Conference Program

2026 8th International Symposium on Computational and Business Intelligence (ISCBI)

Bali Island, Indonesia

6-8 February, 2026

Co-Sponsored By

Hosted by

Patrons

https://www.iscbi.com/

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Welcome Message

On behalf of the organizing committees, it is our honor to extend a heartfelt welcome to all attendees of 2026 8th International Symposium on Computational and Business Intelligence (ISCBI), taking place in Bali Island, Indonesia during February 6-8, 2026.

ISCBI 2026 is co-sponsored by IEEE and IICCI, and hosted by Binus University, Indonesia. IEEE Computer Society Indonesia Chapter, University of Macau, China, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland, Hong Kong Chu Hai College, China and Ubon Ratchathani University, Thailand as Patrons.

After more than one year's preparation, we received more than 160 submissions from United Arab Emirates, China, Indonesia, Singapore, United States, India, Australia, Malaysia, Germany, Italy, Philippines, Canada and other countries. More than 110 Technical Program Committee Members participated in the review process. Thanks for their great efforts and excellent work.

There are 3 keynote speeches, 5 invited speeches and 10 technical sessions in ISCBI 2026 conference program. We believe that over the three days you'll get the theoretical grounding, practical knowledge and personal contacts that will help you build long-term, profitable and sustainable communication among researchers and practitioners working in a wide variety of scientific areas with a common interest in the emerging areas of Computational & Business Intelligence.

We sincerely would like to thank all the authors as well as the technical program committee members and reviewers. Their high competence, enthusiasm, time and expertise knowledge enabled us to prepare the high-quality final program and helped to make the conference become a successful event.

Conference Chair

Prof. Ford Lumban Gaol
Bina Nusantara University, Indonesia
Chairman of IEEE Computer Society Indonesia
January 2026

Organizing Committee

(Alphabetical order by last name)

Conference General Chair

Ford Lumban Gaol, Bina Nusantara University, Indonesia (IEEE Senior Member)

Conference General Co-chairs

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Richard Millham, Durban University of Technology, South Africa (IEEE Senior Member)
Huafeng Qin, Chongqing Technology and Business University, China

Publicity Chairs

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Yan Yang, Southwest Jiaotong University, China (IEEE Member)

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Qun Song, Chongqing Technology and Business University, China

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Frederick Kin Hing Phoa, Institute of Statistical Science, Academia Sinica

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Zhang Xiaohua, Wenzhou Business College, China

Treasurer

Yixing Wu, Nantong Institute of Technology, China

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Jasy Liew Suet Yan, Universiti Sains Malaysia, Malaysia
Shankai Yan, City University of Hong Kong, Hong Kong, China
Wee Meng Yeo, University of Glasgow, UK
Yu Zhao, Tokyo University of Science, Japan

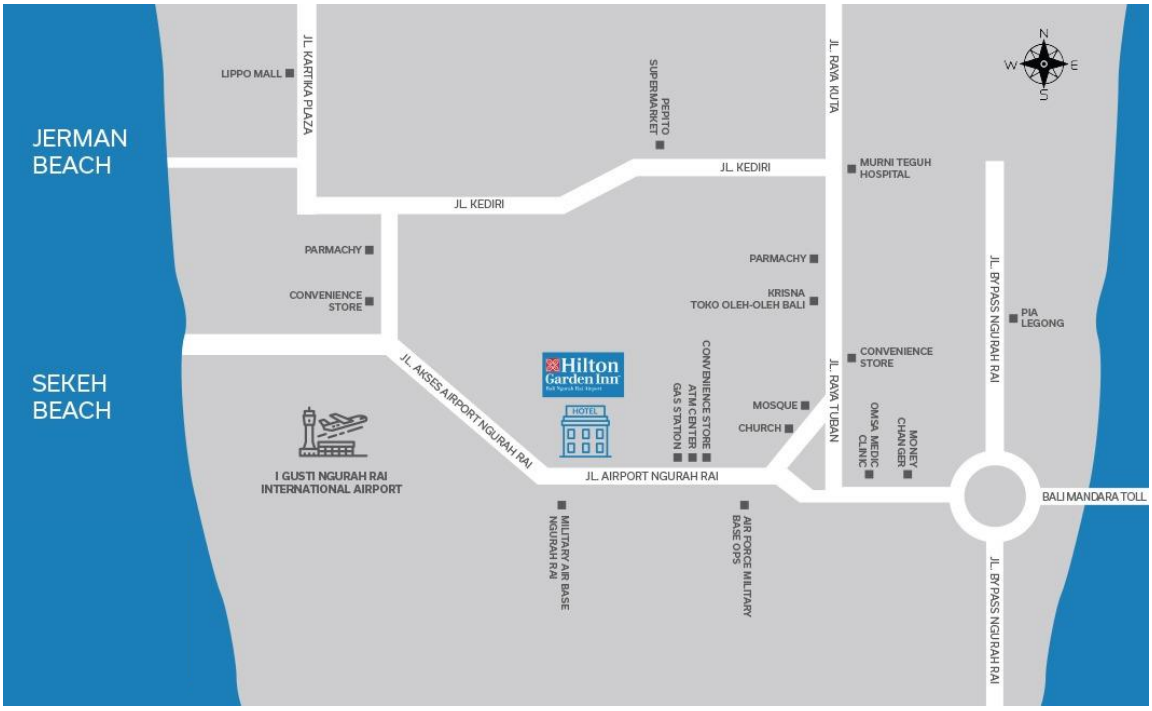
Onsite Conference Notice

Conference Venue

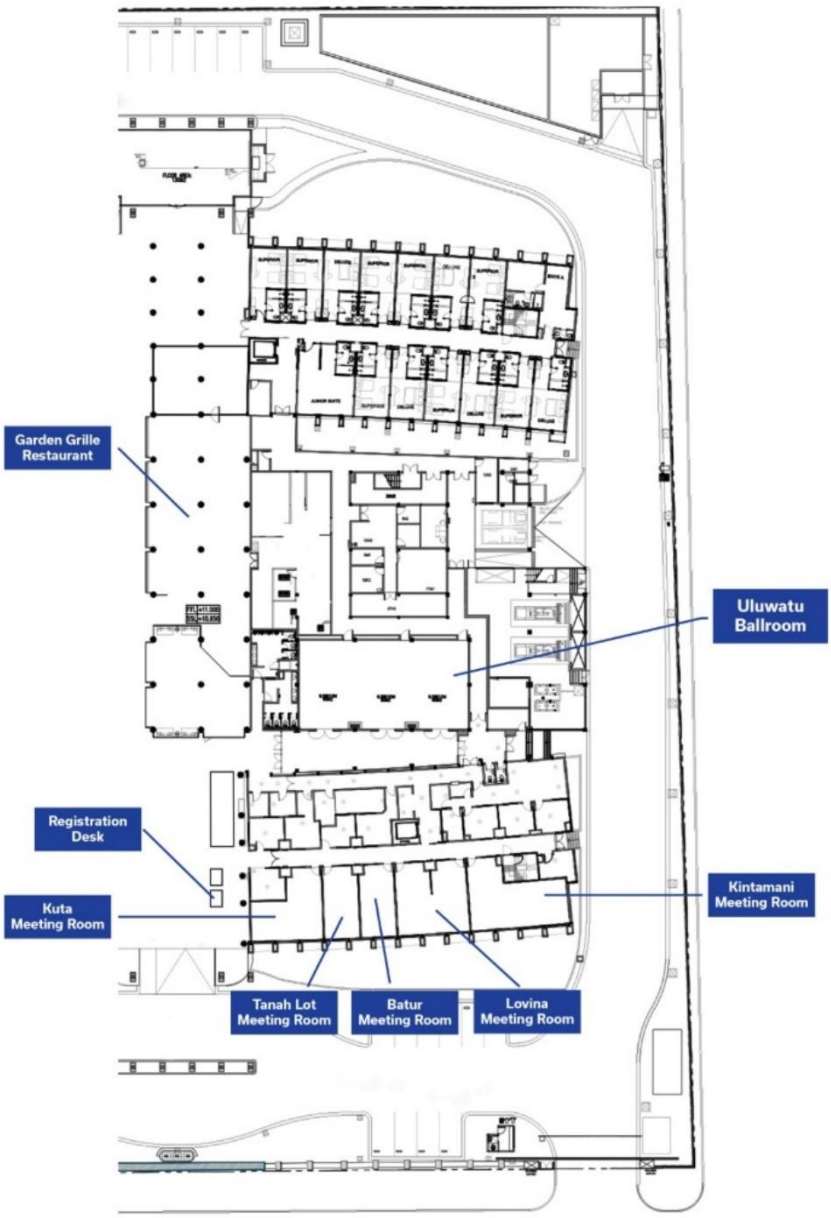
Hilton Garden Inn Bali Ngurah Rai Airport

Address: Jalan Airport Ngurah Rai No. 7 Kuta, Bali, 80361, Indonesia

Map as bellow:



Conference Room Information



Room	Activities
Uluwatu Ballroom, Ground Floor	Opening Remark
	Keynote Speeches
	Invited Speeches
	Session 1 & Session 2 & Session 3

About Onsite Presentation

• Timing: a maximum of 15 minutes total, including speaking time and discussion. Please make sure your presentation is well timed.
• Each speaker is required to meet her / his session chair in the corresponding session rooms 10 minutes before the session starts and copy the slide file (PPT or PDF) to the computer.
• It is suggested that you email a copy of your presentation to your personal in box as a backup. If for some reason the files can't be accessed from your flash drive, you will be able to download them to the computer from your email.
• Please note that each session room will be equipped with a unit LCD projector, screen, point device, microphone, and a laptop with general presentation software such as Microsoft Power Point and Adobe Reader.
• Poster Presenters should bring your poster to the conference venue and put it on designated place.

Name Badge

For security purposes, delegates, speakers, exhibitors and staff are required to wear their name badge to all sessions and social functions. Lending your participant card to others is not allowed. Entrance into sessions is restricted to registered delegates only. If you misplace your name badge, please ask the staff at the registration desk to arrange a replacement.

Gentle Reminder

• Please ensure that you take all items of value with you at all times when leaving a room. Do not leave bags or laptops unattended. The conference organizer does not assume any responsibility for the loss of personal belongings of the participants.
• Accommodation is not provided. Delegates are suggested make early reservation.
• Please show the badge and meal coupons when dining.

Online Conference Notice

Platform: Zoom

Download Link: https://zoom.us/download

Sign In and Join

***Join a meeting without signing in.**

A Zoom account is not required if you join a meeting as a participant, but you cannot change the virtual background or edit the profile picture.

***Sign in with a Zoom account.**

All the functions are available.

Time Zone

GMT+8

***You're suggested to set up the time on your computer in advance.**

Online Room Information

Zoom 1 ID: 870 9870 5756

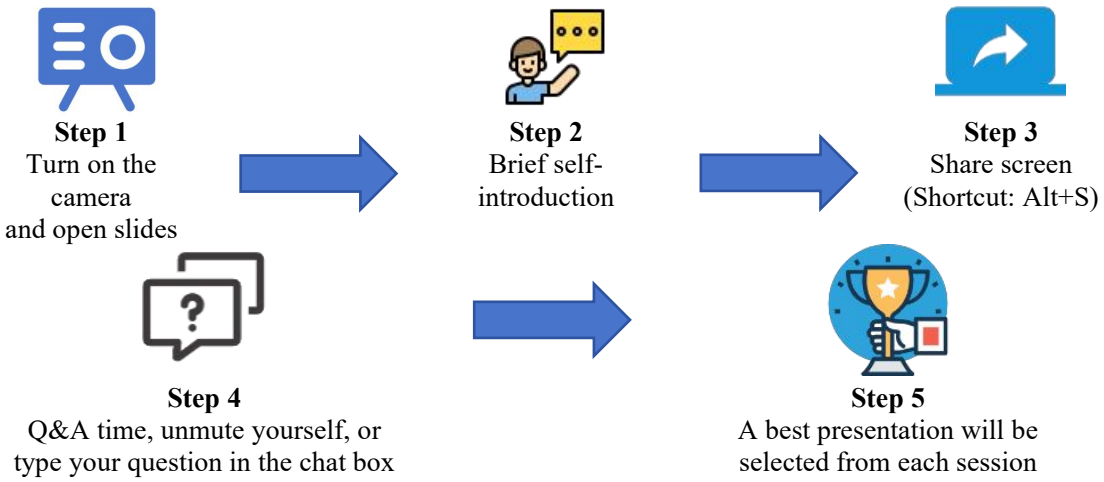
Zoom Link: https://us02web.zoom.us/j/87098705756

You can scan QR code to enter:

1. You can download the virtual background here.
2. Prior to the formal conference, presenter shall join the test room to make sure everything is on the right track
3. Note: Please rename your Zoom Screen Name in below format before entering meeting room.

Role	Format	Example
Conference Committee	Position-Name	Conference Chair-Name
Keynote/ Invited Speaker	Position-Name	Keynote/Invited Speaker-Name
Author	Session Number-Paper ID-Name	S1-CB0001-Name
Delegate	Delegate-Name	Delegate-Name

Presentation Process by Zoom Meeting



About Presentation

• Every presenter has 15 minutes, including Q & A. Each presentation should have at least 10 minutes.
• The best presentation certificate and all authors' presentation certificates will be sent after conference by email.
• It is suggested that the presenter email a copy of his / her video presentation to the conference email box as a backup in case any technical problem occurs.

Environment & Equipment Needed

• A quiet place; Stable Internet connection; Proper lighting and background
• A computer with internet and camera; Earphone

Conference Recording

• We'll record the whole conference. If you do mind, please inform us in advance. We'll stop to record when it's your turn to do the presentation.
• The whole conference will be recorded. It is suggested that you should dress formally and we appreciate your proper behavior.
* The recording will be used for conference program and paper publication requirements. It cannot be distributed to or shared with anyone else, and it shall not be used for commercial nor illegal purpose.

Keynote Speakers

Prof. Tokuro Matsuo

Advanced Institute of Industrial Technology, Japan

Prof. Jerome Yen

University of Macau, China

Prof. Thomas Hanne

University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Invited Speakers

Prof. Alessandro Lampo

University of Saint Joseph, Macao, China

Assoc. Prof. Yu Zhao

Tokyo University of Science, Japan

Prof. Haixin Wang

Fort Valley State University, USA

Assoc. Prof. Masateru Tsunoda

Kindai University, Japan

Prof. Daowen Qiu

Sun Yat-sen University, China

Simple Program

February 6th (Friday)

For Onsite Participants

Onsite Registration & Materials Collection for Onsite Participants
Time: 13:00-17:00 (GMT+8)
Venue: Registration Desk-the ground floor of Hilton Garden Inn Bali Ngurah Rai Airport
Address: Jalan Airport Ngurah Rai No. 7 Kuta, Bali, 80361, Indonesia
Registration Steps:
1. Arrive at the Registration Desk - the ground floor of Hilton Garden Inn Bali Ngurah Rai Airport;
2. Inform the conference staff of your paper ID;
3. Sign your name on the Participants list;
4. Sign your name on Lunch & Dinner requirement list;
5. Check your conference kits;
6. Finish registration.

For Online Participants

Zoom Test for Online Participants	
Zoom: 870 9870 5756	
Zoom Link: https://us02web.zoom.us/j/87098705756	
Online Test (GMT+8)	
9:00-9:10	Prof. Haixin Wang, Fort Valley State University, USA
9:10-9:20	Assoc. Prof. Masateru Tsunoda, Kindai University, Japan
9:20-9:35	Session 4
9:35-10:00	Session 5
10:00-10:15	Session 6
10:15-10:30	Session 7
10:30-10:45	Session 8
10:45-11:00	Session 9
11:00-11:15	Session 10
11:15-11:30	Prof. Jerome Yen, University of Macau, China
16:00-16:10	Prof. Thomas Hanne, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
17:00-17:20	Prof. Daowen Qiu, Sun Yat-sen University, China

You can attend the test in another session if you cannot manage it in your given time.

February 7th (Saturday)

Morning Sessions		
Opening Remark, Keynote Speeches & Invited Speeches **Room: Uluwatu Ballroom** **Zoom Link: https://us02web.zoom.us/j/87098705756**		
9:00-9:10	**Opening Remark**	**Prof. Ford Lumban Gaol,** Bina Nusantara University, Indonesia
9:10-9:50	**Keynote Speech I**	**Prof. Tokuro Matsuo,** Advanced Institute of Industrial Technology, Japan
9:50-10:30	**Keynote Speech II**	**Prof. Jerome Yen,** University of Macau, China
10:30-11:00	**Group Photo & Coffee Break**	
11:00-11:30	**Invited Speaker I**	**Prof. Alessandro Lampo,** University of Saint Joseph, Macao, China
11:30-12:00	**Invited Speaker II**	**Prof. Yu Zhao,** Tokyo University of Science, Japan
12:00-13:00	**Lunch Time**	
Onsite Afternoon Sessions		
Keynote Speech & Onsite Sessions **Room: Uluwatu Ballroom** **Zoom Link: https://us02web.zoom.us/j/87098705756**		
13:00-13:40	**Keynote Speech III**	**Prof. Thomas Hanne,** University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
13:40-14:40	**Session 1** **Topic:** AI-based Multi-Agent Systems and Information Technology (CB0143, CB0166, CB3002, CB0087, CB0046)	
14:40-15:10	**Coffee Break**	
15:10-16:10	**Session 2** **Topic:** Business Intelligence Analytics and Transaction Information Management (CB0042-A, CB0040, CB2008-A, CB0159, CB0021-A)	
16:10-17:25	**Session 3** **Topic:** The Key Role and Applications of Intelligent Decision Analysis in Market Economy Management (CB0047, CB0070, CB0134-A, CB0160, CB3001)	
17:25-20:00	**Dinner Time**	

Online Afternoon Sessions	
Online Sessions **Time Zone: GMT+8** **Zoom Link: https://us02web.zoom.us/j/87098705756**	
15:00-16:45	**Session 4** **Topic:** Machine Learning Models and Predictive Computing (CB0035, CB0059, CB0074, CB0095, CB0111, CB0133, CB0014)
16:45-18:00	**Session 5** **Topic:** Intelligent Image Detection and Computer Vision Analysis (CB0045, CB0088, CB0106, CB0115, CB0167)

February 8th (Sunday)

Online Sessions		
Invited Speeches & Online Sessions **Time Zone: GMT+8** **Zoom Link: https://us02web.zoom.us/j/87098705756**		
9:00-9:30	**Invited Speech III**	**Prof. Haixin Wang**, Fort Valley State University, USA
9:30-11:30	**Session 6** **Topic:** Applications of AI in Intelligent Business and Financial Systems (CB0022, CB0036, CB0041, CB0086, CB0117, CB0118, CB0139, CB0165)	
11:30-13:30	**Session 7** **Topic:** E-commerce Intelligence and Intelligent Decision Making (CB0008, CB0077, CB0091, CB0099, CB0112, CB0116, CB0126, CB0145)	
13:30-14:00	**Invited Speech IV**	**Assoc. Prof. Masateru Tsunoda,** Kindai University, Japan
14:00-16:00	**Session 8** **Topic:** Computer Theory and Information Technology (CB0096, CB0015, CB0097, CB0038, CB0124, CB0135, CB0141, CB0108)	
16:00-16:30	**Invited Speech V**	**Prof. Daowen Qiu,** Sun Yat-sen University, China
16:30-18:15	**Session 9** **Topic:** Demand-Based Digital Retail and Dynamic Supply Chain Matching Strategies (CB0016, CB0018, CB0131, CB0078, CB0132, CB0079, CB0062)	
18:15-20:00	**Session 10** **Topic:** Enterprise Digital Operations and Intelligent Management (CB0048, CB0011, CB0064, CB0060, CB0127, CB0063)	

Detailed Program

Opening Remark

Time	9:00-9:10, February 7	Zoom ID	870 9870 5756
Room	Uluwatu Ballroom	Zoom Link	https://us02web.zoom.us/j/87098705756

Prof. Ford Lumban Gaol

Bina Nusantara University, Indonesia

Chairman of IEEE Computer Society Indonesia

Dr. Ford Lumban Gaol is currently Associate Professor Informatics Engineering and Information System, Bina Nusantara University. He is the Vice Chair of Bina Nusantara University Doctorate Program in Computer Science and Research Interest Group Leader "Advance System in Computational Intelligence & Knowledge Engineering". Dr. Ford is the Vice Chair of IEEE Indonesia section for International and Professional Activities. Dr. Ford is the ACM Indonesia past Chapter Chair. Dr. Ford is the IIAI Indonesia Chapter Chair. Dr. Ford already involved with some project relate with Technology Alignment in some of multinational companies as well as some government projects. for International highlight, Dr. Ford is the recipient of Visiting Professor in Kazan Federal University, Russia 2014 and 2015, Visiting Professor in Vladimir State University, Russia 2016, Invited Scholar in Aligarh Muslim University, keynote speaker in ICCNT 2014 and Invited Scholar in ICTP Trieste Italy. Dr. Ford is member of Indonesian Mathematical Society (IndoMS), The Association for Computing Machinery (ACM) Professional, The International Association of Engineers (IAENG), and the Indonesia Society for Bioinformatics. He holds the B.Sc. in Mathematics, Master of Computer Science. and the Doctor in Computer Science from the University of Indonesia, Indonesia in 1997, 2001 and 2009, respectively.

Keynote Speech I

Time	**9:10-9:50, February 7**	**Zoom ID**	**870 9870 5756**
Room	**Uluwatu Ballroom**	**Zoom Link**	**https://us02web.zoom.us/j/87098705756**

Prof. Tokuro Matsuo

Advanced Institute of Industrial Technology, Japan

Dr. Tokuro Matsuo is currently Full Professor at Advanced Institute of Industrial Technology (AIIT) in Tokyo Public University Corporation from 2012. Also, he is currently Visiting Professor at Sam Houston State University, USA; Director of Research Center for Artificial Intelligence and Service Science at AIIT; Executive Director of International Institute of Applied Informatics (IIAI); Executive Director of International Accreditation Association for Higher Education; Guest Professor at Bina Nusantara University, Indonesia; Japan MICE Ambassador; and Kumamoto City MICE Ambassador. He was Associate Professor at Yamagata University, Japan (2006-2012); Adjunct Professor at Asian University, Taiwan (2019-2021); Invited Professor at City University of Macau, Macau (2018-2020); Visiting Researcher at University of Nevada, Las Vegas, USA (2016-2017); Vice-President, International Association for Computer and Information Science, USA (2015-2017); Vice-President, Software Engineering Research Foundation, USA (2013-2018); Visiting Researcher at University of California at Irvine, USA (2010-2011); Research Fellow at Shanghai University, China (2010-2013); and Project Professor of Green Computing Research Center at Nagoya Institute of Technology, Japan (2011-2014); Guest Professor at Nagoya Institute of Technology, Japan (2021-2023); and Research Fellow of SEITI in Central Michigan University, USA (2010-2018). He received his Ph.D. in computer science from Nagoya Institute of Technology in 2006. His current research interests include agent-based electronic commerce, qualitative reasoning and simulation, material informatics, IT and business management, and IoT. Also, he is a professional event planner and event producer. He delivered 200 keynotes and invited talk at international conferences, symposia, and seminars. He also received over 10 awards on research and over 30 research grants from government, research foundations, and company. He has ever presented over 120 papers in journals and over 220 papers in international conference and including top/high-ranked international journals and conferences, such as, SN Applied Sciences, Data in Brief, Marine Systems & Ocean Technology, International Journal of Neural Systems, International Journal of Business Information Systems, Logic Journal of IGPL, IEEE Access, Heliyon, Applied Artificial Intelligence, Emerging Science Journal, AAAI, IEEE CEC, AAMAS, IEEE WCCI, and WWW. Also, he has published 14 edited books from Springer, IGI-Global, and WIT Press. He has been over 90 international conference organizing chairs (conference chair/ program chair / finance chair / publication chair) of IEEE PRIWEC(2006), IEEE/ACIS SNPD (2009 2012, 2013, 2014, 2015, 2017, 2018, 2019), PRIMA (2009, 2020, 2024, 2026), PRICAI (2024), IEEE/ACIS ICIS (2010, 2013, 2015, 2016), IIAI AAI (2012-2026), AAMAS (2013), IEEE/ACIS SERA (2014, 2015), IEEE SOCA (2014, 2017), IEEE TENSYMP (2016), IEEE International Conference on Agentic AI (2016, 2017, 2023, 2026), IEEE SC2 (2017), ASEAN-AI (2018), and other 50 international conferences and workshops.

Speech Contents

Computational Business Intelligence through Active Data Production

Abstract: Nowadays, a lot of types of communication system to make consensus among people are provided. We can utilize these kinds of systems, such as social network system, e-mail, and instant messenger system, to make a decision and determination through online discussion. In the next decade, we can forecast a lot of types of consensus formation systems are provided and we may find new communication systems integrating between cyber and physical environment. In this talk, I introduce our conducted experiments using cyber-physical discussion environment in the panel discussion session in the conference. In the session, facilitator asks question to panelists about issues on the discussion and attendees can also do as well by their voice. Each attendee also can post and declare his/her opinions and suggestions through the online discussion system during the session. One or two facilitators facilitate the discussion in the online system as well as real discussion. We found out a lot of interesting results of surveys from attendees taken in before/after the experiments. I also introduce the environment to provide useful information for attendees by the digital signage system in the conference venue. This digital signage system is connected to the attendee's location capture system and conference registration system. These integrations between cyber and physical environments and data enable to make better consensus formation between all sorts of people.

Keynote Speech II

Time	**9:50-10:30, February 7**	**Zoom ID**	**870 9870 5756**
Room	**Uluwatu Ballroom**	**Zoom Link**	**https://us02web.zoom.us/j/87098705756**

Prof. Jerome Yen

University of Macau, China

Prof. Yen currently a Distinguished Professor in the Faculty of Science and Technology (FST) at the University of Macau (UM). He obtained his Ph.D. in Systems Engineering and MIS from the University of Arizona. He used to hold appointments in the Department of Finance and Department of Mathematics at HKUST as adjunct professor as an honorary professor in the Dept of EEE at HKU. Prof. Yen is a well-established researcher and practitioner in the finance and banking community. He has published more than seventy journal papers in respectable journals and five books in China Financial Markets, Algo Trading and High Frequency Trading, as well as Pricing of Structured Products and Options Trading. His research has now focused on using hardware accelerators, like FPGA, GPU, and RSIC-V, to design platforms to improve the efficiency and accuracy of the financial computation.

Prof. Yen was the Deputy Chief Risk Officer at Cathay Financial Holdings (CFH) from 2005 to 2007 and Director of the Internet Finance Division of Hong Kong Applied Science and Technology Research Institute (ASTRI). He also provided advisory/consulting services to leading financial institutions, for example, Societe Generale, Hang Seng Bank, AIA, Bank of East Asia (BEA), Essences Securities in China, Great-wall Invesco, SinoPac, and China Construction Bank (CCB) in risk management, exotic options and structured products pricing, as well as building platform to support quick development of mutual funds.

Speech Contents

Multimodal Data and LLM in Decision Support

Abstract: The talk will discuss the research foundation of the Multimodal Data and LLM in Decision Support, which will cover two dimensions: nature of data (structured data or non-structured data) and solution approaches (traditional ones like statistics). Research topics include how the multimodal data, which include structured data, like time series, and non-structured data, for example, texts, images, and video, be used by the traditional approaches and/or machine learning based ones to reach for higher accuracy or higher explainability. Application of such topic can widely be found in the financial markets, healthcare, traffic, tourism, and so on. The key research challenges include: how to innovatively integrate results from different approaches, for example, the fusion technologies; how to adopt and diffuse such multimodal analyses; how to protect the privacy; etc.

Keynote Speech III

Time	13:00-13:40, February 7	Zoom ID	870 9870 5756
Room	Uluwatu Ballroom	Zoom Link	https://us02web.zoom.us/j/87098705756

Prof. Thomas Hanne

University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Thomas Hanne received master's degrees in Economics and Computer Science, and a PhD in Economics. From 1999 to 2007 he worked at the Fraunhofer Institute for Industrial Mathematics (ITWM) as senior scientist. Since then he is Professor for Information Systems at the University of Applied Sciences and Arts Northwestern Switzerland and Head of the Competence Center Systems Engineering since 2012.
Thomas Hanne is author of more than 230 journal articles, conference papers, and other publications and editor of several journals and special issues. His current research interests include computational intelligence, evolutionary algorithms, metaheuristics, optimization, simulation, multicriteria decision analysis, natural language processing, machine learning, systems engineering, software development, logistics, and supply chain management.

Speech Contents

Advanced Business Innovations based on Artificial Intelligence and Natural Language Processing

Abstract: In our presentation, we discuss general aspects of the collaboration between research institutes and companies (especially SMEs) for developing software-based business innovations using techniques from natural language processing, machine learning, and artificial intelligence. We focus on advanced applications of large language models with techniques such as retrieval augmented generation and function calling. Several related projects from different industries and with different challenges are discussed to identify common procedures and methodologies that can be used. The project examples include a company in the gig work sector, a company related to the insurance sector, a project situated in the railway industry, another one in the healthcare sector, and one in the area of facility management. The common path to innovation in such projects includes incremental prototype development and the implementation of novel technological solutions based on natural language processing, machine learning, and large language models. We point out that novel large language models simplify many tasks that required much more effort years ago.

Invited Speech I

Time	11:00-11:30, February 7	Zoom ID	870 9870 5756
Room	Uluwatu Ballroom	Zoom Link	https://us02web.zoom.us/j/87098705756

Asst. Prof. Alessandro Lampo

University of Saint Joseph, Macao, China

Dr. Lampo is a forward-thinking strategist at the forefront of applying emerging technologies and AI to shape the future of marketing and consumer behavior.

Dr. Lampo serves as Head of the Department of Business Studies at the University of Saint Joseph in Macao. In this role, he leads the management and international development of the Faculty of Business and Law's flagship MBA and BBA programmes.

Dr. Lampo is the author of “Promptly Yours,” a guide to shaping conversations with AI, as well as nearly 30 academic publications in the past 5 years, some of which have received international recognition. He actively shapes global business discourse through his contributions to international conferences and his role on the editorial board of academic journals.

The scholarly work is grounded in years of experience in upper management at international companies, where he was directly responsible for strategic planning and technology implementation.

A firm believer in blending strategy with creativity, Dr. Lampo is also a passionate musician, having performed in his earlier years.

Speech Contents

Explaining Long-Term Engagement with Generative AI: A Model for Sustained Technology Use

Abstract: While much research has revolved around the initial adoption of new technology, we know surprisingly little about what keeps people engaged with it after the novelty effect wears off. This study uses a Model for Sustained Technology Use (MSTU) to fill this gap. This conceptual framework explains what motivates individuals to use generative AI after the initial trial. To investigate the behavioural intention for Sustained Technology Use (STU), the model uses three core factors, i.e., Satisfaction (ST), Perceived Usefulness (PU), and Habit (HB). This study empirically evaluates the framework and examines the significance of the constructs using structural equation modelling. Based on the analysis, the constructs are significantly linked to users' long-term intentions to employ generative AI. Specifically, the sustained use of generative AI appears to be driven by user satisfaction with the technology (ST), its perceived usefulness (PU), and habitual engagement (HB). Thus, the findings highlight how positive experiences, tangible benefits, and consistent usage patterns support long-term commitment. This shifts the strategic focus from mere adoption to retention by developing AI into an agentic tool that integrates seamlessly into daily workflows. For developers, the message is clear. There is a need to prioritise user-centred design that cultivates satisfaction and seamless integration into daily routines; an environment where AI proactively anticipates needs and autonomously executes tasks, evolving from a mere tool into an accessible collaborative partner.

Invited Speech II

Time	**11:30-12:00, February 7**	**Zoom ID**	**870 9870 5756**
Room	**Uluwatu Ballroom**	**Zoom Link**	**https://us02web.zoom.us/j/87098705756**

Assoc. Prof. Yu Zhao

Tokyo University of Science, Japan

Dr. Yu Zhao is currently a Junior Associate Professor at the School of Management, Tokyo University of Science. He also serves as a visiting lecturer at the Institute of Statistical Mathematics, Japan. He obtained his Ph.D. in Information Science and Technology from Osaka University. His research primarily focuses on both the theoretical and practical aspects of statistical learning theory, operations research, and management science. His analytical approaches include machine learning and algorithmic learning methods, statistical inference and modeling, and mathematical programming, among others. His work has been published in journals such as Omega – The International Journal of Management Science, The European Journal of Operational Research, Expert Systems with Applications, and other reputable journals.

Speech Contents

Integrating Explainable AI and Probabilistic Clustering for Consumer Segmentation Based on Life Satisfaction

Abstract: Consumer segmentation based on subjective wellbeing offers valuable insights for both marketing strategy and public policy, yet traditional approaches struggle with mixedtype survey data containing continuous, nominal, and ordinal variables. This paper presents an integrated framework combining SHAP-based variable selection with a Mixed-Copula Mixture Model (MCMM) to identify interpretable consumer segments from large-scale survey data. Using a Japanese consumer panel dataset (n=10,632) from the Human Information Database, we first applied CatBoost regression to predict life satisfaction and identified 25 key predictive variables through SHAP analysis. These variables were then used for MCMM clustering, which models marginal distributions and dependency structures separately. BIC-based model selection identified seven distinct segments, explaining 38.7% of the variance in life satisfaction. The associated effect size exceeded the threshold for a large effect (η^2 >0.14), indicating substantial practical relevance. Our analysis revealed a "Distressed" segment characterized by low socioeconomic status, depleted psychological resources, and the lowest life satisfaction, representing a population requiring targeted support interventions. This framework provides a reproducible, interpretable approach for consumer segmentation that bridges predictive modeling and probabilistic clustering.

Invited Speech III (Online)

Time	9:00-9:30, February 8	Zoom ID	870 9870 5756
Room	N/A	Zoom Link	https://us02web.zoom.us/j/87098705756

Prof. Haixin Wang

Fort Valley State University, USA

Haixin Wang is a Professor in the Department of Natural and Computational Sciences at Fort Valley State University, where he supports the Computer Science Program and the Cooperative Development Energy Program (CDEP). His primary research focuses on bioinformatics, signal processing, data mining, and image processing, with recent work centered on image-based analytics for digital agriculture. He has developed practical pipelines for peach leaf image denoising, segmentation, and physical characteristic estimation, including a two-step denoising approach, K-means clustering in L*a*b* color space, and a unified algorithm for estimating physical characteristics of noisy peach. His research aims to automate the extraction of physical characteristics and disease indicators to support modern orchard management. Prof. Wang has served as PI/Co-PI on externally funded projects, including USDA-supported research on peach trees using image processing, and additional awards supported by PREP, NSF, and the U.S. Department of the Army. He has authored 22 publications, reviewed 81+ papers for journals and conferences, and received recognition such as Best Presenter at IEEE CIPCV 2024.

Speech Contents

From Noise Reduction to Traits: Peach Leaf Image Analytics

Abstract: Leaf images provide a low cost, nondestructive way to monitor peach tree health, but real orchard imagery is often degraded by sensor noise, variable illumination, and complex backgrounds. This talk presents a practical research trajectory that starts with noise processing and progresses to trait estimation and disease relevant color analytics. First, I summarize a comprehensive evaluation of denoising filters under mixed Poisson–Gaussian conditions and introduce a two-step denoising procedure that combines a bilateral filter with an inverse harmonic mean filter to reduce noise while preserving edges and fine leaf structure. I show how denoising enables reliable segmentation and measurement. For healthy leaves, we use color space comparative analysis and clustering to isolate the leaf and estimate physical traits such as length, width, area, and perimeter. L*a*b* features and K-means produce optimal segmentation performance. Finally, for unhealthy leaves, I develop a two-branch workflow that partitions the segmented leaf into green, yellow, and other regions, and uses their area ratios as quantitative indicators of discoloration severity and disease progression. The talk concludes with lessons learned for building interpretable, deployable pipelines and outlines next steps toward field systems and deep learning extensions.

Invited Speech IV (Online)

Time	**14:30-15:00, February 8**	**Zoom ID**	**870 9870 5756**
Room	**N/A**	**Zoom Link**	**https://us02web.zoom.us/j/87098705756**

Assoc. Prof. Masateru Tsunoda

Kindai University, Japan

Masateru Tsunoda is an associate professor in the Department of Informatics at Kindai Unitersity, Japan. His research interests include software measurement and human factors in software development. Tsunoda received a Doctor of Engineering in information science from the Nara Institute of Science and Technology. He is a member of IEEE, the Institute of Electronics, Information, and Communication Engineers, the Information Processing Society of Japan, the Japan Society for Software Science and Technology, and the Japan Society for Information and Systems in Education.

Speech Contents

How to select the best LLM for code generation: utilizing bandit algorithms

Abstract: Codes generation tools (LLMs) such as GitHub Copilot have received attention due to their performance in generating code. Generally, a prior analysis of their performance is needed to select new code-generation tools from a list of candidates. Without such analysis, there is a higher risk of selecting an ineffective tool, which would negatively affect software development productivity. Additionally, conducting prior analysis of new code generation tools is often time-consuming. To use a new code generation tool without prior analysis but with low risk, we propose to evaluate the new tools during software development (i.e., online optimization). We apply the bandit algorithm (BA) approach to help select the best code suggestion or generation tool among a list of candidates. Developers evaluate whether the result of the tool is correct or not. When code generation and evaluation are repeated, the evaluation results are saved. We utilize the stored evaluation results to select the best tool based on the BA approach. In our preliminary analysis, we evaluated five tools with 164 code-generation cases using BA. BA approach selected ChatGPT as the best tool as the evaluation proceeded, and during the evaluation, the average accuracy by BA approach outperformed the second-best performing tool. Our results reveal the feasibility and effectiveness of BA in assisting the selection of best-performing code suggestion or generation tools.

Invited Speech V (Online)

Time	11:45-12:15, February 8	Zoom ID	870 9870 5756
Room	N/A	Zoom Link	https://us02web.zoom.us/j/87098705756

Prof. Daowen Qiu

Sun Yat-sen University, China

I have been full professor of computer science in Sun Yat-sen University since 2004, and my research interests are focused on new computing models, quantum computing, distributed quantum algorithms, quantum models learning, quantum communication, fuzzy and probabilistic as well as quantum discrete event systems. I have published peer-reviewed over 200 papers in international journals. I am editors of some international academic journals, including Theoretical Computer Science.

Speech Contents

Universal Error Correction for Distributed Quantum Computing

Abstract: In distributed quantum computing, the final solution of a problem is usually achieved by catenating these partial solutions resulted from different computing nodes, but intolerable errors likely yield in this catenation process. In this talk, I would like to introduce a universal error correction scheme to reduce errors and obtain effective solutions. Then, we apply this error correction scheme to designing a distributed phase estimation algorithm that presents a basic tool for studying distributed Shor' s algorithm and distributed discrete logarithm algorithm as well as other distributed quantum algorithms (for example, distributed quantum counting algorithm and distributed HHL algorithm).

Session 1

February 7, 2026
Time Zone: GMT+8

Topic: AI-based Multi-Agent Systems and Information Technology
Time: 13:40-14:40 (Duration for Each Presentation: 15 minutes)
Room: Uluwatu Ballroom
Session Chair:

Onsite

CB0143

Multi-Agent RAG Chatbot: SIT Student Assistant

Natthanon Somroop, Chanakarn Limprasertsiri, **Pipatpol Jirawatpapha**, Narongrit Waraporn, Olarn Rojanapornpun and Nuttawut Atiratana
King Mongkut's University of Technology Thonburi, Thailand

Abstract-Automated student assistants have become increasingly common in educational institutions, where students expect prompt and accurate responses from modern support systems. At the same time, large language models (LLMs) combined with retrieval-augmented generation (RAG) have enabled human-like conversational interfaces over domainspecific vector databases. However, due to overlapping and imprecisely defined knowledge domains within organizations, conventional LLM-based RAG systems often struggle to deliver high-quality, domain-specific responses. To address this challenge, we propose a multi-agent RAG architecture that explicitly manages multiple knowledge domains and generates responses based on ranked retrieval scores. The proposed system was evaluated through deployment at our university, where experimental results demonstrate a high level of role adherence, effectively reducing hallucination and improving the reliability of the AI student assistant.

CB0166

A Hybrid Static Dynamic Analysis Framework Enhanced by Machine Learning for Comprehensive Code Smell Detection

L.S.K. Wijethunge, M.N. Chandimali and K A Dilini T Kulawansa
University of Moratuwa, Sri Lanka

Abstract-Code smells are design and implementation symptoms that may reduce software quality, maintainability, and understandability. Most of the existing detection methods are based on static analysis and usually fail to detect complex smells that are based on dynamical behavior or deeper semantic context. This causes false alarms and reduces developer trust. To address these drawbacks, this research proposes a hybrid static dynamic analysis framework enhanced by XGBoost, a machine learning model applied within a semi supervised learning framework to work with limited labeled data. Static code measurements are combined with lightweight runtime measurements and repository level information to enhance detection accuracy and context awareness. Moreover, the framework presents explainable outputs with the smell type that developers can use to understand what makes each detection possible. The combination of these methods makes our proposed framework more reliable, context

aware, and transparent in detecting code smells, ultimately contributing to improved software quality and developer trust.

CB3002

Machine Learning Based Modeling of Postprandial Triglyceride Response

Nattakitti Piyavechvirat and Qazi Mazhar ul Haq
Yuan Ze University

Abstract-Postprandial triglyceride (TG) elevation is an important yet under-recognized indicator of metabolic and cardiovascular risk. Routine clinical practice rarely measures postprandial TG levels due to the time and resources required. This study developed and evaluated a leakage-controlled machine learning framework to predict high postprandial TG response (defined as TG at 4 hours above the 75th percentile) using only routine fasting biomarkers. A dataset of 1,500 anonymized clinical records from a hospital-based metabolic screening population, enriched for individuals with dyslipidemia, was analyzed using stratified crossvalidation with per-fold preprocessing, probability calibration, and SHAP-based explainability. Among the evaluated models, calibrated logistic regression achieved the best overall performance (AUROC = 0.776; Brier = 0.156). TG0h emerged as the strongest predictor, showing a nearly linear relationship with model output in SHAP dependence analysis, while additional features such as total protein, BMI, hematocrit, and age contributed modest but consistent predictive value. Correlation and distribution analyses further supported the physiological plausibility of these findings. The results indicate that routine fasting biomarkers, particularly TG0h, contain meaningful information for identifying individuals at risk of elevated postprandial TG response. Although not intended as a diagnostic tool, the proposed framework provides a reproducible and interpretable basis for early screening research and may help guide future studies in metabolic risk stratification. Further validation in diverse populations is warranted.

CB0087

Data-Driven Analytics Practices in Rural Live-Streaming E-Commerce in China: A Systematic Review

Abigail Addai Gyarteng and Hou Guanghai
Southwest University of Science and Technology, China

Abstract-This paper presents a systematic review of analytics methods and business intelligence (BI) applications in rural live-streaming e-commerce platforms in China. We synthesize evidence on how data-driven practices, decision support systems, and platform data are used by rural entrepreneurs to optimize digital management in platform economies. We distinguish BI implementation and descriptive analytics from algorithmic methods; studies are only treated as “computational” when they explicitly report a learning/optimization technique. Through systematic screening of 287 records, 40 sources met the inclusion criteria (2020 – 2025). We organize findings into three analytics mechanisms: (1) engagement feedback analytics for real-time content optimization, (2) predictive analytics for customer segmentation and demand forecasting, and (3) platform governance and algorithmic constraints related to opacity and data asymmetries. The synthesis indicates that analytics adoption supports operational decision-making, yet uneven access to analytical capabilities may reinforce digital divides. We propose a framework linking big data analytics capabilities, BI dashboards, and entrepreneurial performance outcomes. Using the study coding scheme, we report that 75% of included studies describe positive associations between analytics adoption and commercial outcomes, while only 23% document advanced analytics workflows

beyond reporting and basic prediction. We conclude with a research agenda prioritizing transparent model reporting, NLP-based feedback mining where explicitly implemented, and causal designs for estimating the impacts of platform analytics on rural digital entrepreneurship.

CB0046 (Poster)

Extending Human-Centered UX Design with AI-Powered Synthetic Users: A Four-Phase Framework and Case Study

Hayoung Yoo, Jae-Yeon Won, Ye-Ji Park, Su-In Yoo, Ji-Yeon Ham and Do-Hyung Park
Kookmin University, Korea

Abstract-Early-stage user experience design frequently proceeds with limited access to real users, creating the risk of decisions that are not fully grounded in user context or motivation. This study explores an alternative starting point: what if users are created rather than recruited? We propose a four-phase framework that generates synthetic users through a Large Language Model and uses them as the foundation for user experience design. Applying the framework to a Japanese cosmetic recommendation service, we found that narratives obtained through virtual interviews transitioned coherently into personas, mental models, and a user interface concept, forming a continuous flow from early inquiry to prototype development. These findings suggest that synthetic users can serve as a meaningful reference for early-stage design decisions. The work demonstrates the potential of AI-based user research in contexts where access to real users is limited and outlines future directions for collaborative human–AI user experience design.

Session 2

February 7, 2026
Time Zone: GMT+8

Topic: Business Intelligence Analytics and Transaction Information Management
Time: 15:10-16:10 (Duration for Each Presentation: 15 minutes)
Room: Uluwatu Ballroom
Session Chair: Prof. Alessandro Lampo, University of Saint Joseph, Macao, China

Onsite

CB0042-A

Design and Implementation of an International Covid-19 Vaccination Certificate with Secure Online Verification

Chalee Vorakulpipat[1], Soontorn Sirapaisan[1], Siriboon Chaisawat[1], Kajornsak Piyoungkorn[1], Apiwat Chantawibul[1] and Parinda Wattanasri[2]
1. NECTEC, Thailand
2. Department of Disease Control, Thailand

Abstract-Proof of Covid-19 vaccination became essential for international travel during the pandemic. This paper presents the development of an electronic vaccination certificate in Thailand, emphasizing data integrity and availability while ensuring usability in real-world, high-demand conditions. The system employs digital signatures, standardized data formats, and QR code technology to enable secure and verifiable transfer of vaccination records. An online verification approach was adopted to accommodate frequent updates in vaccination data, such as booster doses, ensuring that the certificate remains valid without requiring reissuance. By providing a secure and reliable mechanism for verifying vaccination status, the system supports the continuation of international travel and cross-border business activities, minimizing disruption to commerce during the pandemic. The study also highlights how this system can be adapted for other travel-related vaccination requirements, demonstrating its broader applicability.

CB0040

War Sentiment and Crude Oil Futures: A Deep Sentiment Analysis Approach

Huanxue Li[1], Yisheng Huang[2], Hong Xuan Paul Liu[3] and Zehao Wang[4]
1. University of New South Wales, Australia
2. Xiamen University, China
3. The University of Hong Kong, China
4. Sun Yat-sen University, China

Abstract-Geopolitical events are the key driving factor to the dire fluctuations of crude oil price. Among all geopolitical incidents, the military conflicts in the Middle East are particularly crucial. However, traditional quantitive models contain fundamental limitations in terms of capturing the ever-changing public sentiments triggered by these incidents. This results in a scenario where the academia only knows little about the micro

transmission mechanism of how war-related sentiments effect future prices. Our research aims to fill in this blank. To address the problem, we design a predictive framework that integrates multi-source heterogeneous data. First, we use the well-performed FinBert model to extract the high-frequency war-related sentiment index from professional news media and unsructured social media text. Then we apply PCA to a seires of high-dimensional finance and technology indexes to conduct dimensionality reduction so that we can capture the market's core technological status. Finally, we combine the novel sentiment factor with the market technical status factor and input them into the Random Forest model to predict the return rate direction of crude oil future in different time horizons. Empirical results show that news sentiments not only significantly improve the predition accuracy of short-term return rate direction but perform ever-increasing importance in the long-term predictiom. This confirms that sentimental analysis is a indispensable dimension to boost the prediction accuracy.

CB2008-A

How Does Digital Transformation Build Organizational Resilience?

Xiaoming Wang
University of Electronic Science and Technology of China, China

Abstract-Against the backdrop of the digital economy becoming a national strategic priority and increasingly VUCA (volatile, uncertain, complex, ambiguous) external environments, how enterprises build organizational resilience for sustainable growth has emerged as a critical issue. This study aims to systematically uncover the mechanisms through which digital transformation fosters organizational resilience, specifically examining the mediating roles of total factor productivity and ambidextrous innovation, as well as the moderating effect of investor attention. Grounded in dynamic capabilities theory and the resource-based view, we employ text analysis and panel data models to empirically test our hypotheses using a sample of Chinese A-share manufacturing listed firms.

The findings reveal that: (1) Digital transformation exerts a significant positive effect on organizational resilience. (2) The mechanisms primarily operate through two significant pathways: "total factor productivity" and "exploitative innovation." The former serves as the core mediator, capturing the "efficiency enhancement" effect of digitalization. The latter, representing the functional component of ambidextrous innovation, signifies the "application optimization" effect. In contrast, the mediating effect of exploratory innovation is not significant. This indicates that the process of building organizational resilience through digital transformation is characterized by a distinct logic of "efficiency-first, application-centric, and seeking progress while maintaining stability," prioritizing the stabilization of operational foundations through improved resource allocation and the deepened application of existing technologies. (3) External environmental sensing acts as a crucial boundary condition, as investor attention significantly strengthens the positive impact of digital transformation on organizational resilience. (4) Heterogeneity analyses show this effect is more pronounced in larger firms, state-owned enterprises, and those in highly competitive industries.

The study contributes to theory by: (1) constructing and validating a dual-pathway model, clarifying that digital transformation empowers organizational resilience by enhancing total factor productivity and driving exploitative innovation, respectively; (2) incorporating investor attention into the analytical framework, extending the scope of dynamic capabilities to include sensing and responding to signals from external capital markets; and (3) revealing the contextual dependence of digital transformation's outcomes through heterogeneity tests. For practitioners, it offers clear guidance: digital transformation should be strategically central to resilience-building, with priority given to enhancing total factor productivity and exploitative innovation to solidify operational foundations, while

proactively managing investor relations to leverage external scrutiny for amplifying transformation outcomes.

CB0159

Business Intelligence and Green Marketing Effectiveness: A Data-Driven Approach to Sustainable Customer Segmentation

Mohammad Al Khaldy, Mohammad Fasha and Husam Barham
University of Petra, Jordan

Abstract-Green marketing has expanded from niche positioning into a mainstream expectation, yet many organizations still evaluate “green” campaigns with the same metrics used for conventional promotion. This creates a measurement gap: standard conversion and engagement indicators rarely capture sustainability-oriented value (e.g., adoption of low-impact products, reduced returns and waste, or persistence in greener purchasing paths). In parallel, customer segmentation often relies on demographic or transactional clustering that ignores environmentally relevant drivers, producing segments that are actionable for revenue but weakly aligned with sustainability goals. This paper proposes an end-to-end business intelligence (BI) approach for measuring green marketing effectiveness and performing sustainable customer segmentation using multisource data, interpretable modeling, and governance-ready outputs. We introduce GreenBI-Seg, a modular architecture that integrates transactional, behavioral, and sustainability-related signals into (i) a green propensity scoring layer, (ii) stable, explainable segments derived from hybrid clustering, and (iii) a campaign effectiveness layer based on uplift-style comparisons across segments. The design emphasizes data lineage, auditability, and policy-compatible reporting so that the system can operate in regulated or ESG-reporting contexts. A demonstration on an anonymized retail-style dataset schema (transactions, digital interactions, and sustainability attributes) shows how the proposed method yields segments with improved stability and clearer sustainability profiles than baseline RFM clustering, while enabling managers to allocate green marketing spend to segments with higher incremental response and lower inferred environmental impact. The paper concludes with implications for BI governance, ethical considerations, and limitations that guide future empirical validation.

CB0021-A (Poster)

Designing Opinion Expression Intelligence through Social Capital Theory: Temporal Extensions of the Spiral of Silence

Yeong-woo Lim and Kee-young Kwahk
Kookmin University, Korea

Abstract-This study aimed to explain the mechanism of individual opinion expression in the SNS environment by integrating the spiral of silence theory and social capital theory. In particular, we divided the time of public opinion perception into present and future and analyzed the effects of social capital on attitude certainty and the path to opinion expression. The results showed that social capital positively affected both time points of public opinion perception, with future public opinion perception acting directly on opinion expression willingness. In contrast, current public opinion perception acted indirectly through attitude certainty. This study provides a theoretical foundation for designing communication functions in information systems and digital engagement strategies that consider the importance of the time point of opinion expression.

Session 3

February 7, 2026
Time Zone: GMT+8

Topic: The Key Role and Applications of Intelligent Decision Analysis in Market Economy Management
Time: 16:10-17:25 (Duration for Each Presentation: 15 minutes)
Room: Uluwatu Ballroom
Session Chair: Prof. Yu Zhao, Tokyo University of Science, Japan

Onsite

CB0047

A Market Monitoring Framework for European Broadband using PPP-Adjusted Segmentation and Transition Tracking

Ivan Jajić
University of Zagreb, Croatia

Abstract-This paper proposes a data-driven framework for segmenting European fixed broadband markets using purchasing power parity (PPP)- adjusted prices. The analysis focuses on the least expensive fixed broadband offers in 27 European countries for 2019 and 2023, based on Eurostat data. The aim is to identify stable and changing affordability segments, rather than to analyse any single country in detail. Methodologically, the paper combines descriptive statistics, k-means clustering with internal validation indices, an analysis of cluster transitions and repeated-measures inference, complemented by a country fixed-effects model. The results indicate a substantial decline in PPP-adjusted prices and a persistent, yet partially mobile, segmentation of the market into cheaper and more expensive groups of countries. In both clusters, the 2023 centroids are lower than in 2019, while the internal validation indices suggest clearer separation between clusters in the later year. A transition matrix shows that around two-thirds of countries remain in the same cluster, whereas the remaining third move between segments. The paper demonstrates how relatively simple clustering and panel techniques can be effectively integrated into a business intelligence framework for monitoring price-based market segments over time.

CB0070

Behavioral Analytics of Digital Device Usage for Data-Driven Decision Making in Higher Education

Claudia Tewu and Somya Agrawal
Chaoyang University of Technology

Abstract-The purpose of this study is to describe the influence of the use of digital tools in the teaching and learning process on behaviour and academic achievement. This study adopts a Business Intelligence (BI) perspective to examine student behavioural data and generate data-driven insights that support decision-making in technology-enhanced learning environments. The study employed a survey method, distributing questionnaires to 40 undergraduate students studying at a private university in Taiwan. The study found that although some students reported that digital devices helped them stay focused during learning, many others considered them a source of distraction. This study highlights the importance of effectively managing the use of digital tools to enhance their

benefits for academic purposes. Substantial efforts by teachers and students are needed to minimize distractions and improve students' academic performance. This study is expected to serve as a pilot study for further research on the impact of digital technology on learning and academic achievement.

CB0134-A

Fusion of Variational Mode Decomposition and Multi-Dimensional Temporal Features for Traffic Flow Prediction

Chung-Chian Hsu and Shih-Mao Liu
National Yunlin University of Science and Technology

Abstract-Among the key infrastructures of a smart city, the intelligent transportation system plays a crucial role, as its efficiency and predictive capabilities directly impact the city's functionality and citizens' daily mobility experience. However, existing traffic flow prediction models still face numerous challenges in real-world applications. Traffic flow data often exhibits strong nonlinearity influenced by external factors such as weekends, holidays and noise, resulting in limited stability and accuracy for single-module models such as LSTM in short-term prediction tasks. Although possessing powerful feature extraction capabilities, deep learning models still struggle to accurately detect underlying trend signals when dealing with high-variance and high-frequency traffic time series data. Without effective noise filtering and abnormal fluctuation handling, the model may misinterpret the structure of the data, thus compromising the reliability and stability of predictions.
In response to these challenges, we explore a deep-learning based prediction model which integrates time-related features (e.g. hour, weekday, and holiday), periodic historical patterns, along with multi-frequency modes derived from Variational Mode Decomposition (VMD). VMD decomposes raw time series into a set of Intrinsic Mode Functions (IMFs) with distinct frequency characteristics. Unlike older methods like Empirical Mode Decomposition, which sift through signals recursively, VMD uses a global optimization approach to find modes concurrently, making it more robust to noise and preventing "mode mixing". Although VMD has demonstrated strong performance in fields such as financial analysis and mechanical fault diagnosis, its application in traffic flow prediction remains relatively limited and still holds great potential for exploration.

CB0160

A Hybrid View: Systematic Review of MCDA and Data Mining in Modern Decision Support

Orissa Octaria, Danny Manongga and Irwan Sembiring
Satya Wacana Christian University, Indonesia

Abstract-Multi-Criteria Decision Analysis (MCDA) and data mining techniques have independently demonstrated strong potential in supporting complex decision-making processes. However, existing studies that integrate these paradigms remain fragmented, highly domain-specific, and methodologically heterogeneous, limiting transparency, reproducibility, and real-world adoption particularly in education-oriented decision support systems. This paper presents a systematic literature review (SLR) of 70 peer-reviewed studies published between 2010 and 2025 to examine how MCDA and data mining methods have been hybridized across diverse application domains. Beyond descriptive synthesis, this study proposes a structured taxonomy of hybrid MCDA - data mining integration based on integration direction, methodological roles, validation strategies, and explainability mechanisms. In addition, a conceptual reference architecture for hybrid MCDA - ML decision support systems is derived from the reviewed

literature to address recurring limitations related to ad-hoc integration design, lack of standardization, and insufficient explainability. The findings reveal a rapid increase in hybrid decision-support research after 2021, with strong adoption in engineering, sustainability, and risk assessment domains, while applications in education remain notably limited. This work contributes a reusable analytical foundation to guide the development of transparent, scalable, and accountable hybrid decision support systems, with particular relevance to learning analytics and educational decision-making environments.

CB3001

Clustering Disaggregated Household Consumption Expenditure for Policy Targeting: Evidence from Malaysia's HES 2022

En Lee, Thian Song Ong and Yvonne Lee
Multimedia University, Malaysia

Abstract-This paper investigates whether disaggregated household consumption can be used to identify households facing budget constraints by applying machine learning clustering on household-head observations from Household Expenditure Survey (HES) in Malaysia. Unsupervised clustering is performed using K-means and Gaussian Mixture Models to segment households based on their consumption profiles. We transform the original 13 disaggregated consumption expenditure features into per-capita scale using OECD equivalence scale. To address the inherent highly right-skewed and sparsity data, we augment the dataset with two more binary features and ten engineered summary features. The performance of K-means and Gaussian Mixture Models are then evaluated across four alternate preprocessing pipelines (Robust scaling, Winsorization + Robust scaling, K-distance trimming, K-distance trimming + Winsorization). Following preprocessing, dimensionality reduction is performed by using Principal Component Analysis (PCA), and clustering quality is then assessed across different preprocessing pipelines using silhouette score. Results suggest the presence of four stable and interpretable clusters for policy recommendations. Among them, two clusters are identified as budget-constrained groups with low total spending and disproportionately high allocations of Food and Beverage spendings. The best-performing pipeline is K-Means model on the robust pipeline with silhouette score of 0.7031. These findings demonstrates that disaggregated consumption data, combined with simple engineered features allow the K-Means model to effectively segment households into well separated clusters. This study contributes to evidence-based policymaking by supporting target intervention such as cash transfer for budget-constrained groups. Moreover, this study also presents a reproducible preprocessing and clustering pipeline to handle sparse and highly skewed data.

Session 4 (Online)

February 7, 2026
Time Zone: GMT+8

Topic: Machine Learning Models and Predictive Computing
Time: 15:00-16:45 (Duration for Each Presentation: 15 minutes) (GMT+8)
Zoom Link: https://us02web.zoom.us/j/87098705756
Session Chair: Prof. Thomas Hanne, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Online

CB0035

Comparative Evaluation of Machine Learning and Transformer-Based Models for Financial Domain Sentiment Analysis

Rayhan Juniano Rachman and Eka Miranda
Bina Nusantara University, Indonesia

Abstract-Indonesia's financial literacy remains behind its financial inclusion, SNLIK 2025 reports 66.46% literacy versus 80.51% inclusion, underscoring the need to understand how people react to financial content online. Using the CRISP-DM framework, this study mines public tweets about "investasi" and "edukasi keuangan" posted from 2024 to 2025 to classify sentiment toward financial content. From 5,601 unique tweets then were lexicon-labeled into neutral (66.63%), positive (26.33%), and negative (7.03%), revealing a strong class imbalance that needed SMOTE on the experiments. The authors compared machine learning algorithms (Linear SVM, SVM RBF, Logistic Regression, Random Forest, XGBoost) against a deep learning transformer IndoBERT under stratified 70:30 and 80:20 splits. IndoBERT performed the best, reaching up to 95.09% accuracy (in 80:20 split and non-SMOTE) and 96.43% accuracy (in 80:20 split and SMOTE), other models also show stable and good performance but still below the IndoBERT results. Most residual errors were tweets classified as neutral instead of positive or negative, rather than mixing up positive with negative. The study highlights the effectiveness of data pre-processing method, machine learning, and deep learning models in sentiment classifications.

CB0059

Assessing the Trade-off Between Hybrid BERT–CNN and Transformer Models for Low-Resource Language: Javanese

Tiffany Joycelyn, Yulyani Arifin and Irma Kartika Wairooy
Bina Nusantara University, Indonesia

Abstract-Sentiment analysis for low-resource languages is still becoming a challenge due to limited datasets and the absence of large native pre-training corpora. This study investigates whether hybridizing BERT with Convolutional Neural Networks can improve the accuracy of Javanese sentiment classification. Using the Javanese IMDb dataset, we evaluate Hybrid BERT and CNN architecture against monolingual Transformer baselines. Results show that the hybrid model achieves 72.08 percent accuracy, falling short of the Javanese BERT baseline 76.37 percent. The additional convolutional layer introduces unnecessary complexity, increasing the risk

of overfitting rather than providing complementary local features. This study indicates that, in low-resource scenarios, maximizing the utility of pre-trained Transformer representations is more effective than architectural hybridization. This highlights the importance of data-centric strategies such as curated Javanese pre-training corpora, improved data filtering, and data-efficient learning methods for advancing NLP in underrepresented languages.

CB0074

An improved ant colony optimization for robot path planning and its application

Hao Wang and Qiusheng He
Taiyuan University of science and technology, China

Abstract-To address issues such as path redundancy, slow convergence speed, and trapping into local optimal solutions in traditional ant colony algorithms within multi-obstacle environment. This study proposes an improved ant colony algorithm. First, a dynamic heuristic information update mechanism is introduced. This mechanism senses the distribution of obstacles, directional accessibility and dynamically adjusts the pheromone volatilization coefficient in real time. Such an enhancement significantly improves the algorithm's adaptability in complex environments characterized by multiple obstacles. Secondly, a hierarchical global information sharing strategy is introduced. By constructing a pheromone pool to store the optimal path segments of past generations and establishing a pheromone concentration gradient field, the ant colonies are guided to gather in areas with high-quality solutions and improve the efficiency of path information utilization. Finally, a local optimization module based on bidirectional scanning is designed. Through a redundant point identification and removal mechanism, path quality is further enhanced. Compared with the traditional ant colony algorithm, the proposed IACO reduces the average path length by 12.6%, decreases computation time by 15.3%, and lowers both collision occurrences and convergence iterations by 40% and 30%, respectively. Furthermore, field tests demonstrate that the improved algorithm successfully meets path planning requirements in complex environments.

CB0095

Sentiment Analysis on X Regarding Coretax as a Digital Tax Administration System in Indonesia

Bilal Prasetya Pinaring[1] and Eka Miranda[2]
1. Binus Graduate Program – Master of Information Systems Management, Indonesia
2. Bina Nusantara University, Indonesia

Abstract-This study examines public opinion regarding Coretax, a new digital tax administration in Indonesia, by employing natural language processing (NLP) and machine learning. Using 9,485 posts on X between January and July 2025, this research applies a comparative modeling approach using Naïve Bayes, Support Vector Machine (SVM), Extreme Gradient Boosting (XGBoost), Logistic Regression, and Random Forest. SMOTE is also used to address class imbalance. The best result of this study was achieved by the Logistic Regression model without SMOTE, obtaining 86.6% accuracy and outperforming other algorithms. Sentiment analysis showed that negative sentiments are the most prominent among the other classes, reaching 49.68% of the total dataset, reflecting users' dissatisfaction with the system and suggesting that further improvements are needed.

CB0111

Comparative Analysis of Machine Learning Models for Early Diabetes Prediction based on Imbalance Data Handling Techniques

Rainer Timothy[1], Kokoy Siti Komariah[2] and Dani Suandi[1]
1. Bina Nusantara University, Indonesia
2. The National Agency for Research and Innovation (BRIN), Indonesia

Abstract-Diabetes mellitus is a global health concern characterized by glucose accumulation in the bloodstream, which requires serious treatment. Technological advancements have led to the proposal of various machine learning-based methodologies for the early detection of diabetes. However, the efficacy of such models is often influenced by the characteristics of the dataset used, especially in cases of extreme class imbalance, where instances of the non-diabetic class predominate. This paper compares data imbalance strategies, including undersampling, oversampling, and sampling ratio techniques. Experimental findings demonstrate that these sampling strategies do not reliably outperform the non-sampling method baseline on evaluation measures, highlighting the challenge posed by severe class imbalance and limited diversity in the minority class. The findings offer empirical insights into the effectiveness and limitations of data-level imbalance handling strategies for diabetes prediction.

CB0133

Measuring the Causal Impact of Generative AI Adoption on SME Productivity: A Double Machine Learning Approach

Gede Gida Setia Permana and Murniati
Bina Nusantara University, Indonesia

Abstract-This study investigates the causal effect of Generative AI (GenAI) adoption on small and medium-sized enterprise (SME) productivity, addressing persistent endogeneity and self-selection biases in prior observational research. Drawing on cross-sectional survey data from 200 SME decision-makers, we model GenAI adoption intensity and productivity outcomes using a two-stage empirical design. First, Partial Least Squares Structural Equation Modeling (PLS-SEM) validates measurement reliability and examines key determinants of adoption, including perceived usefulness, technological readiness, and organizational support. Second, we apply Double Machine Learning (DML) to estimate debiased causal impacts under high-dimensional covariates, leveraging flexible machine-learning models to improve robustness. Results indicate that perceived usefulness and readiness significantly increase adoption intensity, while organizational support emerges as the strongest predictor of productivity improvements. The causal effect of GenAI adoption alone is positive but modest, suggesting that productivity gains depend on effective integration, skills development, and governance. These findings provide methodological and managerial implications for evidence-based GenAI implementation in SMEs.

CB0014

Optimized Feature Selection for Diabetes Prediction Using IRIME

Emmanouil Damilakis, Hiren Soni, Rolf Dornberger and **Thomas Hanne**

University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Abstract-Early prediction of diabetes is critical for preventive care, but modern datasets often contain many features that can hinder model performance through overfitting and increased complexity. In this paper, we investigate the effectiveness of IRIME, a novel computational intelligence algorithm, for optimized feature selection in diabetes prediction. We compare IRIME's performance against using all available features and against a custom ensemble feature selection model. This ensemble aggregates the outputs of several computational intelligence algorithms, including Particle Swarm Optimization, Genetic Algorithm, Differential Evolution, Ant Colony Optimization, Brain Storm Optimization, Bat algorithm, and Binary PSO. We apply these methods to a real-world Iraqi diabetes dataset with 1000 patients, using LightGBM and Multilayer Perceptron classifiers to evaluate each selected feature subset. Our results show that the IRIME-selected features achieve an F1-score of 0.990, nearly matching the performance of using all features (F1 ≈ 0.992) and the custom ensemble model (F1 ≈ 0.989) while dramatically reducing the feature count. We interpret the contributions of the selected features using Shapley Additive Explanations to provide insight into their impact on the model's predictions. The IRIME algorithm demonstrates its effectiveness in finding a highly informative feature subset, performing comparably to or even surpassing the custom ensemble and other individual feature selectors in predictive performance. This work demonstrates an efficient, interpretable feature selection framework that improves diabetes prediction and could reduce diagnostic tests.

Session 5(Online)

February 7, 2026
Time Zone: GMT+8

Topic: Intelligent Image Detection and Computer Vision Analysis
Time: 16:45-18:00 (Duration for Each Presentation: 15 minutes) (GMT+8)
Zoom Link: https://us02web.zoom.us/j/87098705756
Session Chair:

Online

CB0045

Kernel Density Estimation Approach for a Heatmap-Enhanced Curriculum Vitae Generator
Intan Dzikria, Kelvin Erlangga Satriagung and Reva Olinda Primalia
Universitas 17 Agustus 1945 Surabaya, Indonesia

Abstract-The increasingly competitive job market requires job seekers, particularly fresh graduates, to have a Curriculum Vitae (CV) that is not only visually appealing but also compliant with Applicant Tracking System standards. At the same time, job seekers often lack insight into the spatial distribution of job opportunities, so career decisions are not sufficiently supported by location-based information. This study develops a web-based CV generator system integrated with a job vacancy heatmap visualization using the Kernel Density Estimation (KDE) method. The KDE process is carried out on a two-dimensional evaluation grid constructed from the geographic coordinates of job vacancies and computed using a Gaussian kernel in the Web Mercator coordinate system. The quality of the heatmap is evaluated through sensitivity analysis and configuration assessment of KDE by varying the bandwidth and grid resolution parameters, then comparing the distribution of density classes as well as the stability of the resulting hotspots across several configurations. The experimental results show that a medium bandwidth combined with a medium grid resolution produces a balanced density pattern, stable hotspots in major metropolitan areas in Indonesia, and a visualization that is easy for users to interpret. The resulting system not only helps users compose ATS-friendly CVs, but also provides spatial insights into regions with high job opportunity concentrations, thereby supporting more strategic career decision-making.

CB0088

Lightweight Deep Learning Model for Rice Leaf Disease Detection with Region Highlighting
Shandez Darlene, Stephen William and Alexander Agung Santoso Gunawan
Bina Nusantara University, Indonesia

Abstract-Rice is one of the world’s most essential crops, yet it is highly vulnerable to leaf diseases that can significantly reduce yield. Conventional visual diagnosis methods are often slow and impractical in rural areas. While recent deep learning approaches offer promising solutions, highly accurate models are typically too large for edge deployment, and lightweight models often lack interpretability. This study proposes a lightweight and explainable deep learning framework for rice leaf disease detection on edge devices based on EfficientNet-B0 integrated with attention mechanisms. Three attention modules—Convolutional Block Attention Module (CBAM),

Efficient Channel Attention (ECA), and Coordinate Attention (CoordAttention) — were compared based on parameter overhead, computational complexity, and classification performance. Among them, CoordAttention achieved the best balance across these metrics and was therefore adopted for the final architecture. The proposed Coord-EficientNetB0 model was evaluated on a dataset of 5,188 augmented images covering seven disease categories along with healthy leaves, and further assessed using a five-fold cross-validation strategy. Experimental results show that the model achieved an accuracy of 93.83%, with a compact size of approximately 4.2 million parameters and an 8.5 MB model size after TensorFlow Lite conversion, enabling efficient inference on edge devices. In addition, qualitative visualization results demonstrate that the proposed attention mechanism effectively highlights disease-relevant regions, thereby enhancing model interpretability. Overall, the integration of CoordAttention improves EfficientNet-B0 in both classification accuracy and lesion localization with no significant increase in computational cost.

CB0106

Harnessing Transformer-Based Deep Learning for Online Discourse Classification in Indonesia: A Comparative Study of RoBERTa and IndoBERT Models

Kevin Joseph Handoyo, Kristian Binsar Pardamean Pasaribu, I Kadek Defa Danuarta, Eduard Mario Kayesa and Yulyani Arifin
Bina Nusantara University, Indonesia

Abstract-The rapid growth in the area of digital communication in Indonesia has increased online discourse's intensity, followed by an increase in the spread of hate speech and toxic content. This research aims to develop and conduct a performance comparison between two Indonesian language-based transformer models, IndoBERT, and RoBERTa, which classify toxic and non-toxic texts by using the dataset IndoToxic2024. The research methodology includes stages of cleaning text data, tokenization, handling class imbalance through class weighting, and model training. The evaluation metrics used in this study are accuracy, precision, recall, F1-score, and ROC-AUC. The experiment's results show that both models perform suitably but the IndoBERT model is superior on most metrics: Accuracy, Precision, F1-Score, and ROC-AUC, while RoBERTa has a slightly higher recall, proving stronger sensitivity in detecting toxic text. The contribution of this study in strengthening Indonesian NLP is toward the development of artificial intelligence systems for maintaining the health of digital discourse.

CB0115

Malaria Detection in Stained Blood Smears Using YOLOv11 Enhanced with CBAM and Swin Transformer

Nathan Raditya Hemanda and Alexander
Binus University, Indonesia

Abstract-Malaria remains one of the leading causes of deaths in children globally. The current methods of detection are unsuitable for initial diagnostics in places that commonly require detection due to the high cost. Automated detection of malaria in blood smears using computer vision shows strong potential for as an alternative with both fast results and cheaper costs. This study will focus on studying the effectiveness of Ultralytic ' s YOLOv11 model and further improving its performance using different backbone architectures. Aside from a standard convolution backbone, a Swin Transformer backbone and a Convolutional Block Attention Module backbone will be explored. The models are trained and evaluated using the same annotated dataset consisting of

stained blood to detect and localize malaria-infected cells. The best performance of the models is from the SwinT Backbone Model, with 0.745 Precision, 0.847 Recall, 0.833 mAP50, and 0.690 mAP50-95. The experiment results demonstrate that backbone architecture selection conclusively impacts detection results. All three models demonstrated different advantages over the others. Of the three CBAM was able to more accurately pinpoint the infected cells while the standard CNN shows more accuracy in classification. SwinT model was the best performing by all metrics but had the longest inference time.

CB0167

Application of Generative AI-Enabled Surveying and Mapping in the Intelligent Commercial Transformation of Intangible Cultural Heritage

LI YuanCheng and WANG Kai
Guangxi Vocational Normal University, China

Abstract-Against the core bottlenecks existing in the process of intelligent commercial transformation of Intangible Cultural Heritage (ICH), such as distorted translation of cultural genes, insufficient precise supply-demand matching, lack of scenario-based experience, and inefficient value realization, an innovative solution for the in-depth integration of generative artificial intelligence (AI) and surveying and mapping technology is proposed. As an auxiliary means for the digital collection of key elements such as ICH core skills, folk symbols, and inheritance scenarios, surveying and mapping technology only provides high-precision basic data support for generative AI model training. The core empowerment logic focuses on improving the efficiency of the entire intelligent commercial transformation chain and accurately retaining cultural value. An intelligent commercial transformation system of ICH is constructed, which follows the logic of "data collection foundation-in-depth model training-intelligent creative generation-precise commercial realization". Relying on generative AI algorithms, the cultural core of ICH is deeply deconstructed to realize personalized intelligent design of cultural and creative products, dynamic generation of immersive experience content, and batch incubation of ICH IP derivative matrices. Meanwhile, combined with intelligent analysis of user portraits, precise supply-demand matching is achieved, which solves the key problem of imbalance between traffic monetization and cultural inheritance in traditional transformation models. Empirical analysis shows that this integrated model can significantly improve the intelligence level and cultural value retention rate of ICH commercial transformation, promote the efficient transformation of ICH resources into digital economic value carriers, and provide a new technical path for the integrated development of ICH living inheritance and digital commerce.

Session 6(Online)

February 8, 2026
Time Zone: GMT+8

Topic: Applications of AI in Intelligent Business and Financial Systems
Time: 9:30-11:30 (Duration for Each Presentation: 15 minutes) (GMT+8)
Zoom Link: https://us02web.zoom.us/j/87098705756
Session Chair: Prof. Haixin Wang, Fort Valley State University, USA

Online

CB0022

Effectiveness Analysis of N-HiTS in Data Forecasting: A Case Study on Walmart Sales Prediction

Yingdong Wang[1] and **Zhiwen Song[2]**
1. China University of Petroleum, China
2. Soochow University, China

Abstract-Retail demand forecasting plays a pivotal role in inventory optimization and supply chain management but faces significant challenges due to data scale, high volatility, and complex hierarchical dependencies. Existing methods often struggle to balance high-precision modeling of exogenous variables with computational efficiency. To address these issues, this paper presents a systematic evaluation of a hybrid framework that enhances the Neural Hierarchical Interpolation for Time Series (N-HiTS) model with a Residual Bias Correction (RBC) module, using Walmart's M5 dataset as a case study. The proposed approach utilizes N-HiTS' s multi-resolution architecture to capture diverse temporal patterns while employing the RBC module to correct systematic biases driven by future-known factors like promotions and holidays. Specifically, the hybrid architecture effectively decomposes the forecasting problem into two orthogonal tasks: learning global temporal dynamics via the deep backbone, and capturing local, exogenous-driven variance through gradient-boosted residual correction. Comprehensive experiments demonstrate that this system achieves an 8.2% reduction in RMSE (2.3667→2.1732) and a 0.408 skill score against the sNaive(7) baseline, consistently outperforming traditional methods across all horizons. Furthermore, the system maintains a practical inference latency of 2.6 – 3.0s, establishing it as a state-of-the-art solution that effectively balances accuracy, interpretability, and scalability for enterprise-level applications.

CB0036

AI Robo-Advisor Adoption Impact on Financial Inclusion, Financial Literacy, and Investment Habit of Millennial and Gen Z Retail Investor in Indonesia

Sherine, Indrajani Sutedja and Mulyono
Bina Nusantara University, Indonesia

Abstract-AI-driven robo-advisors (RA) represent a key financial innovation democratizing professional portfolio management for the masses. This study analyzes RA' s role in transforming investment practices and enhancing the financial well-being of digitally-native demographics. Using Partial Least Squares Structural Equation Modeling (PLSSEM), the analysis confirms a positive and statistically significant relationship between RA

adoption and Financial Inclusion (FI). However, no significant relationship was found between RA adoption and Investment Habit (IH). This non-significant result highlights a critical insight, while technology effectively addresses barriers related to access and information, it does not automatically address the behavioral discipline necessary for forming consistent investment habits. This reveals an ” intention-action gap” where users access sophisticated tools but fail to establish repetitive behaviors. Hence, this presents a clear challenge for FinTech developers. To truly enhance long-term financial well-being, platforms may need to bridge this gap by integrating more effective behavioral touches and selfcontrol influences to foster consistent action.

CB0041

The Utilization Of Artificial Intelligence (AI) In Enhancing The Effectiveness Of Digital Marketing Strategies In E-Commerce Startups

Teta Valestia Prabawaty and **Iston Dwija Utama**
Bina Nusantara University, Indonesia

Abstract-This study examines how Artificial Intelligence in Marketing (AIM) influences the performance of e-commerce startups by testing the mediating role of SME Trust. Although prior studies have acknowledged the benefits of AI in enhancing marketing efficiency, previous research has provided limited explanations on how trust mechanisms shape the effectiveness of AI-driven strategies within e-commerce startups in emerging markets. To address this gap, data were collected from 202 e-commerce startup practitioners through a structured survey and analyzed using PLS-SEM. The findings reveal that AIM positively and significantly improves financial, customer, internal business process, and learning and growth performance. SME Trust is found to mediate the relationship between AIM and all dimensions of business performance, indicating that trust strengthens the effectiveness of AI-enabled digital marketing activities. This study contributes to the AI marketing literature by offering strong evidence on the role of trust as a behavioral mechanism that enhances the impact of AI on business performance. The results also provide practical guidance for SMEs and startup managers to integrate AI technologies more strategically while prioritizing trust-building initiatives to customize digital marketing outcomes.

CB0086

Continuance Intention of Generative AI Chatbot on Success Rate of resolving user issue in Indonesia E-commerce: Expectation Confirmation Model

Fabian Tristan Hengguard, Indrajani Sutedja and Hendry Hartono
Bina Nusantara University, Indonesia

Abstract-This study examines the factors driving the Continuance Intention of Generative AI Chatbots in the Indonesian e-commerce market, utilizing an extended Expectation Confirmation Model. This research focused on the Problem-Solving capability as the key performance driver, which influences user satisfaction and perceived ease of use through confirmation. A quantitative method was employed, and data were analysed using PLS-SEM in SmartPLS 4.0 on 402 e-commerce users who had interacted with GenAI chatbots. The results provided strong support for all six core hypotheses. Key findings confirm a clear cascade: the advanced problem-solving capability strongly determines confirmation, which then influences both satisfaction and perceived ease of use. Both satisfaction and perceived ease of use were found to be direct and significant predictors of continuance intention. The study concludes that sustained user loyalty for GenAI chatbots depends on demonstrable problem-solving

skills combined with highly frictionless interactions, offering essential insights for GenAI retention strategies in the highly competitive Indonesian e-commerce market.

CB0117

The Role Of Artificial Intelligence in Driving Digital Transformation in Retail Companies

Yougi Lisora Novramadwitho and Hendra Alianto
Bina Nusantara University, Indonesia

Abstract-Artificial Intelligence (AI) is no longer just a tool; it's arguably the main catalytic engine for Digital Transformation (DT) in retail. It's the core intelligence activating new data-driven business models. This article synthesizes a mix of academic, industry, and technical literature to look at AI's wide-ranging role. The findings point to a clear, quantifiable impact across the retail value chain. This includes everything from hyper-personalizing the customer experience to optimizing the supply chain and demand forecasting, and even creating frictionless, intelligent in-store environments. By looking at different strategic models—like Walmart's 'Agentic AI' approach, H&M's 'Profitability and Sustainability' turnaround, and Stitch Fix's 'Human-AI Synergy'—we can see multiple paths to value. But this potential is held back by some profound implementation barriers. The research suggests the primary obstacles aren't purely technological. They appear to be socio-technical and ethical, involving a major leadership gap, immature data governance, and serious economic risks, like the possibility of algorithmic collusion or even consumer harm. The report concludes that realizing this value depends on whether retailers can navigate these tricky leadership and ethical challenges, balancing innovation with governance.

CB0118

AI-Driven Recommendation Systems to Enhance Customer Decision in E-commerce

Nicholas Nathaniel Tarunadjaja, **Kelvin Ong**, Felix Nathanael and Cadelina Cassandra
Binus University, Indonesia

Abstract-Artificial Intelligence (AI) is gaining rapid momentum as a novel and business intelligence enabler for many industries, especially the e-commerce domain. AI-driven recommendation systems allow e-commerce platforms to analyze customer behavior, preferences, and interactions to generate actionable insights that improve customer satisfaction and purchasing decisions. This research aim is to examine the AI based system capabilities such as responsiveness, perceived usability, interactivity, chatbot functionality, image search, and recommendation system efficiency to enhance user satisfaction and product recommendations of an e-commerce platform. This research will use a quantitative method through a questionnaire approach to analyze the impact of AI-based recommendation systems in e-commerce platform. This research involved 229 respondents who participate in the questionnaires. The findings indicate that not all AI system features contribute equally to customer satisfaction. The study found that factors such as chatbot, image Search, and recommendation systems contributes on the user satisfaction and enhance the purchase decision. Overall, this study also evaluates on how AI-based business intelligence tools can support customer strategies and improve decision-making, highlighting the importance of focusing on the features that could improve the business.

CB0139

Humanizing the Machine: A Study of Chatbot Continuance Intention in the Indonesian Banking Sector

Keith Kanto, Nathanael Joshua Heriyando, **Valdo Reyes Kurniadi** and Santy
Binus University, Indonesia

Abstract-While banking chatbots are widely deployed, the drivers of long-term continuance in emerging markets remain under-researched. This study addresses this gap by integrating the Technology Acceptance Model (TAM) and the Expectation- Confirmation Model (ECM) to examine chatbot ' s continuance usage in Indonesia. Analyzing survey data via PLS-SEM, the results show that Information Quality and Expectation Confirmation are critical to Customer Satisfaction, while Perceived Usefulness, Trust, and satisfaction most strongly predict continuance intention. The findings reveal that service quality does not significantly impact trust or satisfaction, suggesting a fundamental shift toward functional and cognitive evaluations in AI driven environments. This research demonstrates that conventional service quality metrics have limited explanatory power for autonomous agents. Practically, banks should prioritize information accuracy and expectation management over traditional service dimensions to ensure sustainable digital strategies.

CB0165

A Multivariate LSTM Model with Attention and Time Decay for Data-Driven Marketing Channel Attribution

Kristoforus Hyronimus Andreaw Wirakusuma and Gede Putra Kusuma
Bina Nusantara University, Indonesia

Abstract-Marketing channel attribution remains a critical challenge in e-commerce, where determining the contribution of each marketing touchpoint to conversion events is essential for optimizing advertising spend. Traditional attribution models such as first-click and last-click often fail to capture the complex, sequential nature of multichannel customer journeys. This paper proposes a data-driven attribution (DDA) framework based on a Multivariate Long Short-Term Memory (LSTM) network enhanced with an attention mechanism and time-decay function. The model is choosen after comparing with the another sequential BERT like model. Metrics showing that the LSTM like model is overperforming BERT based on the both marketing expert in the industry by analyzing the attribution score as well as the metrics result by comparing the AUC of the model. The model learns from sequential user interactions while dynamically weighting each touchpoint based on its relevance to conversion outcomes. Evaluated on a real-world dataset comprising over 2.7 million user interactions from a major Indonesian e-commerce platform, the proposed approach achieves an AUC score of 0.854. Attentionweight analysis reveals that social media and referral channels contribute most significantly to conversions, while specific user actions such as adding items to cart serve as strong purchase intention indicators. The results demonstrate that integrating LSTM with attention mechanisms and temporal decay improves attribution accuracy, enabling more objective and data-driven marketing budget allocation decisions.

Session 7(Online)

February 8, 2026
Time Zone: GMT+8

Topic: E-commerce Intelligence and Intelligent Decision Making
Time: 12:00-14:00 (Duration for Each Presentation: 15 minutes) (GMT+8)
Zoom Link: https://us02web.zoom.us/j/87098705756
Session Chair:

Online

CB0008

Mitigating Risk in Digital Finance: How Perceived Personal Data Protection and Usefulness Drive Intention to Use a Bank's Loan Services

Bryan Bhaskara Pratama, Prasetyo Adi Wibowo and Darjat Sudrajat,
Bina Nusantara University, Indonesia

Abstract-This research investigates the perceptions of personal data protection, usefulness, risk, and intention to use a digital loan service within the Indonesian banking context. A quantitative method was employed, and data were collected from 207 users of a state-owned bank's digital loan application, which was subsequently analyzed using SmartPLS. The findings also show that perceived privacy has a strong indirect effect on perceived risk. Still, there is only a weak direct influence on intention to use, as perceived personal data protection has no direct impact on this endogenous construct. Perceived usefulness has both direct and indirect influences on perceived risk, in addition to intention. The mediating effect of perceived risk is itself strong, as it increases the association between personal data security, usefulness, and intention to adopt digital lending services. The model accounts for 78% of the variance in intention and has high reliability and validity indicators. This is the implication of the results of this study, which emphasizes the necessity of reconciling trust, security, and usefulness to increase the Adoption and continuance of digital lending.

CB0077

The Effect of e-WOM, Price Perception, and Trust on Shopee Users' Purchase Decisions in Bekasi

Evans, **Rafael Newantona Sinurat** and Danang Prihandoko
Bina Nusantara University, Indonesia

Abstract-This study investigates the impact of digital marketing factors and consumer perceptions on purchasing decisions of Indonesian e-commerce users in Bekasi. The research explores the determinants of purchasing decisions on the Shopee platform, examining the direct relationships between Electronic Word of Mouth (e-WOM), Price Perception, and Trust as key drivers in the online shopping environment. This quantitative study used 405 survey responses from active Indonesian e-commerce consumers in Bekasi aged 17 – 59 who participated in online shopping between November and December 2025. The data were analyzed using SmartPLS 4.0 with Structural Equation Modeling Partial Least Squares (SEM-PLS). The results show that trust had the strongest direct effect on purchasing decisions compared to price perception and e-WOM, although all three

variables demonstrated a positive and significant influence. This study provides practical insights for researchers and industry practitioners regarding the importance of consumer trust, pricing strategies, and digital reviews in sustaining competitiveness in the e-commerce sector.

CB0091

Digital Marketing Factors Influencing Gen Z Consumer Behaviour in Indonesia's E-Commerce Market

Vincent Harnjo and Stephanie Surja
Bina Nusantara University, Indonesia

Abstract-This study analyses the influence of four essential digital marketing elements — Mobile Marketing, Content Marketing, Social Media Marketing, and Email Marketing — on Consumer Buyer Behaviour among Generation Z (Gen Z) within Indonesia's e-commerce landscape. Gen Z customers, as digital natives, predominantly depend on mobile devices, social media, and tailored internet material for their purchase decisions. A quantitative methodology was utilized, gathering 500 valid replies via an online survey. The measurement model exhibited robust reliability and validity, while hypothesis testing using SmartPLS indicated that Content Marketing, Mobile Marketing, and Social Media Marketing each exert a positive and substantial impact on consumer behaviour. Email Marketing exhibits a notable negative impact, suggesting that conventional email advertising may be less attractive to Gen Z customers. These findings underscore the significance of tailored, visually captivating, and interactive digital methods in shaping online purchasing decisions. This study enhances the existing digital marketing literature and offers actionable insights for organizations seeking to refine their marketing strategy for Gen Z within Indonesia's competitive e-commerce environment.

CB0099

The Impact of Product Perceived Quality, Environmental Responsibility, and Brand Trust on Gen Z: Examining the Moderating Effects of Fear of Missing Out and Social Media

Angelica Virginevra Malina More and Robertus Tang Herman
Bina Nusantara University, Indonesia

Abstract-The Indonesian beauty and personal care market is experiencing significant growth, driven by rising consumer demand and the increasing adoption of digital commerce, particularly in the skincare segment. Generation Z has become a key driver of this growth, with their purchasing decisions influenced by factors such as perceived product quality (PPQ), brand trust (BT), and environmental responsibility (ER). Additionally, social media platforms like TikTok and emotional triggers like fear of missing out (FOMO) play a crucial role in shaping their buying behavior. This study explores the impact of these factors on Gen Z's purchasing decisions, with a focus on how social media and FOMO act as moderating variables. By integrating SEM-PLS and decision tree analysis, this research provides valuable insights into the factors driving purchase decisions and offers practical implications for brands targeting this demographic. The findings emphasize the importance of leveraging algorithmic insights and social media analytics to optimize marketing strategies and resonate with Gen Z's values, particularly around sustainability and responsible consumption.

CB0112

Analytical Technology Infrastructure and Decision Making Efficiency in The Retail Sector

Arya Kemal, Chato Meyer Alexander, Muhammad Ridho and Robertus Nugroho Perwiro Atmojo
Bina Nusantara University, Indonesia

Abstract-This study aims to determine the extent to which the proposed model and data-driven technological aspects influence decision-making effectiveness in the retail industry. The analysis focuses on three independent variables—Big Data, Data Quality, and Data Analysis—evaluated against the dependent variable of decision-making effectiveness. The empirical findings demonstrate that all three variables have a significant impact on decision-making effectiveness, as evidenced by the hypothesis testing results: Data Analysis (T-statistics = 4.550; P-value = 0.000), Big Data (T-statistics = 2.246; P-value = 0.025), and Data Quality (T-statistics = 3.255; P-value = 0.001). These results provide strong empirical evidence that data analytics capabilities and data management quality play a crucial role in supporting strategic decision-making processes within the retail sector.

CB0116

Security Qualification Model for Digital Banking Systems Based on Software Metrics

Parman Suparman, Haryono Soeparno, Yulyani Arifin and Ford Lumban Gaol
Bina Nusantara University, Indonesia

Abstract-The increasing complexity of cyberattacks on today's online banking platforms requires a sophisticated approach to security risk analysis. Thus, it is necessary to introduce a security rating model based on software metrics to save online banking platforms from complex cyberattacks. The proposed model allows for security ratings analysis of online banking platforms from multiple viewpoints by mapping all possible software attributes, such as reliability, security, and critical components in online banking. The experimental results show consistency with expectations because they provide a complete understanding and explanation for security ratings analysis. The key contribution in presenting this article is providing a theoretical model for software metrics to illustrate their application within online banking security.

CB0126

An Analysis of Factors Influencing User Satisfaction in the Maxim Ride-Hailing Application

Ryan Nathan Utama and Elfindah Princes
Bina Nusantara University, Indonesia

Abstract-This study aims to explore the key factors that influence user satisfaction in the context of the Maxim ride-hailing application, which has been gaining popularity in Indonesia as a low-cost alternative to established competitors like Gojek and Grab. The research focuses on four main independent variables—Application Features, System Quality, Price Value, and Service Quality—and examines how they influence Customer Loyalty, which in turn affects User Satisfaction. A quantitative research approach was adopted using a survey method, and data was collected through online questionnaires distributed to active Maxim users. The responses were measured using a 5-point Likert scale and analyzed using Structural Equation Modeling (SEM) with a Partial Least Squares (PLS) approach via SmartPLS software. The results show that Application Features and Service Quality have a significant positive effect on Customer Loyalty, while System Quality and Price Value do not. Moreover,

Customer Loyalty was found to have a strong and significant impact on User Satisfaction. These findings highlight the importance of Maxim focusing on improving its app features and service quality to enhance customer loyalty and, ultimately, user satisfaction.

CB0145

High-Dimensional Evolutionary Game Decision Analysis Based on Adaptive Solving and GPU Parallel Acceleration

Yuan Zhang, Yanji Piao, Haoyu Guo and Xianglan Jin
Yanbian University, China

Abstract-To address the core challenges of high-dimensional parameter optimization and low simulation efficiency in multiagent strategic interaction decision-making, this paper proposes an efficient decision analysis framework that integrates adaptive algorithms with GPU parallel computing. This framework uses an improved RKF45 solver to ensure the numerical stability of evolutionary game dynamics and achieves fine-grained parallel acceleration through CUDA implementation. Experiments show that this tool can achieve a 56-fold performance acceleration, enabling rapid evaluation of a large number of decision scenarios. In the case study of elderly care service quality supervision, the tool increased the efficiency of strategy equilibrium analysis by 68%, automatically identifying the optimal policy parameter combinations, which raised the steady-state probability of highquality service from 0.62 to 0.89. This study provides a powerful quantitative analysis tool for complex decision-making scenarios such as market analysis and risk management.

Session 8(Online)

February 8, 2026
Time Zone: GMT+8

Topic: Computer Theory and Information Technology
Time: 14:30-16:30 (Duration for Each Presentation: 15 minutes) (GMT+8)
Zoom Link: https://us02web.zoom.us/j/87098705756
Session Chair: Assoc. Prof. Masateru Tsunoda, Kindai University, Japan

Online

CB0096

Scalable Cloud-Native Architecture for High-Concurrency Smart Learning Ecosystems: A Hybrid Routing Approach

Rico Aurelio Gunadi Sastra and Ahmad Nurul Fajar
Binus University, Indonesia

Abstract-The integration of synchronous AI services, such as mass attendance in higher education environments, into educational platforms creates significant throughput bottlenecks. The instantaneous load of 5,000 concurrent users can cause rapid resource exhaustion and cascading failures in legacy architectures [1]. This research proposes a scalable cloud-native blueprint that
utilizes a Segregated Workload Strategy to address this issue. This architecture uses a Hybrid Routing mechanism: NGINX via gRPC for high-throughput biometric data ingestion, and Ocelot for efficient platform data aggregation [2]. To mitigate the "Thundering Herd" scenario amid hardware limitations, Kafka is implemented as an asynchronous shock absorber [3]. System reliability is further managed through an automated GitOps strategy on the RKE2 cluster [4], [5]. Validated through capacity planning on NVIDIA RTX 4060 Ti, this design is estimated to be able to accommodate a peak load of ≈130 req/s, which effectively prevents data loss through a queue-based load leveling mechanism.

CB0015

Different Optimization Methods for Solving the Rush Hour Puzzle

Alexander Gafirov, Rolf Dornberger and **Thomas Hanne**
University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Abstract-The rush hour puzzle is a widely recognized benchmark problem used to evaluate search algorithms in artificial intelligence. It presents a constrained, grid-based planning task that is known to be PSPACE-complete and serves as a useful model for studying computational complexity, heuristic search, and constraint satisfaction. This paper compares three optimization methods: Breadth-First Search (BFS), A*, and Greedy Best-First Search (GBFS) in their ability to solve rush hour puzzles efficiently. A Python-based prototype was developed to perform 100 benchmark runs on 6×6 and 9×9 grid configurations at hard difficulty. The analysis focuses on the solver success rate, timeouts, and normalized efficiency metrics, including time per step and nodes per step. The results show that GBFS consistently achieves the fastest performance with the highest solve rate, while A* offers a

balance between solution quality and runtime. BFS, although complete, struggles with scalability. These findings provide practical insights into the trade-offs between completeness, optimality, and computational efficiency in pathfinding under constraints.

CB0097

Empirical Evaluation of Software Task Effort Prediction Using Natural Language Descriptions

Surya Sujarwo, Haryono Soeparno, Yulyani Arifin and Ford Lumban Gaol
Bina Nusantara University, Indonesia

Abstract-This paper offers an empirically grounded analysis of machine learning models that predict effort directly from natural language task input to address the issue of software effort estimation with machine learning. Two different datasets, a proprietary commercial dataset (SiP) and the open-source JOSSE dataset, were used to test combinations of three embedding techniques (TF-IDF+SVD, Word2Vec, and BERT) and four classifiers (Random Forest, LightGBM, Histogram-Based Gradient Boosting, and Feed-Forward Artificial Neural Networks). Based on an improved 7-class effort classification, the assessment assesses 27,729 activities across 100 projects. The results show that the optimal embedding-classifier combination depends on the context. While BERT embeddings with LightGBM exhibit the highest overall performance globally (F1=0.355, AUC-ROC=0.787), BERT with Random Forest performs better when it comes to per-project deployment (average F1: 0.895 for SiP, 0.817 for JOSSE). All models demonstrated strong ranking ability (AUC-ROC>0.979), confirming their promise in case prioritization even though precise classification is still challenging. This paper also emphasizes how important data quality is, as commercial data produces predictions that are far more reliable. This paper may have an impact on the choice of embedding-classifier combinations for different projects and dataset scenarios.

CB0038

RankUplift: Ranking-Aware Two-Stage Learning for Optimal Targeted Interventions

Kangyang Luo and Huanhuan Chen
University of Science and Technology of China, China

Abstract-Uplift modeling aims to identify individuals who respond most positively to an intervention. While numerous methods have been proposed to estimate individual treatment effects (ITEs), most optimize for pointwise prediction accuracy, which misaligns with the practical goal of ranking individuals by responsiveness to enable effective targeting under budget constraints. Moreover, real-world observational data often suffer from selection bias and poor overlap, further degrading ranking quality when models prioritize absolute error over ordinal fidelity. To bridge this gap, we propose RankUplift, a two-stage framework that decouples causal effect estimation from ranking optimization. In the first stage, a robust ITE estimator generates surrogate labels; in the second stage, a scoring function is trained via the listwise ListNet objective to preserve global uplift ranking structure. We prove that under mild conditions, RankUplift asymptotically recovers the true ITE ranking and yields near-optimal top-k policies. Extensive experiments across benchmark and semi-synthetic datasets demonstrate consistent improvements over state-of-the-art baselines in both ranking metrics and practical targeting performance, confirming that aligning the learning objective with decision-making needs leads to superior real-world outcomes.

CB0124

Optimizing Query Tail Latency with Adaptive Timeout Strategies in Rails – Postgres Applications

Trias Mining Luthfiana and Ford Lumban Gaol
Bina Nusantara University, Indonesia

Abstract-Tail latency is still a big problem for database-backed web apps, especially when short transactional queries and longer analytical workloads are mixed together. In Ruby on Rails apps that use PostgreSQL, query execution timeouts are often set through static configuration, which sets a fixed threshold that doesn't change based on how the query behaves or how much work it has to do. Static timeout settings like these can cause queries to be canceled too soon or too much resource contention, both of which can make tail latency unstable. This paper looks into how well adaptive query timeout strategies work to lower tail latency in Rails PostgreSQL apps. We create a workload-aware adaptive timeout system that changes the deadlines for query execution based on how the program runs in real time and how it has run in the past. We test the proposed method by running controlled experiments with e-commerce-like workloads that show a mix of analytical and transactional query patterns. Experimental findings demonstrate that adaptive timeout strategies reduce high percentile response times, specifically P95 and P99, compared to static timeout configurations, while simultaneously decreasing unnecessary query cancellations under fluctuating workloads. The results show that using adaptive timeout techniques on database queries can make latency more stable and the system more reliable in Rails PostgreSQL environments.

CB0135

AI-Based Early Warning System for At-Risk Students in the College of Computer Studies at Carlos Hilado Memorial State University

Melanie G. Reynoso[1], El Jireh P. Bibangco[1], Maureen M. Villamor[2] and Christian John A. Moncera[3]
1. Carlos Hilado Memorial State University, Philippines
2. University of Southeastern Philippines, Philippines
3. University of Negros Occidental Recoletos, Philippines

Abstract-This study reports the design, implementation, and evaluation of an AI – based Early Warning System (EWS) for identifying at-risk students in the College of Computer Studies at Carlos Hilado Memorial State University, responding to the institutional challenge of late and reactive academic support mechanisms in Philippine higher education. Anchored in Design Science Research, the system employs a suite of regularized and linear predictive models to estimate course-level student performance using integrated academic, behavioral, and socio-demographic indicators, with at-risk status defined as a predicted final grade below the institutional passing threshold of 75%. The EWS was implemented as a secure, role-based web platform and rigorously evaluated along three dimensions: predictive accuracy (using MAE, MSE, and RMSE), software quality (via McCall's Software Quality Model), and user acceptance (via Technology Acceptance Model 2). Findings indicate that the regularized regression approaches provided stable, interpretable predictions across core and major courses. At the same time, the system consistently achieved high ratings in product operation, revision, and transition quality factors, alongside strong perceived usefulness, ease of use, and behavioral intention among students and faculty. This study contributes a practical, scalable, and replicable AI-driven EWS tailored to state universities in resource-constrained settings, advancing proactive academic intervention and equitable student success strategies.

CB0141

The Cognitive Impact of AI Chatbot Dependency Among Students

William Chandra and Andy Effendi
Binus University, Indonesia

Abstract-The usage of artificial intelligence (AI) chatbots in education has changed the way students access information and complete their academic tasks. While AI chatbots offer efficiency and convenience in helping students perform various task, students may have not realized that they are slowly getting dependent on AI chatbots and that dependency can affect their cognitive abilities. This research aims to examine the effects of AI chatbot dependency on student's cognitive engagement and critical thinking. The significance of this study lies in its contribution to understanding how reliance on AI assistance may influence student's cognitive abilities. This research uses a quantitative approach by using a survey method. Research data were collected from 150 students across various educational levels who are currently enrolled in various learning institutions. The questionnaire were distributed online and designed to measure students levels of AI chatbot dependency, cognitive engagement and critical thinking ability. The collected research data were analyzed using statistical techniques to identify the general patterns and the relationships between the variables. This research's results indicate that AI chatbot dependency has a visible influence on student's cognitive engagement and their critical thinking abilities. Overall, higher levels of AI dependency is associated with reduced cognitive abilities, which suggests the need for more guided use of AI chatbots in various learning institutions.

CB0108

An Impresiv AI – Driven Academic Data Assistant for Intelligent Academic Information Systems

Adli Abdillah Nababan[1], Kaisul F. Dewananda[2], Ince Ahmad Zarqan[1], Jefri Junifer Pangaribuan[1], Ryan Dhika Priyatna[3] and Harry Pratama Figna[3]
1. Bina Nusantara University, Indonesia
2. PT Wadah Inovasi Teknologi, Indonesia
3. STKIP Al Maksum, Indonesia

Abstract-The increasing digitalization of higher education has intensified the demand for academic information systems that are not only efficient but also intelligent, secure, and responsive to diverse stakeholder needs. Conventional academic data services often rely on static dashboards and manually defined workflows, resulting in limited flexibility, delayed access to information, and suboptimal support for academic decision-making. This paper aims to address these limitations by proposing an Impresiv AI – driven academic data assistant for intelligent academic information systems, designed to enable conversational, policy-aware, and automated access to academic data. The proposed approach integrates a messaging-based interface with an AI reasoning engine that performs intent detection, context extraction, access control reasoning, and dynamic workflow generation, while all data interactions are mediated through a secure, read-only query service. The system further supports intelligent output selection, delivering either concise textual responses or structured Excel reports based on request complexity and user needs. Experimental evaluation demonstrates that the proposed system improves response efficiency, automation rate, and usability compared to conventional academic data access mechanisms. The main

contribution of this work lies in introducing an AI-driven workflow governor that dynamically constructs academic workflows without static rule definitions, thereby enhancing flexibility, governance, and scalability. The proposed solution is applicable to higher education institutions seeking to modernize academic data services and support data-driven academic governance.

Session 9(Online)

February 8, 2026
Time Zone: GMT+8

Topic: Demand-Based Digital Retail and Dynamic Supply Chain Matching Strategies
Time: 16:30-18:15 (Duration for Each Presentation: 15 minutes) (GMT+8)
Zoom Link: https://us02web.zoom.us/j/87098705756
Session Chair:

Online

CB0016

Blockchain-Facilitated Supply Chains and Firm Competitiveness: The Mediating Role of Halal Supply Chain Performance in Indonesia's Food and Beverage Industry

Yosaphat Dedie Purwanto, Rula Alma Anjani and Darjat Sudrajat Sudrajat
Bina Nusantara University, Indonesia

Abstract-This research examines how Blockchain-Facilitated Supply Chains (BFSC) contribute to improving the performance of halal supply chains and enhancing firm competitiveness, particularly within Indonesia's halal food and beverage industry. The study focuses on three fundamental blockchain capabilities — traceability, adaptability, and agility—and analyzes their influence, both direct and mediated, on a firm's competitive position through halal supply chain performance. The application of blockchain is shown to increase operational efficiency, support halal standard compliance, and strengthen consumer trust. In addition, the study underlines the critical role of consumer perceptions, especially in terms of trust and awareness, in shaping purchasing behavior. By employing the PLS-SEM method, the study finds that traceability stands out as the most impactful factor, significantly boosting both competitiveness and halal supply chain effectiveness. Meanwhile, adaptability and agility exhibit significant effects on halal supply chain performance but do not directly enhance competitiveness. Furthermore, halal supply chain performance itself does not show a significant direct influence on competitiveness, implying that its role may be more indirect or context-dependent. These results support the view that traceability functions as a strategic asset in line with the Resource-Based View (RBV), offering transparency and compliance advantages that elevate competitive strength. While adaptability and agility enhance responsiveness and efficiency, they must be aligned with broader strategies or channeled through supply chain improvements to effectively impact competitiveness. This study contributes to the evolving discourse on halal supply chain strategy by underscoring traceability as a foundational element for building long-term trust, accountability, and strategic differentiation in an increasingly transparent and dynamic market landscape.

CB0018

Comparison of Static and Dynamic Order-Picking in Warehouse Systems

Mathusha Pathmanathan, Vlera Kica, **Thomas Hanne** and Rolf Dornberger
University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Abstract-This study examines the optimization of order-picking routes in warehouse logistics, with a focus on

comparing static and dynamic models. The objective is to determine how different methods impact computational costs and efficiency. While dynamic models offer greater flexibility but require higher computational effort, static models, which use fixed order lists, perform well under stable conditions. Despite advancements in dynamic routing, a direct comparison of the performance of Ant Colony Optimization and Nearest Distance Optimization under such conditions has not yet been conducted. This study analyzes their efficiency through a structured comparison of order-picking models. This comparison is based on a simulated warehouse setup with orders that arrive dynamically during the ongoing picking process.

CB0131

Optimizing Sales Strategies for MSMEs through Digital Payments in the Digital Era

Permata Rahayu Sampurno and Audio Valentino Himawan Mahendra
Bina Nusantara University, Indonesia

Abstract-This study aims to analyze strategies that can be employed to optimize sales for micro, small, and medium enterprises (MSMEs) through the adoption of digital payment systems. The approach used is descriptive qualitative, with data collected through observations and in-depth interviews with MSME operators who have implemented digital payment systems such as QRIS. Data analysis was conducted through processes of collection, reduction, presentation, and conclusion drawing. This research is expected to reveal how digital payments enhance transaction efficiency, expand market reach, and improve customer convenience, ultimately optimizing MSME sales. The findings of this study will provide strategic recommendations to support the development of MSMEs and enhance their competitiveness in the digital era.

CB0078

Digital Transformation for Circular and Sustainable Procurement: Applying the Interpretative Structural Modelling

Maricielo Vera[1], **Glenn Mamani[1]**, Edgar Ramos[1] and Donovan Fuqua[2]
1. Universidad Peruana de Ciencias Aplicadas, Peru
2. New Mexico State University, USA

Abstract-Digital transformation, the circular economy, and sustainability are reshaping procurement, yet research addressing their interdependencies remains scarce. This study develops an integrative framework to identify and structure the enablers of digital, circular, and sustainable procurement. Using Interpretive Structural Modelling (ISM), expert evaluations were applied to map hierarchical relationships among enablers such as technological readiness, supplier collaboration, regulatory compliance, and lifecycle thinking. Results reveal that managerial commitment and regulatory frameworks act as root enablers that drive the adoption of digital technologies and sustainability practices. The proposed ISM model contributes theoretically by clarifying causal linkages across procurement domains and practically by offering decision-makers a roadmap to align procurement strategies with digital and sustainability transitions.

CB0132

Smart AI-Driven Logistics Optimization and Sentiment Analysis The Role of Technology Trust and

Organizational Readliness in Enhancing Business Performance

Muhammad Irvan Firdaus and Murniati
Bina Nusantara University, Indonesia

Abstract-The growing adoption of artificial intelligence (AI) in logistics offers substantial potential to enhance efficiency and business performance, yet its impact depends on organizational and behavioral readiness. This study investigates how technology trust and organizational readiness strengthen the effects of smart AI-driven logistics optimization and sentiment analysis on business performance. Using an explanatory quantitative approach, data from logistics and supply chain professionals were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that AI adoption alone does not significantly improve logistics outcomes unless supported by high organizational readiness and user trust. AI-based sentiment analysis further enhances logistics efficiency by enabling data-driven and adaptive decision-making. The study concludes that aligning AI capabilities with trust and organizational preparedness is essential for achieving sustainable logistics performance and competitive advantage.

CB0079

Enhancing Resilience, Flexibility and Leagile: An empirical investigation in a Peruvian food supply chain company

Mariana Girón[1], Karla Soto[1], Edgar Ramos[1] and Victor Pimentel[2]
1. Peruvian University of Applied Sciences, Perú
2. New Mexico State University, USA

Abstract-Food supply chains increasingly face disruptions that challenge their flexibility, resilience, and leagility. Balancing these dimensions is critical, as prioritizing one in isolation can undermine overall performance and amplify food waste. Prior studies emphasize that enablers such as customer orientation, diversified sourcing, and information visibility are elemental to reinforce adaptive capacity. Building on this evidence, the present study evaluates and prioritizes 15 strategic criteria across these three dimensions in the context of a Peruvian food supply chain. Using the Best Worst Method (BWM) and expert judgment, the analysis identified Customer Focus (L5), Flexible Sourcing Strategy (R4), and Supply Chain Visibility (F5) as the most influential enablers in their respective dimensions. The results dwell on the role of real-time information sharing, supplier diversification, and consumer-driven operations in building a more adaptive and competitive supply chain capable of maintaining continuity and efficiency under volatile conditions.

CB0062

Price Optimization through Revenue Management in Service Businesses: Predictive Model Based on Demand and Seasonality

Aris Malca Morales, **Anderson Aliaga Medina** and Luis Angel Huaynarupay Alvarez
Universidad Continental, Perú

Abstract-This study proposes a predictive model for dynamic pricing based on the principles of Revenue Management to optimize management in service-oriented businesses. Under a quantitative approach and using data analysis, the solution was evaluated through two key metrics: the increase in total revenue and the occupancy

rate. The results showed a significant 12% increase in revenue (from 99,876 to 111,950 monetary units, $p < 0.05$) and a 7.5% improvement in occupancy rate (from 72.13% to 79.65%, $p < 0.05$). Through the use of statistical analyses, demand forecasting techniques, and scenario simulations, the model confirms its effectiveness in maximizing profitability and improving the utilization of available capacity. The findings highlight the relevance of applying analytical approaches to pricing management, offering a practical and scalable alternative to strengthen the competitiveness of service businesses in contexts of high demand variability.

Session 10(Online)

February 8, 2026
Time Zone: GMT+8

Topic: Enterprise Digital Operations and Intelligent Management
Time: 18:15-20:00 (Duration for Each Presentation: 15 minutes) (GMT+8)
Zoom Link: https://us02web.zoom.us/j/87098705756
Session Chair:

Online

CB0048

Enhancing SME Financial Accuracy through Prompt Engineering Services to Address Manual Recording Challenges (Phenomenological Study)

Khalid Muhammad Alfarisi and Riza Rizqiyah
Bina Nusantara University, Indonesia

Abstract-The majority of Indonesian Small to Medium Enterprises (SMEs) still remain on using manual financial recording despite digital tools being widespread and available to access, resulting in hindered efficiency and data inaccuracies. AI technology are currently on the rise, creating new jobs on tuning AI to fit individual needs. Earlier studies predominantly focuses on AI adoption in large enterprises, overlooking prompt engineering potentials as a bridge on smaller enterprise digitalization. This research gaps are addressed through this research by studying the lived experiences and operational workflows of seven Small to Medium Enterprise (SME) owners and accountant to identify resistance factors and adoption perquisites through a phenomenological approach. High AI enthusiasm and low technical readiness are revealed in this research, currently 70% of the participants uses manual/hybrid recording. The research also reveal that tiered prompt engineering service monetization to be crucial, it helps improving financial accuracy by 27.3% and predictability by 34.5%. This research shows scalable monetization processes that match high-level computational intelligence with technical and resource-based limitations of emerging economies, therefore supporting SDG 8 and SDG 9.

CB0011

Loot Boxes System: The Algorithm, Players' Consumption Psychology and Social Controversy Behind It

Haoyu Cheng[1], Shaojie Zheng[2] and Taining Su[3]
1. Central South University, China
2. Chengdu University of Technology, China
3. University of California San Diego, China

Abstract-Loot boxes, which are randomized in-game rewards that can be purchased, have garnered increasing academic and policy attention as a result of their intricate intersections with regulation, economics, psychology, and algorithmic design. This review integrates the results of three representative studies to investigate the psychological effect of loot box pricing on participants, the mechanisms behind it, and the broader societal

implications. Economic models illustrate that firms can capture a significant portion of consumer surplus by implementing specific pricing structures, particularly those that involve nonrepeating ” unique ” containers. Psychological analyses underscore that engagement is concurrently influenced by gambling-related perceptions, impulsivity, and flow states, while both positive and negative emotions increase behavioral risks. Empirical evidence also indicates that there are significant correlations between loot box engagement, the severity of problem gambling, and internet gaming disorder, particularly among adolescents. Regulatory responses vary significantly across jurisdictions. Together, the literature emphasizes the necessity of evidence-based regulation, enhanced measurement of psychological risk factors, and transparent algorithmic practices in treasure box design.

CB0064

Enhancing Task Logging and Quality Monitoring through Voice and AI-based Systems

Cadelina Cassandra, Raden Muhammad Hadi Suryo Suharto, Indrajani Sutedja and **Richard Wiputra**
Bina Nusantara University, Indonesia

Abstract-In modern industrial operations, quality monitoring are essential for maintaining efficiency and enhance productivity. However, many process still rely on manual, paper-based methods that cause delays, human errors, and inefficiencies. This paper aims to design the intelligent system by leveraging artifical intelligence to automate key aspects of industrial data documentation and analysis through voice recognition, real-time dashboards, and AI-generated report to solved the problems. The methodology built around the analysis and design for the application. As a result, the proposed intelligent system using voice-based task logging to capture the activities and provide early warning systems, as well as a real – time quality monitoring application to improved operational visibility and decision making in dashboard visualization. Initial testing showed that real-time alerts and AI-driven forecasting enhanced decision-making processes and increased overall productivity. This study highlights the potential of integrating voice and AI technologies to modernize industrial environments and support more responsive, data-driven operations.

CB0060

Technological Model Supported by Enterprise Architecture to Improve User Experience in Public Transportation Services Through Digital Tools and Geolocation

YERSIN GABRIEL LIMAS GONZALO, DANIEL QUINTO APAICO, JOSE LUIS JULIAN DAGA and ARIS MALCA MORALES
Universidad Continental, Perú

Abstract-This study proposes a mobile application – based technological model to optimize shared transportation services through digital registration, real-time geolocation, automated seat management, and dynamic route monitoring. Following an applied technological research approach, the system was tested with simulated operational data, showing a 38.8% reduction in average passenger waiting time (from 8.5 to 5.2 minutes, $p < 0.05$). By integrating GPS, Mobile GIS, and IoT-based monitoring, the platform enables real-time interaction between drivers and passengers, improving coordination, reducing uncertainty, and enhancing service reliability. The results highlight the potential of combining intelligent transportation technologies with user-centered design to improve operational efficiency and user satisfaction in urban mobility.

CB0127

Web-Based Inventory Management for SME using Rapid Application Development for Enhanced Usability and Efficiency

Jeremy Shawn and Jeklin Harefa
Bina Nusantara University, Indonesia

Abstract-Small Medium Enterprises (SMEs) businesses often face challenges in manage inventory due to limited digital infrastructure and reliability on manual method or management. These challenges reduce data accuracy, delay stock updates, and delays over operational decision making. This study represents the development of a web-based inventory management application designed to support Small Medium Enterprises on improving operational management more efficient with features stock visibility, and transaction accuracy, stock-in and stock-out with literature review. The study and research use Rapid Application Development (RAD) methodology, shows emphasizes short iterative prototyping, continuous user feedback. The development is structured and divided into four stages consists of requirement planning, user design, construction phase, and cutover phase. Functional requirements were used for stock-in/out transactions and reports were collected with structured interviews and observations by Small Medium Enterprise owners. Implementation were assessed using the Unified Theory of Acceptance and Use of Technology (UTAUT) model also applied to measure its model. Results shows satisfaction on its functional requirements and shows positive acceptance that also shows strong behavioral intention for adopting with the Small Medium Enterprises.

CB0063

Methodological framework for the integration of augmented reality in the training of operators for optimal drill pattern design in underground mining

Aldair Rai Cuba Cardenas and Yovana Torres Gonzales
Universidad Continental, Perú

Abstract-This study presents a methodological framework for integrating Augmented Reality (AR) into the technical training of underground mining operators, aiming to optimize the design and execution of drill patterns. A practical AR-based simulator was developed to reproduce realistic geomechanical conditions of the underground environment, allowing trainees to visualize and adjust critical parameters such as angle, spacing, and depth of drilling holes in a safe, controlled, and repeatable context. Forty participants were divided into two groups: one trained using the AR simulator and the other through conventional instruction. Statistical analysis with the Shapiro – Wilk test and independent-samples t-test demonstrated that the AR-trained group achieved higher drilling accuracy (91.9 %), reduced execution time (13.15 min), and fewer operational errors (1.28 per session) compared to the control group. The results confirm that augmented reality constitutes an effective technological application for improving technical performance and safety in underground mining operations, contributing to more efficient and reliable training processes in industrial environments.

Notes

CONFERENCE

IEAI 2026

2026 7th International conference on Industrial Engineering and Artificial Intelligence

April.23-25/2026

Krabi, Thailand

https://ieai.net/index.html

Introduction

The 7th International Conference on Industrial Engineering and Artificial Intelligence (IEAI 2026) will be held in Krabi, Thailand, 23-25 April , 2026. It is a premier forum dedicated to the convergence of industrial engineering and artificial intelligence (AI). As industries worldwide rapidly adopt AI to enhance efficiency, productivity, and innovation, this conference aims to explore the latest advancements, research, and applications at this intersection.

Topics

- Applications of AI in Industrial Engineering
- Industrial Optimization and AI
- AI for Quality Control and Safety in Industry
- Artificial Intelligence in Industrial Supply Chains
- Smart Manufacturing and IoT
- Industrial Robotics and Autonomous Systems
- AI in Industrial Process Automation
- AI and Industrial Cybersecurity

For more topics, please visit :

https://ieai.net/cfp.html

Important Dates

Submission Deadline:
February 10, 2026
Acceptance Notification:
February 2, 2026
Registration Deadline:
February 28, 2026

Keynote Speakers

Prof. Maged M. Dessouky
University of Southern California, USA

Prof. Yang XU
Peking University, China

Publication & Submission

All accepted papers, after registration and presentation, will be published into IEAI 2026 Conference Proceeding, which will be submitted to be indexed by Ei Compendex and Scopus.
Submission Methods (Only choose 1):
① https://www.zmeeting.org/submission/IEAI2026
②ieai@acm-sg.net

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