Buyya is one of the highly cited authors in computer science and software engineering worldwide (h-index=168 g-index=369, and 150,600+ citations). He has been recognised as IEEE Fellow, a "Web of Science Highly Cited Researcher" for seven times since 2016, the "Best of the World" twice for research fields (in Computing Systems in 2019 and Software Systems in 2021/2022/2023) as well as "Lifetime Achiever" and "Superstar of Research" in "Engineering and Computer Science" discipline twice (2019 and 2021) by the Australian Research Review.

Software technologies for Grid, Cloud, Fog, and Quantum computing developed under Dr. Buyya's leadership have gained rapid acceptance and are in use at several academic institutions and commercial enterprises in 50+ countries around the world. Manjrasoft's Aneka Cloud technology developed under his leadership has received "Frost New Product Innovation Award". He served as founding Editor-in-Chief of the IEEE Transactions on Cloud Computing. He is currently serving as Editor-in-Chief of Software: Practice and Experience, a long-standing journal in the field established 54+ years ago. He has presented over 750 invited talks (keynotes, tutorials, and seminars) on his vision on IT Futures, Advanced Computing technologies, and Spiritual Science at international conferences and institutions in Asia, Australia, Europe, North America, and South America. He has recently been recognized as a Fellow of the Academy of Europe.

For further information on Dr.Buyya, please visit his cyberhome: www.buyya.com

Keynote Speaker II

09:50-10:35, Thursday, March 13 (GMT+11), Melbourne Time
Meeting Room: The President's Room, First Floor
ZOOM Link: https://us02web.zoom.us/j/85456447819 Password: ICINT2025

Prof. Jiankun Hu

IEEE Fellow
Senior Area Editor of IEEE Transactions on Information Forensics and Security

University of New South Wales, Australia

Speech Title: Privacy-Preserving Biometric Authentication

Abstract: It is well-known that biometrics can provide an authentication of genuine users. Significant advances have been made in the field with many successful applications, e.g., border control and digital access control. Biometrics involves a person's privacy data which is regulated by laws in many countries. There is a trend/need to develop privacy-preserving biometrics authentication technologies. In this talk, I'll introduce some major research works in this field. It will cover the popular infinite-to-one mapping-based cancelable biometrics template design, Attack via Record Multiplicity (ARM), ARM attack resilient cancelable biometrics designs, and hill-climbing attacks on biometrics templates. We will introduce our latest projects/works on ARM and hill-climbing resilient cancelable deep learning models.

Bio: Jiankun Hu is a professor with the School of Systems and Computing, University of New South Wales, Canberra, Australia. He has received eleven Australian Research Council (ARC) Grants and has served at the Panel on Mathematics, Information, and Computing Sciences, Australian Research Council ERA - The Excellence in Research for Australia Evaluation Committee in 2012. His research interests are in the field of cyber security covering intrusion detection, sensor key management, and biometrics authentication. His main research interest is in the field of cyber security, including biometrics security, where he has publications at top venues including the IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE, IEEE TRANSACTIONS ON INFORMATION FORENSICS AND SECURITY, and PATTERN RECOGNITION. He is a Senior Area Editor of the IEEE TRANSACTIONS ON INFORMATION FORENSICS AND SECURITY. He has a Google h-index of 72.

Keynote Speaker III

11:05-11:50, Thursday, March 13 (GMT+11), Melbourne Time
Meeting Room: The President's Room, First Floor
ZOOM Link: https://us02web.zoom.us/j/85456447819 Password: ICINT2025

Prof. Jiong Jin

World Top 2% Scientists for Citation Impact since 2019 of Stanford University's List
Associate Dean Research (acting) in the School of Science, Computing and Engineering Technologies

Swinburne University of Technology, Australia

Speech Title: Real-time Internet of Things: Architecture, Algorithms and Applications

Abstract: The Internet of Things (IoT) is an emerging revolution, which targets anytime connectivity for anything to create smart environments in which there is fast-paced interaction between systems (networked sensors, heterogeneous devices, actuators, robots) and between such systems and people. To further enable real-time services in IoT, a new multi-tier computing paradigm is recently introduced and explored in both academic and industrial fields. Its basic concept is to construct local computing nodes (aka edge/fog nodes), which moves computation, control, networking, storage and security functionalities from traditional remote cloud right to a place closer to the end-users in order to optimally support time-critical applications. Meanwhile, it also empowers a new set of industrial applications, such as networked robotics and cloud-fog automation, to achieve real-time operations. In this talk, a complete overview and recent developments of real-time IoT will be presented with its applications in smart manufacturing, smart transportation and smart cities.

Bio: Jiong Jin is currently a full Professor and Associate Dean Research (acting) in the School of Science, Computing and Engineering Technologies, Swinburne University of Technology. He received the B.E. degree with First Class Honours in Computer Engineering from Nanyang Technological University, Singapore, in 2006, and the Ph.D. degree in Electrical and Electronic Engineering from the University of Melbourne, Australia, in 2011. His research interests include network design and optimization, edge computing and intelligence, robotics and automation, and cyber-physical systems and Internet of Things as well as their applications in smart manufacturing, smart transportation and smart cities. He is recognized as an Honourable Mention in the AI 2000 Most Influential Scholars List in IoT (2021 and 2022) and included in Stanford University's list of the world Top 2% scientists for citation impact since 2019. He is currently an Associate Editor of IEEE Transactions on Industrial Informatics.

Invited Speaker I

13:30-13:55, Thursday, March 13 (GMT+11), Melbourne Time
Meeting Room: The President's Room, First Floor

Prof. Rubita Sudirman

Universiti Teknologi Malaysia, Malaysia

Speech Title: Prediction of Cognitive States using Physiological Signals: A Machine Learning Approach

Abstract: The relationship between physiological signals and cognitive states has been a focus of increasing research interest due to its potential applications in education, healthcare, and workplace environments. This study aimed to predict cognitive states using multimodal physiological data. Data were collected from ten participants during academic exams and preprocessed to remove artifacts. Features such as mean, standard deviation, variance, maximum amplitude, minimum amplitude, and power spectral density were extracted and classified using supervised machine learning classifiers. The results demonstrated that EDA alone achieved the highest classification accuracy of 80% during Midterm 1. However, the predictive power of EDA and other signals varied across exams, with accuracies ranging between 40% and 60% in Midterm 2 and the final exam. Smaller combinations of signals, such as HR and TEMP, also showed promising results, achieving 60% accuracy. This study demonstrates the feasibility of leveraging physiological data for accurate and efficient cognitive assessment, laying the groundwork for future advancements in this field.

Bio: Professor Rubita Sudirman received her Bachelor's and Master's degrees in Electrical Engineering from the University of Tulsa, USA, and obtained her Ph.D. in Electrical Engineering from Universiti Teknologi Malaysia (UTM). Currently, she is a professor and certified professional engineer serving at the Faculty of Electrical Engineering, UTM. She has published more than 150 indexed papers, including journals and conference papers. Her current research interests include applications of soft computing in biomedical engineering, particularly in speech processing, EEG & EOG signal analysis, medical electronics, and rehabilitation engineering.

Invited Speaker II

13:55-14:20, Thursday, March 13 (GMT+11), Melbourne Time
Meeting Room: The President's Room, First Floor

Prof. Chen Li

Anhui Jianzhu University, China

Speech Title: Construction of PSO-SVM Model and Evaluation of Information Service Quality in Smart Libraries in China

Abstract: Information services play an important role in the construction of smart libraries in universities. Starting from domestic and international research on smart libraries, this article explores the connotation of smart libraries and elaborates on the role of information services in the construction of smart libraries in universities. Analyze the advantages of smart libraries in information services. Construct an evaluation index system for the quality of information services in smart libraries, including 10 indicators such as intelligent services, information resource integration, efficient data management and services, convenience of information services, and real-time updates of information data. Analyzing the current evaluation methods for the quality of information services in smart libraries, there are problems such as subjective weight setting. The evaluation methods need to further integrate information technology, and it is of great significance to improve the evaluation methods with the help of artificial intelligence technology. This article constructs an evaluation model for the information service quality of the smart library of Anhui Jianzhu University Library in China based on PSO-SVM, and conducts empirical analysis. The research results show that the correlation fitting coefficient between the simulated values and the real values of the PSO-SVM method is 99.7789%, indicating that the PSO-SVM method has strong reliability in the application of information service quality evaluation in smart libraries and is a reliable method.

Bio: CHEN LI is a Doctoral Supervisor, Level-2 Professor, a Renowned Teacher in Anhui Province, the Director of the Library of Anhui Jianzhu University, and holds a Doctorate degree. For years, she has been engaged in research related to artificial intelligence, project evaluation theories and methods, and spatial econometric analysis. She has presided over nearly 10 national and provincial ministerial level projects, including 1 post - funded project of the National Social Science Foundation, 1 project of the Anhui Provincial Philosophy and Social Science Planning, 3 soft science projects of the

Anhui Provincial Department of Science and Technology, 1 general project of the Anhui Natural Science Foundation, and 2 research topics on the innovative development of social sciences in Anhui Province. She has published over 100 academic papers, among which nearly 30 are in SSCI, EI (JA), CSCD, CSSCI, and core journals. As the first completed person, she won the Second Prize of the Anhui Provincial Social Science Award (Social Science Category) (2019 - 2020). One of her independently written research reports received instructions from the main leaders of the Anhui Provincial Party Committee. She presides over the Provincial Renowned Teacher Studio, leads a provincial level teaching team, teaches provincial level excellent courses, has edited 2 provincial planned textbooks, presided over a major educational reform project of the Anhui Provincial Department of Education. In 2021, the postgraduate education led by her won the First Prize of the Provincial Teaching Achievement Award; in 2022, she won the Second Prize of the Anhui Provincial Social Science Award. The case written by the team she led was included in the case library of the China Professional Degree Teaching Case Center of the Ministry of Education. She has edited 2 provincial planned textbooks and published 5 monographs.

Invited Speaker III

14:20-14:45, Thursday, March 13 (GMT+11), Melbourne Time
Meeting Room: The President's Room, First Floor

Prof. Kazuyuki Shimizu

Meiji University, Japan

Speech Title: Beating Bitcoin

Abstract: Using Bitcoin, often referred to as "digital gold (Proof of Work, POW)," as a benchmark, this study investigates the development and promotion of ecosystems driven by "digital oil (Proof of Stake, POS)." The findings can be summarized in three key points: (1) Revolution in Decentralized Governance, while current systems are dominated by centralized control, often referred to as the "Magnificent Seven," the Bitcoin network achieves decentralized data management and governance through consensus mechanisms like PoW and PoS. This shift enables a democratic revolution where ownership lies with the users. (2) Universal Law of Success, The Bitcoin network exemplifies the mathematical "power law," representing universal principles of success. It quantifies economic growth dynamics exponentially, offering a hybrid perspective that combines traditional capital market investment strategies with approaches tailored to emerging (startup) markets. This framework facilitates a paradigm shift in the economy by enhancing productivity. (3) Optimizing Resource Allocation, the current global economy relies on single value benchmarks, such as the US dollar, which leads to inefficiencies and resource misallocations. Adopting new benchmarks like Bitcoin, combined with alternative indicators (including altcoins), could enable better resource allocation and measurement. This process, driven by "tokenized time" as a new productivity metric, holds the potential to improve resource management and create a more efficient economic framework.

Bio: Prof. Dr. Kazuyuki Shimizu is a Professor at the Faculty of Business Administration, Meiji University, Japan. His research focuses on corporate governance, stakeholder theory, and digital transformation, with a particular interest in blockchain technologies and ESG investment strategies. He has been a visiting scholar at the University of Limerick, Ireland, and regularly presents his work at international conferences, including ETHICOMP and other conferences. Prof. Shimizu's recent research explores the impact of digital innovation on corporate governance and sustainability, and he has published

extensively in both Japanese and international academic journals. His practical experience includes working in institutional investor relations at German investment banking and Barclays Capital in Tokyo, providing him with a unique blend of academic and industry insights.

Invited Speaker IV

16:15-16:40, Thursday, March 13 (GMT+11), Melbourne Time

Meeting Room: The President's Room, First Floor

Prof. Qiu Chen

Kogakuin University, Japan

Speech Title: A Scene Recognition Algorithm Using Features of Hybrid Scene Concepts

Abstract: A scene image is usually composed of foreground objects and background contexts with a certain spatial layout. For better scene representation, we proposed in this paper a novel scene recognition algorithm using Features of Hybrid Scene Concepts (FoHSC). Our approach can be simply described as three steps, namely patch sampling, feature extraction, and feature encoding. First, we apply Class Activation Mapping (CAM) to implement a special sampling strategy, which can preserve the essential spatial structure of the scene. Secondarily, Convolutional Neural Networks (CNNs) are used to extract the learning-based features from sampling patches. Finally, non-negative sparse coding and spatial max pooling are performed on each feature sub-space, respectively. The forward path of our model is separated into two independent data streams after patch sampling. Experimental results on publicly available scene datasets show that the proposed algorithm can perform better than the state-of-the-art methods, demonstrating that our concatenated features benefit scene recognition.

Bio: Qiu Chen received his Ph.D. in electronic engineering from Tohoku University, Japan, in 2004. Since then, he has held positions as an assistant professor and associate professor at Tohoku University. Currently, he is a professor with Kogakuin University. His research interests include pattern recognition, computer vision, deep learning, information retrieval, and their applications. He serves on the editorial boards for several journals, as well as committees for numerous international conferences.

Invited Speaker V

11:00-11:25, Friday, March 14 (GMT+11), Melbourne Time
ZOOM Link: https://us02web.zoom.us/j/85456447819 Password: ICINT2025

Assoc. Prof. Wasi Haider Butt

National University of Sciences and Technology (NUST), Pakistan

Speech Title: Pair Elicitation, A Novel Software Requirements Elicitation Technique, Inspired by Pair Programming

Abstract: The success or failure of a software product is mainly dependent on its fitness to purpose which in turn is fully dependent on the quality of software requirements. The quality of software requirements is defined by adherence to standard software engineering process comprising elicitation, analysis, specifications, validation and management. Elicitation means proactively discovering the actual stakeholder's requirements. Various methods are currently being used to elicit software requirements including interviews, questionnaires, workshops, storyboarding and ethnomethodology. The traditional conventional interviews are conducted in an old fashion and requirement error are figured out later during analysis. To address this issue, a novel pair elicitation method is proposed, drawing inspiration for extreme programming practice of pair programming, where code writing and inspection occur simultaneously. Using the same approach is elicitation, requirement elicitation and analysis to detect the straight forward requirement errors is made side by side. The effectiveness of the proposed approach has been validated through a case study of a university management information system. The results demonstrate significant improvements in both error reduction and time efficiency for elicited requirements.

Bio: Dr. Wasi Haider Butt is a tenured Associate Professor in the Department of Computer and Software Engineering at the College of Electrical and Mechanical Engineering (CEME), National University of Sciences and Technology (NUST), Pakistan. He earned his Ph.D. in Computer Software Engineering from NUST and leads the Automated Software Engineering Research Group at the university. Dr. Butt's research interests encompass various facets of computer science and software engineering, with a particular focus on automated software engineering. Dr. Butt's contributions to the field are recognized

through his publications and research work, which are accessible via his Google Scholar profile. His dedication to advancing software engineering education and research continues to impact both his students and the broader academic community.

Agenda Overview

Day 1- March 12, 2025, Wednesday, GMT+11, Melbourne Time

Onsite Sign-in		
Time	**Event**	**Venue**
10:00-13:30	**Onsite Sign-in**	**The Grand Vestibule Area of Hotel**
13 :30-16 :00	**Campus Tour**	**La Trobe University** (Gather in the hotel lobby, departure at 13:30)

Online Pretest Session		
Time	**Presenters**	**ZOOM Information**
13:00-16:00	Keynote Speakers (Online), Session Chairs (Online), Committee Members (Online), Invited Speaker	**Zoom Link:** https://us02web.zoom.us/j/85456447819 **Zoom ID:** 854 5644 7819 **Password:** ICINT2025
13 :00-16 :00	**Online Session 1:** Next Generation Artificial Intelligence and Intelligent Information System Assoc. Prof. Wasi Haider Butt MB770, MB750, MB731, MB762, MB757, MB733, MB767	
	Online Session 2: Image Analysis and Processing Technology Based on Data Mb761, MB740, MB760, MB725, MB768, MB764, MB777	
	Online Session 3: Future Communication System and Information Security MB735, MB765, MB743, MB755, MB773	

Online Test Tips:

- ✧ Please get your presentation file ready for the pretest.
- ✧ Please unmute audio and start video while your presentation.
- ✧ It's suggested to use headset with microphone or earphone with microphone.

Agenda Overview

Day 2- March 13, 2025, Thursday, GMT+11, Melbourne Time

Opening Ceremony and Keynote Speeches *Meeting Room: The President's Room, First Floor* *Zoom Link: https://us02web.zoom.us/j/85456447819* *Password: ICINT2025*	
09:00-09:05	**Welcome Message** **Prof. Wei Xiang,** **La Trobe University, Australia**
09:05-09:50	**Keynote Speech I** **Prof. Rajkumar Buyya** IEEE Fellow Redmond Barry Distinguished Professor Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory **University of Melbourne, Australia** ***Speech Title: Neoteric Frontiers in Cloud and Quantum Computing***
09:50-10:35	**Keynote Speech II** **Prof. Jiankun Hu** IEEE Fellow Senior Area Editor of IEEE Transactions on Information Forensics and Security **University of New South Wales, Australia** ***Speech Title: Privacy-Preserving Biometric Authentication***
10:35-11:05	**Coffee Break & Group Photo**
11:05-11:50	**Keynote Speech III** **Prof. Jiong Jin** World Top 2% Scientists for Citation Impact since 2019 of Stanford University's List Associate Dean Research (acting) in the School of Science, Computing and Engineering Technologies **Swinburne University of Technology, Australia** ***Speech Title: Real-time Internet of Things: Architecture, Algorithms and Applications***

11:50-13:30	**Lunch (Mr. Tomkins Restaurant, Basement Floor)**	
Onsite Session ***Topic: AI-based Digital Communication and Information Technology*** ***Meeting Room: The President's Room, First Floor***		
13:30-16:10	**Part I**	***Session Chair : Dr. Sanjeev Shukla, IIT Roorkee, India*** **Invited Speaker I-MB739:** Prof. Rubita Sudirman, Universiti Teknologi Malaysia, Malaysia **Invited Speaker II-MB730-A:** Prof. CHEN LI, Anhui Jianzhu University, China **Invited Speaker III-MB738:** Prof. Kazuyuki Shimizu, Meiji University, Japan MB720, MB763, MB781, MB769
16:00-16:15	**Coffee Break & Group Photo (The President's Room, First Floor)**	
16:15-18:40	**Part II**	***Session Chair: Prof. Jiankun Hu, University of New South Wales, Australia*** **Invited Speaker IV-MB741:** Prof. Qiu Chen, Kogakuin University, Japan MB742, MB751, MB771, MB714, MB779, MB756, MB778, MB726, MB727
18:40-20:00	**Dinner （The President's Room, First Floor）**	

Agenda Overview

Day 3– March 14, 2025, Friday, GMT+11, Melbourne Time

Online Sessions		
09:30-11:40	**ZOOM ID : 854 5644 7819** https://us02web.zoom.us/j/85456447819 **Password:** ICINT2025	**Online Session 1–Next Generation Artificial Intelligence and Intelligent Information System** **Session Chair: Asst. Prof. John Ivan C. Maurat, National University, Philippines** **Invited Speaker V:** Assoc. Prof. Wasi Haider Butt, National University of Sciences and Technology (NUST), Pakistan MB770, MB750, MB731, MB762, MB757, MB733, **Invited Speech, MB767**
11:40-13:30	**Break Time**	
13:30-15:15	**ZOOM ID : 854 5644 7819** https://us02web.zoom.us/j/85456447819 **Password:** ICINT2025	**Online Session 2–Image Analysis and Processing Technology Based on Data** **Session Chair: Assoc. Prof. Herminiño Lagunzad, National University, Philippines** MB761, MB740, MB760, MB725, MB768, MB764, MB777
15:15-15:45	**Break Time**	
15:45-17:00	**ZOOM ID : 854 5644 7819** https://us02web.zoom.us/j/85456447819 **Password:** ICINT2025	**Online Session 3–Future Communication System and Information Security** **Session Chair: Assoc. Prof. Chao-Lung Chou, Feng Chia University, Taiwan** Mb735, MB765, MB743, MB755, MB773

Onsite Session

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Topic: AI-based Digital Communication and Information Technology

Time: 13:30-18:10 | Thursday, March 13, 2025 (GMT+11, Melbourne Time)

Session Chair: Part I - Dr. Sanjeev Shukla, IIT Roorkee, India

Part II - Prof. Jiankun Hu, University of New South Wales, Australia

Meeting Room: The President's Room, First Floor

Invited Speech I **MB739** 13:30-13:55	**Title: Prediction of Cognitive States using Physiological Signals: A Machine Learning Approach** **Authors:** Syarifah Noor Syakiylla Sayed Daud, Rubita Sudirman, Eileen Su Lee Ming, Raymond Teoh Yong Sheng **Invited Speaker:** Prof. Rubita Sudirman, Universiti Teknologi Malaysia, Malaysia **Abstract:** The relationship between physiological signals and cognitive states has been a focus of increasing research interest due to its potential applications in education, healthcare, and workplace environments. This study aimed to predict cognitive states using multimodal physiological data. Data were collected from ten participants during academic exams and preprocessed to remove artifacts. Features such as mean, standard deviation, variance, maximum amplitude, minimum amplitude, and power spectral density were extracted and classified using supervised machine learning classifiers. The results demonstrated that EDA alone achieved the highest classification accuracy of 80% during Midterm 1. However, the predictive power of EDA and other signals varied across exams, with accuracies ranging between 40% and 60% in Midterm 2 and the final exam. Smaller combinations of signals, such as HR and TEMP, also showed promising results, achieving 60% accuracy. This study demonstrates the feasibility of leveraging physiological data for accurate and efficient cognitive assessment, laying the groundwork for future advancements in this field.
Invited Speech II **MB730-A** 13:55-14:20	**Title: Construction of PSO-SVM Model and Evaluation of Information Service Quality in Smart Libraries in China** **Authors:** CHEN LI **Invited Speaker:** Prof. CHEN LI, Anhui Jianzhu University, China **Abstract:** Information services play an important role in the construction of smart libraries in universities. Starting from domestic and international research on smart libraries, this article explores the connotation of smart libraries and elaborates on the role of information services in the construction of smart libraries in universities. Analyze the advantages of smart libraries in information services. Construct an evaluation index system for the quality of information services in smart libraries, including 10 indicators such as intelligent services, information resource integration, efficient data management and services, convenience of information services, and real-time updates of information data. Analyzing the current evaluation methods for the quality of information services in smart libraries, there are problems such as subjective weight setting. The evaluation methods need to further integrate information technology, and it is of great significance to improve the evaluation methods with the help of artificial intelligence technology. This

	article constructs an evaluation model for the information service quality of the smart library of Anhui Jianzhu University Library in China based on PSO-SVM, and conducts empirical analysis. The research results show that the correlation fitting coefficient between the simulated values and the real values of the PSO-SVM method is 99.7789%, indicating that the PSO-SVM method has strong reliability in the application of information service quality evaluation in smart libraries and is a reliable method.
Invited Speech III **MB738** 14:20-14:45	**Title: Beating Bitcoin** **Authors:** Kazuyuki Shimizu **Invited Speaker:** Prof. Kazuyuki Shimizu, Meiji University, Japan **Abstract:** Using Bitcoin, often referred to as "digital gold (Proof of Work, POW)," as a benchmark, this study investigates the development and promotion of ecosystems driven by "digital oil (Proof of Stake, POS)." The findings can be summarized in three key points: (1) Revolution in Decentralized Governance, while current systems are dominated by centralized control, often referred to as the "Magnificent Seven," the Bitcoin network achieves decentralized data management and governance through consensus mechanisms like PoW and PoS. This shift enables a democratic revolution where ownership lies with the users. (2) Universal Law of Success, The Bitcoin network exemplifies the mathematical "power law," representing universal principles of success. It quantifies economic growth dynamics exponentially, offering a hybrid perspective that combines traditional capital market investment strategies with approaches tailored to emerging (startup) markets. This framework facilitates a paradigm shift in the economy by enhancing productivity. (3) Optimizing Resource Allocation, the current global economy relies on single value benchmarks, such as the US dollar, which leads to inefficiencies and resource misallocations. Adopting new benchmarks like Bitcoin, combined with alternative indicators (including altcoins), could enable better resource allocation and measurement. This process, driven by "tokenized time" as a new productivity metric, holds the potential to improve resource management and create a more efficient economic framework.
MB720 14:45-15:00	**Title: Cryptojacking Detection Using eBPF and Machine Learning Techniques** **Authors:** Natan Orzechowski, Marco Zuppelli, Luca Caviglione, Wojciech Mazurczyk **Presenter:** Natan Orzechowski, Warsaw University of Technology, Poland **Abstract:** This paper presents a novel approach to cryptojacking detection, leveraging the extended Berkeley Packet Filter (eBPF) alongside machine learning. Specifically, we use eBPF for efficient, kernel-level monitoring of system resources, providing real-time data on CPU usage, memory allocation, and network activity. We employ machine learning models to analyze collected information, focusing on “core” behavioral patterns rather than implementation-specific aspects. Our idea offers robust detection capabilities, resilience against minor modifications of malicious software, and higher reliability compared to techniques based on user-level measurements. We demonstrate the effectiveness of our method through experimental results and discuss limitations and possible future enhancements.

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MB763 15:00-15:15	**Title: A Multidisciplinary Review of Machine Learning for Driver Distraction Prediction: Unveiling Challenges** **Authors:** Achala Aponso, Craig Speelman, Mike Johnstone **Presenter:** Achala Aponso, Edith Cowan University, Joondalup, Australia **Abstract:** Driver distraction remains a significant contributor to road accidents worldwide, presenting an urgent need for advanced prediction systems capable of addressing this critical public safety issue. Despite advancements in the integration of physiological signals such as electroencephalography (EEG), galvanic skin response (GSR), and heart rate variability (HRV) with machine learning algorithms, achieving reliable performance in real-world scenarios is still a challenge. The variability of individual responses to cognitive and visual distractions complicates the scalability of existing systems, limiting their applicability in dynamic driving contexts. This review examines the current state of distraction detection systems, focusing on the interplay between physiological signal processing and machine learning methodologies. While promising progress has been made with techniques such as hybrid deep learning architectures, LSTM-CNN models, these approaches often struggle to generalise across diverse populations and real-world environments. Challenges such as signal variability, overfitting, and the practical deployment of multimodal systems are explored, offering a critical evaluation of the limitations in existing frameworks. By synthesising insights from cognitive science, physiological analysis, and machine learning, this paper highlights the importance of developing adaptive and context-aware systems capable of addressing the complexities of distraction detection. Through a multidisciplinary approach, the review provides a foundation for future research aimed at bridging theoretical advancements and practical implementation, paving the way for more effective, scalable, and personalised solutions to enhance road safety.
MB781 15:15-15:30	**Title: Pulse-based Step Velocity Adjustment in Walking Support System with Metaverse** **Authors:** Yutaka Ishibashi, Pingguo Huang, Hisataka Maruyama **Presenter:** Yutaka Ishibashi, Aichi Sangyo University, Japan **Abstract:** In this paper, we propose a method for dynamically adjusting the step velocity according to information on pulse rate from a smartwatch to achieve a target pulse rate suitable for aerobic exercise in a walking support system with metaverse, which was researched and developed for the prevention of frailty in the elderly. We also verify the operation of the proposed method through experiment.
MB769 15:30-15:45	**Title: Sustainable Collaborative Cargo: Integrating emissions reduction and emerging technologies in a digital logistics exchange** **Authors:** Hans-Henrik Hvolby, Kenn Steger-Jensen, Sven Vestergaard, Mihai Neagoe, Paul Turner, Carsten Svensson, Jan Frick **Presenter:** Hans-Henrik Hvolby, act2learn UCN, Denmark **Abstract:** The response to global warming continues to drive efforts to reduce CO2 emissions across all sectors. In cargo transport, more environmentally friendly transport modes and fuel types continue to be advocated and mechanisms to share available cargo space to improve utilization rates across transport modes. The development in freight exchanges as well as the benefits of collaborative logistics are discussed alongside the

	challenges in environmental calculations and reporting. Finally, a new concept of utilizing real-time planning to reduce costs and improve the usage of cargo trucks is lined up and discussed.
MB742 15:45-16:00	**Title: Attention-Based Caption Generation via Input Tokens** **Authors:** Hidekazu Yanagimoto, Sorato Nakamura **Presenter:** Hidekazu Yanagimoto, Osaka Metropolitan University, Japan **Abstract:** This paper proposes a caption generation system that adapts to specific attention points in an image. Multimodal systems capable of processing both images and text have garnered significant attention. This study focuses on caption generation. Conventional caption generation systems produce a single caption representing the content of an image. However, human annotator typically generates multiple captions based on the objects they focus on. To address this, we develop a system that generates multiple different captions by specifying attention points on the image. This is achieved by incorporating the attention points as input to a caption generation system built with a Transformer decoder. The attention points are represented as masks in the Transformer decoder, enabling implementation within GPTbased systems, such as large language models. Evaluation experiments demonstrated that the proposed system achieved higher Rouge scores compared to a conventional system. Additionally, comparing the generated captions confirmed that the proposed system successfully produced different captions depending on the specified attention points.
16:00-16:15	**Coffee Break & Group Photo (The President's Room, First Floor)**
Invited Speaker IV **MB741** 16:15-16:40	**Title: A Scene Recognition Algorithm Using Features of Hybrid Scene Concepts** **Authors:** Qiu Chen, Ran Miao, Feifei Lee **Invited Speaker:** Prof. Qiu Chen, Kogakuin University, Japan **Abstract:** A scene image is usually composed of foreground objects and background contexts with a certain spatial layout. For better scene representation, we proposed a novel scene recognition algorithm using Features of Hybrid Scene Concepts (FoHSC) in this paper. Our approach can be simply described as three steps, namely patch sampling, feature extraction, and feature encoding. First, we apply Class Activation Mapping (CAM) to implement a special sampling strategy, which can preserve the essential spatial structure of the scene. Secondarily, Convolutional Neural Networks (CNNs) are used to extract the learning-based features from sampling patches. Finally, non-negative sparse coding and spatial max pooling are performed on each feature sub-space, respectively. The forward path of our model is separated into two independent data streams after patch sampling. Experimental results on publicly available scene datasets show that the proposed algorithm can perform better than the state-of-the-art methods, demonstrating that our concatenated features benefit scene recognition.

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MB751 16:40-16:55	**Title: Reinforcement Learning-Based Self-Optimizing Wi-Fi Spectrum Auction for 6G Networks** **Authors:** Rasika Nilaweera Kalahe-Wattege, Fernando Beltran **Presenter:** Rasika Nilaweera Kalahe-Wattege, University of Auckland, New Zealand **Abstract:** This paper examines the technical policy options for potential conflicts and synergies in the 6 GHz band (5.925–7.125 GHz), with a specific focus on its shared use. The mobile industry is showing increasing interest in utilizing the upper portion of the 6 GHz band (6425–7125 MHz) to develop International Mobile Telecommunications (IMT), including 5G and 6G technologies. At the same time, the entire 1200 MHz spectrum within this band is being considered for the deployment of IEEE 802.11 technologies, commonly known as Wi-Fi. This paper reviews and analyzes critical literature, alongside case studies from the FCC in the U.S. and the European CEPT, examining various technical spectrum coexistence studies. However, the allocation of the upper 6 GHz band remains a country-specific decision, influenced by national service demands and the technologies that offer the greatest overall socio-economic value. The paper also discusses how the 6 GHz band can enable sustainable connectivity by identifying regulatory conflicts and synergies, while promoting collaboration among key stakeholders.
MB771 16:55-17:10	**Title: Quantum Machine Learning for Phishing URLs Detection: Implementation and Evaluation with Qiskit** **Authors:** Yi Wei, Yuji Sekiya, Masaya Nakayama, Synge Todo **Presenter:** Yi Wei, The University of Tokyo, Japan **Abstract:** Phishing is a kind of cybercrime where attackers trick unsuspecting network users into revealing sensitive information, resulting in identity theft and financial damage. As this threat continues to grow, artificial intelligence strategies have emerged as a promising solution for its detection in recent years. However, conventional machine learning approaches are starting to show limitations because training on large datasets in standard computing environments may either take too long for accurate results or produce poor accuracy with quick training. The recent advances in the study of the application of quantum computing to machine learning tasks have demonstrated that existing solutions can be strengthened by utilizing the synergy of the two fields, known as Quantum Machine Learning (QML). To explore the potential of this emerging technique, this study implements various QML models integrated with the latest version of Qiskit and presents a detailed execution process along with a comprehensive comparative analysis. The quantitative results obtained from the experiments demonstrate the significant potential of QML models in phishing detection. Furthermore, these state-of-the-art assessments also contribute to future research in improving the composition of QML models applied in the cyber defense field.
MB714 17:10-17:25	**Title: User Behavior Under Phishing Attacks: Eye tracking, Scenarios and Analysis** **Authors:** Shaikha Jamal M S Al-Naimi, Alireza Sadighian, Gabriele Oligeri **Presenter:** Alireza Sadighian, Division of Information and Computing Technology, Hamad Bin Khalifa University, Qatar Foundation, Qatar **Abstract:** In our increasingly digital world, phishing attacks pose a persistent threat that requires enhanced cybersecurity measures. Social engineering attacks in the form of Phishing emails pose various risks and challenges to an enormous number of users around

	the world. In such attacks, attackers use various strategies, such as visual manipulations and cognitive vulner-abilities, to significantly increase the number of victims. This paper introduces an approach that addresses the urgent need for better cybersecurity measures against persistent phishing threats, highlighting a gap in our understanding of how users cognitively and behaviorally respond to phishing emails. For this purpose, by analyzing users' visual and cognitive reactions to possible phishing content through two separate scenarios, this study aims to clarify changes in behavior caused by malicious emails and the criteria to determine their legitimacy. Our results highlight the differences in decision criteria among users when encountering phishing emails.
MB779 17:25-17:40	**Title: Spectrum Sharing in the 6 GHz Band** **Authors:** Rasika Nilaweera Kalahe-Watteg **Presenter:** Rasika Nilaweera Kalahe-Wattege, University of Auckland, New Zealand **Abstract:** This paper examines the technical policy options for potential conflicts and synergies in the 6 GHz band (5.925–7.125 GHz), with a specific focus on its shared use. The mobile industry is showing increasing interest in utilizing the upper portion of the 6 GHz band (6425–7125 MHz) to develop International Mobile Telecommunications (IMT), including 5G and 6G technologies. At the same time, the entire 1200 MHz spectrum within this band is being considered for the deployment of IEEE 802.11 technologies, commonly known as Wi-Fi. This paper reviews and analyzes critical literature, alongside case studies from the FCC in the U.S. and the European CEPT, examining various technical spectrum coexistence studies. However, the allocation of the upper 6 GHz band remains a country-specific decision, influenced by national service demands and the technologies that offer the greatest overall socio-economic value. The paper also discusses how the 6 GHz band can enable sustainable connectivity by identifying regulatory conflicts and synergies, while promoting collaboration among key stakeholders.
MB756 17:40-17:55	**Title: Internet of Things (IoT) for Sustainable Mechatronic Systems and Cyber-Physical Systems (CPS)** **Authors:** Zhuming Bi, Chris W. J. Zhang, Jianning Chi, Chaomin Luo **Presenter:** Zhuming Bi, Purdue University Fort Wayne, USA **Abstract:** This paper discusses the relevance of Internet of Things (IoT) to Sustainable Mechatronics. The impact of IoT on sustainable mechatronic systems is discussed, and the focus is on how IoT is used to empower mechatronic systems by integrating with more smart things over Internet. IoT-based reference architecture is presented, and critical enabling technologies are explored. Functional Requirements (FRs) of sustainable mechatronic systems are defined in terms of openness, scalability, dynamics, privacy, and security. Satisfying these FRs require IoT-based solutions in data acquisition, transmission, processes, and utilization. Furthermore, existing solutions on communications, protocols, frameworks, networking, and dynamic compositions are discussed with concluding remarks of the presented work.
MB778 17:55-18:10	**Title: A Comparative Performance Analysis of Diverse Task Scheduling Algorithms for Cloud Computing** **Authors:** Mohammed Alaa Ala'anzy, Raiymbek Zhanuzak, Abdulrahman K. Al-Qadhi, Zhanar Mukash, Ramis Akhmedov **Presenter:** Mohammed Alaa Ala'anzy, SDU University, Kazakhstan **Abstract:** Task scheduling is a critical component in cloud computing, directly impacting

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	the efficiency and performance of cloud environments. This paper presents a comparative performance analysis of four task scheduling algorithms: a hybrid credit-based resource-aware load balancing algorithm (HO-CB-RALB-SA), a conventional load balancing algorithm, an enhanced load balancing algorithm, and a locust-inspired algorithm. The hybrid approach integrates the Walrus Optimisation Algorithm (WOA) and Lyrebird Optimisation Algorithm (LOA), while the other algorithms represent nature-inspired and heuristic techniques. The evaluation focuses on three key metrics: makespan, resource utilisation, and balance percentage. By analysing these algorithms, the study identifies the strengths and limitations of each approach, providing insights into their effectiveness for cloud task scheduling. The results contribute to the selection and optimisation of task scheduling strategies tailored to diverse cloud computing needs and increase user satisfaction.
MB726 18:10-18:25	**Title: PSYCHOGRAPHIC SEGMENTATION BASED ON SIMILARITY MEASURING OF CUSTOMER'S ONLINE REVIEWS** **Authors:** Ha Thi Thu Nguyen, Huong Dao Thi Lan, Thu Nguyen Thi, Hai Khuong Thi Thu, Quyen Phan Dinh **Presenter:** Ha Thi Thu Nguyen, FPT University, Vietnam **Abstract:** The growth of e-commerce has enabled technology platforms to allow customers to directly review products, resulting in a shift toward using online reviews for customer opinion segmentation in recent research. This approach taps into the extensive big data generated by consumers online, providing businesses with critical insights into consumer preferences and behaviors. By analyzing these reviews, companies gain a deeper understanding of customer needs, emotions, and motivations. This insight allows businesses to tailor their marketing strategies, making them more personalized and relevant to different customer segments. This study proposed a hierarchical clustering method to segment customer reviews about the Sheraton hotel in Hanoi. To measure, it can be compared with the manual method by a human, the accuracy is approximately 83.6%. The results show that the customers in a group have the same opinion. This can apply in mining data for companies to perform marketing programs for each segment.
MB727 18:25-18:40	**Title: Applying Big Data Analysis for Developing a Real Estate Information System** **Authors:** Ha Thi Thu Nguyen, Huong Dao Thi Lan, Han Nguyen Ngoc **Presenter:** Ha Thi Thu Nguyen, FPT University, Vietnam **Abstract:** The real estate market is one of the keys to many economies in the world, it is contributing to mobilizing investment capital, promoting production, and increasing state budget revenue. Therefore, it is difficult to regulate and manage the real estate market without knowing real-time market information. In this paper, we propose a solution to analyze big data from real estate transactions on some large real estate websites in Vietnam. The data was collected with nearly 3,000 real estate transaction messages; after that, we used some text mining techniques such as entity extraction, data normalization, and visualization of the results through graphs. C# programming language is used to deal with algorithms and deploy application systems on both the web and IOS platforms. The implementation results show that the system is really meaningful and effective in analyzing data and supporting real-time understanding of the real estate market to make effective decisions for buyers and sellers and state management.
Dinner 19:00-20:00	**Dinner （The President's Room, First Floor）**

Online Session 1

Topic: Next Generation Artificial Intelligence and Intelligent Information System

Time: 9:30-11:40 | Friday, March 14 (GMT+11, Melbourne Time)
Session Chair: Asst. Prof. John Ivan C. Maurat, National University, Philippines
Zoom link: https://us02web.zoom.us/j/85456447819 Password: ICINT2025

MB770 9:30-9:45	**Title: Optimizing Secure and Efficient Data Communication in Health Information Systems: A Hybrid Cryptographic Approach** **Authors:** Paul Kobina Arhin Jnr, George Aggrey, Michael Asante, Linda Otoo, Akua Biney **Invited Speaker:** Paul Kobina Arhin Jnr, University of Cape Coast, Ghana **Abstract:** This study is conducted to provide solution to efficiency and security issues for health information transactions in resource constrained environments, such as Africa. An experiment was conducted using Elgamal with various symmetric algorithms; Blowfish, Twofish, IDEA, and 3DES, to measure encryption and decryption speeds. The outcome shows that, the hybrid of Elgamal and ChaCha20-poly1305 outperforms all others, achieving over 60% faster encryption than all the hybrid algorithms. The speed and security provided by the hybrid algorithm make it highly effective for data communication in health information systems in Africa, where limited computational resources and the high need for data confidentiality is very critical. The proposed system utilizes ElGamal for secure key exchange and ChaCha20-Poly1305 for fast, authenticated encryption of Health transactional data. This combination addresses critical security challenges, including confidentiality, integrity, and authentication, while optimizing performance for resource-constrained environments.
MB750 9:45-10:00	**Title: Identification of Important Nodes Based on Resistance Distance Fusion Gravity Model** **Authors:** Weiping Zhang, Sheng Zhang, Congyuan Xiong, Yuxuan Wang, Fuhao Liu, Hongmei Mao **Presenter:** Weiping Zhang, Nanchang Hangkong University, China **Abstract:** Existing gravity model-based methods for evaluating node importance rely on conventional distance metrics in complex networks, focusing solely on shortest paths and neglecting local information and node relationships. To address these limitations, this paper proposes a novel method integrating resistance distance into the gravity model. Resistance distance, derived from electrical network theory, is used to replace traditional distance metrics. Node degree is employed as node mass, and the sum of gravitational forces between a central node and others quantifies node importance. Experiments on four real-world networks using the SIR model, Kendall correlation coefficient, and monotonicity show that this method achieves more accurate rankings and significantly reduces the frequency of ties compared to existing approaches.

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MB731 10:00-10:15	**Title: Impact of Knowledge-Based Help Desk System: Facebook Messenger Chatbot for Student IT Support at Pamantasan ng Lungsod ng Valenzuela** **Authors:** Rommel Apostol **Presenter:** Rommel Apostol, Pamantasan ng Lungsod ng Valenzuela, Philippines **Abstract:** Digital support systems, in the form of Information Technology (IT) help desks, are key in transforming the educational technology infrastructure. This study investigates a Facebook Messenger chatbot implemented at Pamantasan ng Lungsod ng Valenzuela (PLV), addressing critical challenges in student IT support. Serving over 11,000 students, the analysis of a knowledge-based help desk system explores the potential of automated support mechanisms to expedite response times, improve accuracy, and enhance the overall student experience in digital resource management.
MB762 10:15-10:30	**Title: SemIRNet: A Semantic Irony Recognition Network for Multimodal Sarcasm Detection** **Authors:** Jingxuan Zhou, Yuehao Wu, Yibo Zhang, Yeyubei Zhang, Yunchong Liu, Bolin Huang, Chunhong Yuan **Presenter:** Jingxuan Zhou, University of New South Wales, Australia **Abstract:** Aiming at the problem of difficulty in accurately identifying graphical implicit correlations in multimodal irony detection tasks, this paper proposes a Semantic Irony Recognition Network (SemIRNet). The model contains three main innovations: (1) The ConceptNet knowledge base is introduced for the first time to acquire conceptual knowledge, which enhances the model's common-sense reasoning ability; (2) Two cross-modal semantic similarity detection modules at the word level and sample level are designed to model graphic-textual correlations at different granularities; and (3) A contrastive learning loss function is introduced to optimize the spatial distribution of the sample features, which improves the separability of positive and negative samples. Experiments on a publicly available multimodal irony detection benchmark dataset show that the accuracy and F1 value of this model are improved by 1.64% and 2.88% to 88.87% and 86.33%, respectively, compared with the existing optimal methods. Further ablation experiments verify the important role of knowledge fusion and semantic similarity detection in improving the model performance.
MB757 10:30-10:45	**Title: Intelligent Assignment Grading System Based on BERT for Computer Science Course** **Authors:** Guo Jun，Guo Yan Ting **Presenter:** Guo Jun, Zhujiang College, South China Agricultural University, GuangZhou, China **Abstract:** This study is the research outcome of the project "Exploration of Student-Centered Teaching Reform and AI Technology Application in Dynamic Website Design Courses" led by the author at South China Agricultural University, ZhuJiang College. This research focuses on the development and application of an intelligent assignment grading system based on the BERT model in computer science course teaching. Traditional assignment grading methods often fail to provide timely and personalized feedback, particularly when answering student queries. To address this issue, this paper

	proposes an assignment grading system based on BERT's bidirectional training capabilities, which can deeply understand the context and generate vectors for both student answers and standard answers. It uses cosine similarity to provide precise grading results. This study introduces innovations in system architecture, model selection, dataset construction, and the training process to meet the specific needs of grading computer science course assignments. The research methodology includes dataset construction, using 1,000 carefully selected answer pairs covering foundational topics such as dynamic website design, data structures, programming languages, and databases. By fine-tuning the BERT model, utilizing dynamic masking, Adam optimizer, and learning rate decay, we achieve optimal generalization results. In addition, a user feedback mechanism has been developed to continuously optimize the model based on the accuracy of the grading results in response to student feedback. The study designs an MVC architecture-based system, integrating Java, Tomcat, FastAPI, Uvicorn, and MySQL. Experimental results show that this system outperforms traditional methods in performance and efficiency, with an average cosine similarity of 0.88, Spearman rank correlation of 0.94, mean squared error (MSE) of 0.05, and an F1 score of 0.92. These results demonstrate that BERT significantly outperforms other models in understanding the semantic similarity between student answers and standard answers, providing more accurate grading predictions. Error analysis reveals that there is still room for improvement in handling complex technical terms and context understanding. The innovation of this study lies in providing a powerful and scalable tool to improve the quality of computer science education, offering an effective solution for educators to enhance teaching interaction, improve efficiency, and provide personalized learning support. Insights gained from this research support the widespread application of AI-driven assignment grading systems in academic environments and pave the way for the future development of automated educational support technologies.
MB733 10:45-11:00	**Title: Inertial navigation system based on six-axis gyroscope and encoder** **Authors:** ZHOU TAO, TAN ZHOUWEN, WANG Weixiang, WU XIAOLONG, LIU YIMING **Presenter:** ZHOU TAO, School of Electronic Information, Hunan First Normal University, China **Abstract:** This research paper explores the development and evaluation of a recommendation and search algorithm using OpenAI's embedding API and PineconeDB, focusing on creating an accessible, efficient, and scalable system capable of handling multimodal content. The study is divided into several sections, including a comprehensive introduction to the challenges and proposed solutions for modern search systems, detailed method analysis, and experimental validation. Two primary experiments were conducted: the first assessed the search algorithm's semantic indexing accuracy with different datasets, and the second tested the system's capability to handle searches involving both textual and visual data. Results from the first experiment indicated that while the system performs exceptionally well with semantically rich content (92% accuracy), it struggles with content of lower semantic quality (58% accuracy), highlighting the need for advanced semantic processing techniques. The second experiment demonstrated the system's proficiency in multi-modal searches, achieving an average precision of 87% and recall of 80%, confirming its suitability for complex search tasks across various data types. These findings validate the effectiveness of using vector embeddings in improving search and recommendation systems, while also pointing out areas for future enhancement, particularly in handling content with

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	vague or sparse semantic details. This paper contributes to the ongoing discussion about the feasibility and efficiency of building sophisticated search systems using state-of-the-art AI technologies.
Invited Speaker V Assoc. Prof. Wasi Haider Butt 11:00-11:25	**Title: Pair Elicitation, A Novel Software Requirements Elicitation Technique, Inspired by Pair Programming** **Authors:** Wasi Haider Butt **Invited Speaker:** Assoc. Prof. Wasi Haider Butt, National University of Sciences and Technology (NUST), Pakistan **Abstract:** The success or failure of a software product is mainly dependent on its fitness to purpose which in turn is fully dependent on the quality of software requirements. The quality of software requirements is defined by adherence to standard software engineering process comprising elicitation, analysis, specifications, validation and management. Elicitation means proactively discovering the actual stakeholder's requirements. Various methods are currently being used to elicit software requirements including interviews, questionnaires, workshops, storyboarding and ethnomethodology. The traditional conventional interviews are conducted in an old fashion and requirement error are figured out later during analysis. To address this issue, a novel pair elicitation method is proposed, drawing inspiration for extreme programming practice of pair programming, where code writing and inspection occur simultaneously. Using the same approach is elicitation, requirement elicitation and analysis to detect the straight forward requirement errors is made side by side. The effectiveness of the proposed approach has been validated through a case study of a university management information system. The results demonstrate significant improvements in both error reduction and time efficiency for elicited requirements.
MB767 11:25-11:40	**Title: Enhancing Motivation by Haptic Feedback to Metaverse Walking Support System with Audio, Visual, and Olfactory Senses** **Authors:** Pingguo Huang, Yutaka Ishibashi **Presenter:** Pingguo Huang, Gifu Shotoku Gakuen University Gifu, Japan **Abstract:** This paper presents the integration of haptic feedback into a previously developed metaverse system with audio, visual, and olfactory senses. By incorporating the haptic sense, users can not only experience the scent of flowers and hear sounds such as bird chirping and the babbling of a stream but also interact with objects which they would like to touch but rarely have the chance to in the real world, feeling the reaction force from the object. This enhancement is expected to significantly boost user engagement and motivation.

Online Session 2

Topic: Image Analysis and Processing Technology Based on Data

Time: 13:30-15:15 | Friday, March 14, 2025 (GMT+11, Melbourne Time)
Session Chair: Assoc. Prof. Herminiño Lagunzad, National University, Philippines
Zoom link: https://us02web.zoom.us/j/85456447819 **Password: ICINT2025**

MB761 13:30-13:45	**Title: Real-Time Traffic Sign Recognition Based on Threshold Segmentation and Neural Networks** **Authors:** Yuanzhou Wei, Meiyan Gao, Jun Xiao, Bolin Huang, Yeyubei Zhang, Yuanhao Tian **Presenter:** Yuanzhou Wei, College of Engineering and Computing, Florida International University Miami, USA **Abstract:** This paper constructs a traffic sign recognition model by comparing traffic sign detection and classification algorithms, utilizing threshold segmentation and neural network algorithms. The model achieves an error rate of less than 5% for traffic sign recognition on the GTSRB dataset, with the recognition process for each frame taking approximately 150ms. This effectively realizes real-time detection and classification of traffic signs. It provides a convenient management technology for relevant traffic management departments.
MB740 13:45-14:00	**Title: Addressing the Cold Start Problem of Recommendation Systems: A Comprehensive Review of Traditional and Emerging Solutions** **Authors:** Hisham Bawa, Achala Aponso **Presenter:** Hisham Bawa, Informatics Institute of Technology, Sri Lanka **Abstract:** Recommendation systems are crucial for managing the overwhelming volume of information available due to the rapid growth of the internet. Providing personalized recommendations is vital for enhancing user experience and is a key driver for the growth of a business through improved user retention, which often leads to increased sales. Among the various approaches for building a recommendation system, Collaborative Filtering is widely adopted and is regarded as the most successful approach. It excels in leveraging the available historical user-item interactions in the system to find similarities that can be utilized for recommendations. However, the cold start problem—where new users and items lack sufficient data severely hampers the effectiveness of such systems. This paper reviews how emerging approaches such as Generative Adversarial Networks, Associative Rule Mining, Data Imputation, and Active Learning address this challenge. The paper further elucidates each approach's strengths, limitations, and practical implications, accompanied by an analysis of their impact on real-world applications. Through the actionable insights outlined to overcome the identified gaps in the existing solutions, this paper contributes to advancing the research on addressing the cold start problem, paving the path for future researchers to develop more dynamic and scalable recommendation systems.

MB760 14:00-14:15	**Title: Proactive Reliability Governance in Complex Systems: Leveraging Pattern Mining for Scalable Solutions** **Authors:** Bolin Huang, Yuanzhou Wei, Jun Xiao, Yuanhao Tian, Yeyubei Zhang, Changyang Zheng **Presenter:** Yuanzhou Wei, College of Engineering and Computing, Florida International University Miami, USA **Abstract:** This paper delves into cutting-edge methodologies to enhance the reliability of large-scale online systems using pattern mining techniques. As reliability is pivotal for system stability and fostering user trust, this research focuses on discovering common reliability patterns and implementing scalable governance frameworks. Key areas of focus include idempotence, dependency management, and access control, leveraging automated tools and data-driven strategies for comprehensive and adaptable solutions. The proposed pattern-driven approach aims to proactively mitigate failures through systematic detection and intervention mechanisms, ultimately ensuring more robust and resilient systems.
MB725 14:15-14:30	**Title: MuzonEcoSave: Recyclables Recovery Rewarding Machine** **Authors:** Joanna Grace P. Dulaca, Czarina Krisel S. Cuarez, Ivan P. Nicolas, Christian R. Dela Cruz, Adrian Parado, Jhamil G. Gutierrez **Presenter:** Czarina Krisel S. Cuarez, National University, Philippines **Abstract:** Plastic bottle waste management presents a significant challenge in Muzon Proper, particularly due to limited youth participation in recycling initiatives. This paper presents MuzonEcoSave, an innovative Reverse Vending Machine (RVM) that integrates advanced detection capabilities with a reward-based system to enhance recycling participation. The system employs multiple sensor technologies—including load cells, inductive sensors, and infrared detectors—to accurately identify and classify plastic bottles. Our implementation demonstrates a 97.14% accuracy rate in bottle detection and classification, with an average processing time of 7.56 seconds per transaction. The integration of a cloud-based reward system has shown a 94% increase in youth recycling participation interest compared to traditional methods. These results indicate that combining precise detection technology with incentive mechanisms significantly improves community recycling effectiveness.
MB768 14:30-14:45	**Title: Secure Low-Complexity k-MCMC for Large-Scale Datasets with Fully Homomorphic Encryption** **Authors:** Shozo Saeki, Minoru Kawahara, Hirohisa Aman **Presenter:** Shozo Saeki, Ehime University, Japan **Abstract:** Outsourcing services and data sharing, such as artificial intelligence services and open science, have been increas- ing, and so has the importance of data security while keeping availability. One secure method is utilizing Fully Homomorphic Encryption (FHE). In addition, clustering algorithms with FHE have been proposed for outsourcing services. However, these al- gorithms are difficult to apply to a large-scale dataset due to FHE computations having high computational and space complexities. To address this, we propose secure low complexity k-MCMC (SLC k-MCMC), which approximate k-Means++ initialization and help clustering algorithms to fast convergence. SLC k- MCMC uses data packing with FHE and replaced sampling

	strategy (RSS), which reduces computational complexity and the amount of network traffic. Finally, we apply SLC k-MCMC to large-scale datasets, including million-scale datasets. As a result, SLC k-MCMC can be approximated to k-Means++ initialization with less than 1 / 1000th computational complexity and network traffic. Fast and high-quality initialization of SLC k-MCMC expands the applicability of the secure clustering algorithms to large-scale datasets.
MB764 14:45-15:00	**Title: Exponentially Fast Collaborative Broadcasting in 3D Space** **Authors:** Yotam Ashkenazi, Shlomi Dolev, Sergey Frenkel, Manish Kumar, Sweta Kumari, Ram Prasadh Narayanan, Archit Somani **Presenter:** Archit Somani, Shiv Nadar Institution of Eminence, India **Abstract:** Broadcasting stands as a vital function within wireless sensor networks (WSNs), where nodes disseminate messages throughout the entire network, radiating in all possible directions. Our focus lies on the issue of three-dimensional broadcasting, involving n sensors/robots positioned uniformly across a threedimensional space. We propose an exponentially fast hybrid collaborative broadcasting algorithm in three-dimensional space "growing ball" through successive propagation steps. We study the effect of various parameters such as the density of the growing ball (ρ), distance (d), the energy emitted by node (Eemit), and ϵ used by the collaborative broadcast. Our approach is based on the idea of dividing the 3D space into two halves that reduce mathematical intricacy. The number of nodes Nk in the kth step of the growing ball is the factor of (1+ϵ)k implies the exponential fast broadcast.
MB777 15:00-15:15	**Title: Ensemble-Based Explainable Approach for Rare Medicinal Plant Recognition and Conservation** **Authors:** Shakil Khan, Hamdadur Rahman, Md. Ismail Hossain Siddiqui, Zishad Hossain Limon, Mahbub Alam Khan, Rezaul Haque, Md. Redwan Ahmed, Ahmed Wasif Reza, Shamim Hasnat Ripon **Presenter:** Rezaul Haque, East West University, Bangladesh **Abstract:** Accurate classification of medicinal plants, particularly those that are threatened, rare, or endangered, is crucial for biodiversity conservation and sustainable use. This study introduces a robust ensemble-based classification model that integrates various architectures, including EfficientNet-B7, ConvNeXt, NasNet, and XceptionNet. Data augmentation with normalization enabled a training process using 4,500 high-resolution leaf images from a balanced dataset while helping achieve improved performance metrics. Transparent insight into model decisions became possible through our integration of Explainable AI (XAI) techniques which provided interpretable information about how the model reached its output. This transparency enables researchers and conservationists to better understand the system's outputs. The ensemble model achieved an impressive accuracy of 99.29%, surpassing the performance of individual models and demonstrating strong generalization capabilities. We also built a real-time web application that delivers useful biodiversity monitoring solutions and helps assess species for pharmaceutical research and conservation initiatives. The study demonstrates AI-driven potentials through its analysis but it reveals two main challenges including dataset scope boundaries and high computational costs of modeling. Developments in future research will concentrate on enhancing database size along with computational strategies to enable mobile applications as field identification tools. This research has developed a flexible and dependable system which unites artificial intelligence investigation with practical environmental protection necessities.

Online Session 3

Topic: Future Communication System and Information Security

Time: 15:45-17:00 | Friday, March 14, 2025 (GMT+11, Melbourne Time)

Session Chair: Assoc. Prof. Chao-Lung Chou, Feng Chia University, Taiwan

Zoom link: https://us02web.zoom.us/j/85456447819 Password: ICINT2025

MB735 15:45-16:00	**Title: Smart Basket Automated Shopping Experience with IOT Technology** **Authors:** Juan Carlo De Gana, Seth Owen Dangli, John Chester Julio, Stephen Marc Sison, Alexander Luis Watin, Herminiño Lagunzad, Mikee Gonzaga **Presenter:** Alexander Luis C. Watin, National University, Philippines **Abstract:** People often perceive grocery shopping as a tedious task, especially during peak hours, as traditional checkout systems struggle to keep up with demand, leading to extended wait times and customer dissatisfaction. The Smart Basket solution introduces an innovative shopping technology that utilizes IoT and RFID technology to create a seamless "Shop, Drop, Go" experience. Built on Event-Driven Architecture, it integrates RFID sensors, Python programming, and a Raspberry Pi microcontroller to optimize the shopping process. Real-time data processing through Raspberry Pi edge computing enables efficient local operations before synchronizing with retail servers. Python facilitates real-time product adjustments, instantly displaying updated cost data on an LCD interface upon RFID sensor detection. At checkout, the system generates a QR code containing transaction details, allowing for quick and error-free scanning. By automating transactions through RFID technology, the Smart Basket enhances operational efficiency, transaction accuracy, and customer satisfaction, ultimately driving greater business productivity.
MB765 16:00-16:15	**Title: Evaluating Machine Learning and Deep Learning Models for Credit Card Fraud Detection in Cybersecurity** **Authors:** Md Abdul Ahad Juel, Mushfikul Islam, Sharmin Nusrat Jahan, Abu Tarek, Abdullah Al Hasib, Md. Shahadat Jaman **Presenter:** Md. Shahadat Jaman, Bangladesh University of Business and Technology, Bangladesh **Abstract:** In this study, a robust machine learning model was developed to enhance cybersecurity in banking systems by detecting credit card fraud using the European card benchmark dataset. The research addressed the critical challenge of class imbalance through a comparative analysis, ensuring both efficiency and accuracy. Core methodologies included Multilayer Perceptron, Random Forest classifiers, with fine-tuning of hidden layers, learning rates, and epochs to optimize performance. Cross-validation techniques were applied to assess model effectiveness and mitigate overfitting. Among the tested approaches, the standard Random Forest (RF) classifier demonstrated the highest effectiveness, achieving an impressive accuracy of 99.8% and a precision of 99.2%, with no signs of overfitting. These findings underscore the potential of advanced machine learning techniques in enhancing fraud detection and strengthening cybersecurity in financial systems. The optimized RF model offers a critical solution for

Online Session 3

	safeguarding sensitive transactions and combating fraudulent activities in banking.
MB743 16:15-16:30	**Title: Enhancing Traffic Safety with AI and 6G: Latency Requirements and Real-Time Threat Detection** **Authors:** Kurt Horvath, Dragi Kimovski, Stojan Kitanov, Radu Prodan **Presenter:** Kurt Horvath, University of Klagenfurt, Austria **Abstract:** The rapid digitalization of urban infrastructure opens the path to smart cities, where IoT-enabled infrastructure enhances public safety and efficiency. This paper presents a 6G and AI-enabled framework for traffic safety enhancement, focusing on real-time detection and classification of emergency vehicles and leveraging 6G as the latest global communication standard. The system integrates sensor data acquisition, convolutional neural network-based threat detection, and user alert dissemination through various software modules of the use case. We define the latency requirements for such a system, segmenting the end-toend latency into computational and networking components. Our empirical evaluation demonstrates the impact of vehicle speed and user trajectory on system reliability. The results provide insights for network operators and smart city service providers, emphasizing the critical role of low-latency communication and how networks can enable relevant services for traffic safety.
MB755 16:30-16:45	**Title: Predictive Maintenance for QoS in 5G Communication: A State of the Art Review** **Authors:** Asma Belhadj, Mawloud Omar, Sofiane Aissani **Presenter:** Asma Belhadj, University of Boumerdes, Algeria **Abstract:** 5G networks operate in highly dynamic environ ments, characterized by virtualized services and the need for seamless connectivity to ensure Quality of Service (QoS). Mobility plays a pivotal role in this landscape, influencing resource allo cation, performance, and service continuity. This paper focuses on studying the concept of mobility within the 5G infrastructure and explores how mobility prediction can significantly enhance predictive maintenance strategies. By accurately forecasting user trajectories, mobility prediction enables proactive measures to address potential service disruptions and performance degrada tion before they occur. The integration of mobility prediction with predictive maintenance not only optimizes resource allocation but also ensures the highest levels of service across diverse applica tions. Through a state of the art review, this paper highlights the intersection of mobility management and predictive maintenance, emphasizing the transformative potential of leveraging mobility data to maintain system health and sustain robust performance in real-time 5G operations.
MB773 16:45-17:00	**Title: Efficient Location-Based Service Discovery for IoT and Edge Computing in the 6G Era** **Authors:** Kurt Horvath, Dragi Kimovski **Presenter:** Kurt Horvath, University of Klagenfurt, Austria **Abstract:** Efficient service discovery is a cornerstone of the rapidly expanding Internet of Things (IoT) and edge computing ecosystems, where low latency and localized

	service provisioning are critical. This paper proposes a novel location-based DNS (Domain Name System) method that leverages Location Resource Records (LOC RRs) to enhance service discovery. By embedding geographic data in DNS responses, the system dynamically allocates services to edge nodes based on user proximity, ensuring reduced latency and improved Quality of Service (QoS). Comprehensive evaluations demonstrate minimal computational overhead, with processing times below 1 ms, making the approach highly suitable for latency-sensitive applications. Furthermore, the proposed methodology aligns with emerging 6G standards, which promise sub-millisecond latency and robust connectivity. Future research will focus on real-world deployment, validating the approach in dynamic IoT environments. This work establishes a scalable, efficient, and practical framework for locationaware service discovery, providing a strong foundation for nextgeneration IoT and edge-computing solutions.

About Melbourne

Melbourne is Australia's mecca for all things trendy and tasty. The city offers up exquisite dining, exhilarating sport and abundant opportunities to experience art. A perfect blend of rich cultural history and new age trends is waiting for you in Melbourne. As the sun goes down, the city comes to life with a vibrant dining scene as well as events and exhibitions. Explore its bustling laneways, trendy neighborhoods and sophisticated foodie scene to get a taste of what Melbourne is all about.

La Trobe University

La Trobe University is a public research university based in Melbourne, Victoria, Australia. Its main campus is located in the suburb of Bundoora. The university was established in 1964, becoming the third university in the state of Victoria and the twelfth university in Australia. La Trobe is one of the Australian verdant universities and also part of the Innovative Research Universities group, an Australian group that collectively receives over $340 million in research grants.

La Trobe University has been confirmed as one of Australia's leading research universities, climbing to third in Victoria, based on the Excellence in Research Australia (ERA) 2012 report. La Trobe is the top ranked institution in the nation for research in microbiology and equal top with just one other university in biochemistry and cell biology and in veterinary sciences. Historical studies and archaeology were also both assessed at the top ranking.

Federation Square

Federation Square is a cultural and entertainment hub located in the heart of Melbourne. It houses several important galleries, museums, restaurants, and cafes. The architectural design of the square is unique, blending modern and traditional elements. You can visit the Australian Centre for the Moving Image (ACMI) or take a short walk to the nearby Arts Centre Melbourne to experience Melbourne’s cultural scene. The square is also known for its vibrant street performances and events.

Royal Botanic Gardens

Located just south of the city center, the Royal Botanic Gardens is an ideal place to enjoy tranquility and nature. The gardens feature vast lawns, lakes, and a wide variety of plants. Visitors can take a leisurely stroll, have a picnic, or join a guided tour. It is not only a sightseeing destination but also a favorite spot for locals to relax and unwind. Whether you're looking to appreciate nature or simply enjoy a peaceful walk, the gardens offer a perfect escape.

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