2026 14th International Conference on Information Management and Engineering (ICIME 2026) & 2026 8th International Conference on Big Data Engineering (BDE 2026)

August 5-7, 2026

Yokohama, Japan

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Welcome Message

On behalf of the organizing committee, it is our great honor and pleasure to welcome you to the 2026 14th International Conference on Information Management and Engineering (ICIME 2026) and the 2026 8th International Conference on Big Data Engineering (BDE 2026), taking place from 5th to 7th August 2026 at Keio University, Japan (Yagami Campus).

ICIME&BDE 2026 brings together leading experts, researchers, and practitioners from around the globe to share cutting-edge advancements, innovative ideas, and collaborative insights in the fields of Information Management and Engineering and Big Data Engineering. This conference serves as a premier platform for fostering interdisciplinary discussions, exploring emerging technologies, and addressing the challenges and opportunities in these rapidly evolving domains.

We are delighted to host this event at the prestigious Keio University, a hub of academic excellence and innovation. The vibrant city of Yokohama, with its rich cultural heritage and technological advancements, provides an inspiring backdrop for this gathering of minds.

Over the course of three days, you will have the opportunity to engage in keynote speeches, technical sessions, all designed to facilitate knowledge exchange and collaboration. We are confident that the diverse perspectives and expertise represented here will lead to meaningful discussions and groundbreaking outcomes.

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

We wish you a productive, inspiring, and enjoyable conference experience. Welcome to ICIME&BDE 2026!

ICIME&BDE 2026 Organizing Committee
August 2026

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Guideline for Onsite Attendance

Important Notes

- Please enter the meeting room at least 15 minutes before your session. Your punctual arrival and active involvement will be highly appreciated.
- Please wear your name tag for all the conference activities. Lending it to others is not allowed. If you have any companying person, please do inform our staff in advance.
- Please keep all your belongings (laptop and camera etc.) at any time. The conference organizer does not assume any responsibility for the loss of personal belongings.
- Please show name tag and meal coupons when dining.
- Due to force majeure including but not limited to earthquake, natural disaster, war and country policy, the organizer reserves the rights to change the conference dates or venue with immediate effect and takes no responsibility.

Oral & Poster Presentation

- Regular oral presentation: 15 minutes (including Q&A).
- Get your presentation PPT or PDF files prepared. Presentations MUST be uploaded at the session room at least 15 minutes before the session starts.
- Laptop (with MS-Office & Adobe Reader), projector & screen, laser pointer will be provided in all oral session rooms.
- Poster Presenters should bring your poster to the conference venue and put it on designated place.

Guideline for Online Attendance

Platform: Zoom

- Step 1: Download Zoom from the link: https://zoom.us/download

How to use Zoom

* 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.

- Rename: Before you enter the conference room, please change your name to Paper ID + Name
- Chat and raise your hand: During the session, if you have any questions, please let us know by clicking “raise your hands” and use “chat” to communicate with conference secretary.
- When you deliver your online speech, please open your camera.
- During the Question section, if you have any questions about keynote speakers or authors, you can also click “raise your hands” or “chat”
- Share Screen: Please open your power point first, and then click “share screen” when it’s your turn to do the presentation.

How to join the conference online

- Find your paper ID and suitable meeting ID on the conference program.
- Open the Zoom, click the join, paste the meeting ID, then you can join the conference.
- Click the stop share after you finish your presentation

Time Zone

- **Japan Standard Time (GMT+9)**

Device

- A computer with an internet connection (wired connection recommended)
- USB plug-in headset with a microphone (recommended for optimal audio quality)
- Webcam: built-in or USB plug-in

Online Room Information

Online Room Information

Zoom ID: **870 2111 4233**

Zoom Link: **https://us02web.zoom.us/j/87021114233**

* Please rename your Zoom Screen Name in below format before entering meeting room.

Role	Format	Example
Conference Committee	Position-Name	Conference Chair-Prof.
Keynote/ Invited Speaker	Position-Name	Keynote/Invited Speaker-Prof.
Author	Session Number-Paper ID-Name	S1-IM0001-Name
Delegate	Delegate-Name	Delegate-Name

Conference Venue

Keio University, Japan (Yagami Campus)

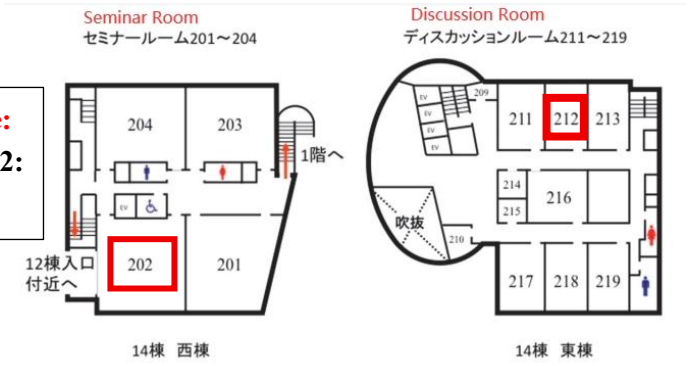
https://www.keio.ac.jp/en/

Address: Address: 3-14-1 Hiyoshi, Kohoku-ku, Yokohama, Kanagawa 223-8522, Japan

Conference Rooms

Rooms	Activities	Time (GMT+9)
Discussion Room 2, 2nd Floor, 14th Building	Registration	13:00-16:30 August 5th
Seminar Room 2, 14th Building	Opening Remark & Keynote Speeches & Invited Speech	9:00-17:45 August 6th
	Session 1 & Session 2 & Poster Session & session 3	

Conference Venue:
Seminar Room 2: 202



Conference Venue:
Discussion Room 2: 212

Discussion Room 2 is in the east tower of the 14th building, and Seminar Room 2 is in the west building of the 14th building.

The organizer doesn't provide accommodation, and we suggest you make an early reservation.

Conference Building

https://www.keio.ac.jp/en/about/campus/yagami/map/

14th Building: Sosokan

Simple Program

August 5, 2026 (Wednesday)

Onsite Registration

Registration Time: 13:00-16:30

Venue: Keio University, Japan (Yagami Campus)

Conference Room: Discussion Room 2, 2nd Floor, 14th Building

Address: 3-14-1 Hiyoshi, Kohoku-ku, Yokohama, Kanagawa 223-8522, Japan

1. Arrive at Conference Room DR2, 2nd Floor, 14th Building, Keio University, Japan (Yagami Campus);

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.

Online Test Time Zone: GMT+9

Online Test **Zoom ID: 870 2111 4233** **Link: https://us02web.zoom.us/j/87021114233**	**Duration**
Prof. Zheng Yan	10:30-10:40
Prof. Amiya Kumar Tripathy	10:40-10:50
Online Session (IM0005, IM0021, IM0023, IM0024, IM5001, IM5002, IM5013, IM0030, IM0031)	10:50-11:35

Note: If you want to do online zoom test after 12:00, please contact your conference secretary.

August 6, 2026 (Thursday)

Morning Sessions Venue: Seminar Room 2, 2nd Floor, the west building of the 14th building		Duration
Opening Remark	General Chair Prof. Tomoaki Otsuki, Keio University, Japan	9:00-9:05
Keynote Speech 1	Prof. Shyi-Ming Chen, Asia University Speech Title: Fuzzy Forecasting Based on High-Order Fuzzy Time Series and Genetic Algorithms	9:05-9:45
Keynote Speech 2	Prof. Hiroki Matsutani, Keio University, Japan Speech Title: On-Device Learning for Edge AI: From Algorithms to Practical Applications	9:45-10:25
Invited Speech 1	Prof. Seungshik Kang, Kookmin University, Republic of Korea Speech Title: Recent Research Issues in Natural Language Processing and Large Language Models	10:25-10:45
10:45-11:00 Coffee Break		

Parallel Sessions		
11:00-12:00	**Session 1:** Applications of Generative AI in Organizational Management and Education **Session Chair:** Associate Prof. Jai Woo Lee, Korea University, Republic of Korea **Presentations:** IM0003, IM0008, IM0009-A, IM0026	**Seminar Room 2**
12:00-13:15	**Lunch Time**	

13:15-15:30	**Session 2:** AI-Driven Intelligent Information Systems: User Experience Analysis, Technology Acceptance Models, and Consumer Behavior Analysis **Session Chair:** Prof. Chieh-Peng Lin, National Yang Ming Chiao Tung University **Presentations:** IM0015-A, IM0036, IM0019, IM0028, IM0014-A IM0032-A, IM0035, IM0034, IM0016-A	**Seminar Room 2**
15:30-15:45	**Coffee Break & Poster Session** **Topic: AI-Based Cross-Domain Data Analysis and Optimization Algorithms** **Presentations: IM0001-A, IM5012-A, M5015-A**	
15:45-17:45	**Session 3:** Big Data Platform Architecture and High-Performance Retrieval Optimization Techniques **Session Chair:** Prof. Seungshik Kang, Kookmin University, Republic of Korea **Presentations:** IM5003, IM5005-A, IM5006, IM5009-A, IM5017, IM5014, IM5016, IM0004-A	**Seminar Room 2**
17:45-19:00	**Dinner Time**	

Note:

(1) One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session by Session Chairs.

(2) Regular each Presentation: about 15 Minutes including 2-3 Minutes for Question and Answer.

August 7, 2026 Online (GMT+9)

Morning Sessions		Duration
Online Speeches and online sessions **Zoom ID: 870 2111 4233** **Zoom link: https://us02web.zoom.us/j/87021114233**		
Keynote Speech	Prof. Zheng Yan, Xidian University, China (IEEE Fellow, IET Fellow, AAIA Fellow, and AIIA Fellow) Speech Title: Decentralized Trust Management with Privacy Preservation	14:00-14:40
Invited Speech	Prof. Amiya Kumar Tripathy, Don Bosco Institute of Technology, India Speech Title: Agentic AI Powered by Big Data Ecosystems: Architecting the Next Generation of Autonomous Intelligence	14:40-15:00
Online Session	**Topic:** Multimodal Sensing and Understanding for Agricultural and Biomedical Applications **Session Chair:** Prof. Amiya Kumar Tripathy, Don Bosco Institute of Technology, India **Presentations:** IM0005, IM0021, IM0023, IM0024, IM5001, IM5002, IM5013, IM0030, IM00031	15:00-17:15

Detailed Program

August 6, 2026 (Thursday)

Opening Remark

9:00-9:05	**Opening Remark**
Venue	**Seminar Room 2, 14th Building**

Prof. Tomoaki Otsuki

Keio University, Japan

Tomoaki Otsuki (Ohtsuki) received the B.E., M.E., and Ph. D. degrees in Electrical Engineering from Keio University, Yokohama, Japan in 1990, 1992, and 1994, respectively. From 1994 to 1995 he was a Post Doctoral Fellow and a Visiting Researcher in Electrical Engineering at Keio University. From 1993 to 1995 he was a Special Researcher of Fellowships of the Japan Society for the Promotion of Science for Japanese Junior Scientists. From 1995 to 2005 he was with Science University of Tokyo. In 2005 he joined Keio University. He is now a Professor at Keio University. From 1998 to 1999 he was with the department of electrical engineering and computer sciences, University of California, Berkeley. He is engaged in research on wireless communications, optical communications, signal processing, and information theory. Dr. Ohtsuki is a recipient of the 1997 Inoue Research Award for Young Scientist, the 1997 Hiroshi Ando Memorial Young Engineering Award, Ericsson Young Scientist Award 2000, 2002 Funai Information and Science Award for Young Scientist, IEEE the 1st Asia-Pacific Young Researcher Award 2001, the 5th International Communication Foundation (ICF) Research Award, 2011 IEEE SPCE Outstanding Service Award, the 27th TELECOM System Technology Award,

ETRI Journal's 2012 Best Reviewer Award, 9th International Conference on Communications and Networking in China 2014 (CHINACOM '14) Best Paper Award, 2020 Yagami Award, The 26th Asia-Pacific Conference on Communications (APCC2021) Best Paper Award, and International Conference on Internet of Things, Communication and Intelligent Technology (IoTCIT) 2024 Best Paper Award. He has published more than 276 journal papers and 518 international conference papers. He served as a Chair of IEEE Communications Society, Signal Processing for Communications and Electronics Technical Committee. He served as a technical editor of the IEEE Wireless Communications Magazine and an editor of Elsevier Physical Communications. He is now serving as an Area Editor of the IEEE Transactions on Vehicular Technology and an editor of the IEEE Communications Surveys and Tutorials. He is also serving as the IEEE Communications Society, Asia Pacific Board Director. He has served as general-co chair, symposium co-chair, and TPC co-chair of many conferences, including IEEE GLOBECOM 2008, SPC, IEEE ICC 2011, CTS, IEEE GLOBECOM 2012, SPC, IEEE ICC 2020, SPC, IEEE APWCS, IEEE SPAWC, and IEEE VTC. He gave tutorials and keynote speeches at many international conferences including IEEE VTC, IEEE PIMRC, IEEE WCNC, and so on. He was Vice President and President of the Communications Society of the IEICE, also he was a distinguished lecturer of the IEEE. He is a fellow of the IEICE, a Fellow of Asia-Pacific Artificial Intelligence Association (AAIA), a senior member of the IEEE, and a member of the Engineering Academy of Japan.

Keynote Speech 1

Time	**9:05-9:45, August 6, 2026**
Venue	**Seminar Room 2, 14th Building**

Prof. Shyi-Ming Chen

Asia University

Shyi-Ming Chen is a Chair Professor in the Department of Computer Science and Information Engineering, Asia University, Taichung, Taiwan. He received the Ph.D. degree in Electrical Engineering from National Taiwan University, Taipei, Taiwan, in June 1991. He is an IEEE Fellow, an IET Fellow, an IFSA Fellow, an AAIS Fellow, an IETI Distinguished Fellow, a Member of the National Academy of Artificial Intelligence (NAAI), and a Fellow of the Pakistan Academy of Engineering (PAE). He was a Chair Professor in the Department of Computer Science and Information Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan. He was the Dean of the College of Electrical Engineering and Computer Science, Jinwen University of Science and Technology, New Taipei City, Taiwan. He was the Vice President of the National Taichung University of Education, Taichung, Taiwan. He was the President of the Taiwanese Association for Artificial Intelligence (TAAI). He was the President of the Taiwanese Association for Consumer Electronics (TACE). He has published more than 600 papers in referred journals, conference proceedings and book chapters. His research interests include Fuzzy Systems, Intelligent Systems, Fuzzy Decision Making, Computational Intelligence, Knowledge-Based Systems, Machine Learning, Deep Learning, Data Mining, Big Data Analysis, Genetic Algorithms, and Particle Swam Optimization Techniques.

He is an Associate Editor of IEEE Transactions on Fuzzy Systems, an Associate Editor of IEEE Transactions on Cybernetics (2019-2024), an Associate Editor of the IEEE Transactions on Systems, Man, and Cybernetics: Systems, an Associate Editor

of IEEE Transactions on Artificial Intelligence, an Associate Editor of Knowledge-Based Systems, an Associate Editor of Expert Systems with Applications, an Associate Editor of Information Fusion, an Associate Editor of International Journal on Artificial Intelligence Tools, an Associate Editor of International Journal of Pattern Recognition and Artificial Intelligence, an Associate Editor of International Journal of Fuzzy Systems (2003-2024), an Associate Editor of Journal of Information Science and Engineering, an Associate Editor of Fuzzy Optimization and Decision Making (2016-2024), an Associate Editor of Knowledge and Information Systems (2016-2025), an Editor of International Journal of Intelligent Systems, an Editor of Engineering Applications of Artificial Intelligence (2022-2025), an Editor of Applied Computational Intelligence and Soft Computing, and an Associate Editor of International Journal of Computational Intelligence and Applications.

Speech Contents

Speech Title: Fuzzy Forecasting Based on High-Order Fuzzy Time Series and Genetic Algorithms

Abstract: In our daily life, we often use forecasting techniques to predict the weather, the earthquakes, the stock, the temperature, .., etc. Many methods have been presented to deal with forecasting problems. The drawbacks of the traditional forecasting methods are that they cannot deal with forecasting problems whose historical data are linguistic values and their forecasting accuracy rates are not good enough. In this talk, we will present a method for temperature prediction and TAIFEX forecasting based on two-factors high-order fuzzy time series and genetic algorithms. The proposed method gets higher forecasting accuracy rates than the ones obtained by the existing methods. We also will point out some future research directions in this talk.

Keynote Speech 2

Time	**9:45-10:25, August 6, 2026**
Venue	**Seminar Room 2, 14th Building**

Prof. Hiroki Matsutani

Keio University, Japan

Hiroki Matsutani received the BA, ME, and PhD degrees from Keio University, Yokohama, Japan, in 2004, 2006, and 2008, respectively. He is currently a Professor in the Department of Information and Computer Science at Keio University. His research interests include computer architecture, interconnection networks, hardware accelerators, and machine learning algorithms.

Speech Contents

Speech Title: On-Device Learning for Edge AI: From Algorithms to Practical Applications

Abstract: We are working on on-device learning technologies that enable AI models to train and adapt directly on edge devices with limited computational resources. This approach to on-device learning is highly effective when there is a discrepancy between the training data available beforehand and the data actually collected in the field. It is characterized by its ability to update models on-site to adapt to environmental changes and individual differences. In recent years, AI chips equipped with on-device learning capabilities have emerged, and their commercialization and mass production are steadily progressing. In this presentation, we will introduce on-device learning, covering everything from its underlying algorithms to its practical applications

Invited Speech 1

Time	**10:25-10:45, August 6, 2026**
Venue	**Seminar Room 2, 14th Building**

Prof. Seungshik Kang

Kookmin University, Republic of Korea

He received B.S., M.S., and Ph.D. degrees in Computer Science from Seoul National University in 1986, 1988 and 1993, respectively. He is working for Kookmin University as a full professor. His research interests include natural language processing, text mining, big data processing, and machine learning.

His doctoral dissertation focused on Korean morphological analysis, and the new algorithm he proposed laid the foundation for the development of a practical Korean morphological analyzer. He has made significant contributions to the field of Korean information processing, and the morphological analyzer he developed has been widely used as a Hangul indexer in domestic and international search engines.

Recently, his interest in deep learning NLP is Hangul tokenization and embedding techniques. He is studying the impact of tokenizer performance on the learning speed and accuracy of deep learning NLP systems..

Speech Contents

Speech Title: Recent Research Issues in Natural Language Processing and Large Language Models

Abstract: Recently, the field of natural language processing has been undergoing rapid changes due to the advancement of transformer-based large language models. Transformers utilize a self-attention mechanism to simultaneously learn the relationships between all words within a sentence, serving as the foundational technology for subsequent BERT and GPT models. In particular, GPT models have significantly improved natural language generation capabilities through large-scale data and parameter expansion, enabling them to perform various tasks such as human-like text generation, question answering, translation, and code writing. However, the advancement of LLMs signifies more than just simple performance improvements. Issues such as increased computational costs due to larger model sizes, bias in training data, hallucination, and a lack of inference ability continue to be raised. While early LLM research focused on expanding model size and increasing pre-training data, recent research directions have expanded to include enhancing inference capabilities, efficient learning methods, retrieval-augmented generation, multimodal processing, agent systems, and input representation optimization. However, LLM still faces limitations such as hallucinations, high computational costs, data quality issues, and differences in expression across languages, and recent research is shifting in the following directions. First, research is focusing on efficient learning and inference methods rather than increasing model size. Second, the direction of research is shifting from simple language generation to the development of models equipped with complex reasoning capabilities. Third, research on agent-based systems capable of external knowledge retrieval and tool utilization is expanding. Fourth, research on tokenization and input representation to improve language expression itself is becoming increasingly important. This study systematically analyzes these latest trends in NLP research and suggests research directions that should be considered specifically in the Korean language environment. In particular, in non-English languages like Korean, linguistic characteristics such as morpheme structure, conjugations of particles and endings, compound nouns, and spacing variations have a significant impact on model performance. This study analyzes major recent research trends in the fields of NLP and LLM, and examines inference-centric models, efficient learning, knowledge retrieval-based generation, multimodal models, semantic-based tokenization, and research directions specific to the Korean language. Furthermore, it is suggested that optimizing data quality and language representation methods will become important research tasks in future NLP research, rather than simply expanding model size.

Keynote Speech 3 (Online)

Time	**14:00-14:40, August 7, 2026 (GMT+9)**
Zoom ID	**870 2111 4233**
Zoom Link:	**https://us02web.zoom.us/j/87021114233**

Prof. Zheng Yan (IEEE Fellow, IET Fellow, AAIA Fellow, and AIIA Fellow)

Xidian University, China

Dr. Zheng Yan is currently a Distinguished Professor at Xidian University, China. She earned the Doctor of Science in Technology from Helsinki University of Technology. She is a Stanford World top 2% scientist, an Elsevier highly cited Chinese researcher, and a ScholarGPS World Top 0.05% Highly Ranked Scholar. Her research interests are in trust, security, privacy, and data analysis. She has published more than 470 papers in prestigious journals and conferences, with 300+ as the first or corresponding author. She has authored two English books, used for teaching for nearly a decade. She invented 220+ patents including 50 PCT patents, with more than 150 patents adopted by industry, most of them are solely invented by her. Some of these patents have entered international standards and widely used. She has received numerous awards, including the Nokia Distinguished Inventor, IEEE TCSC Award for Excellence, IEEE HITC Industrial Impact Award, IEEE TEMS Distinguished Leadership, N²Women Star in Computer Networking and Communications, three EU awards, two IEEE TC best journal paper awards, Shaanxi Natural Science Award, etc. She is currently a member of IEEE Fellow Committee. She serves as a Co-EiC of Information Sciences and an Area Editor/Associate Editor for 60+ esteemed journals. She founded the IEEE International Conference on Blockchain and serves as its Steering Committee Co-chair. She has contributed to more than 50 conferences as a General Chair or TPC Chair and delivered more than 50 keynotes and invited talks. She is a Member of Finnish Academy of Science and Letters, and a Fellow of IEEE, IET, AAIA, and AIIA.

Speech Contents

Speech Title: Decentralized Trust Management with Privacy Preservation

Abstract: Blockchain provides a decentralized, tamper-resistant, and transparent ledger that enables secure, trustworthy, and auditable data sharing among mutually untrusted parties without relying on a central authority. As one of the most influential decentralized technologies, blockchain has shown tremendous potential across a wide range of applications, with decentralized trust management being a particularly promising area. However, its inherent transparency and openness also introduce significant privacy challenges, making privacy preservation a fundamental research issue. Although substantial progress has been made, many open problems remain, especially in achieving privacy-preserving decentralized trust management.

In this talk, I will present our recent research on blockchain-based decentralized trust management with privacy preservation in two representative application scenarios: cross-chain transactions and integrated heterogeneous networks. I will introduce the key techniques we have developed to address these challenges and demonstrate their effectiveness through proofs, experiments and several prototype systems. Some of these prototypes have already been transferred to a leading telecommunications company for further development and practical deployment.

Invited Speech 2 (Online)

Time	**14:40-15:00, August 7, 2026 (GMT+9)**
Zoom ID	**870 2111 4233**
Zoom Link:	**https://us02web.zoom.us/j/87021114233**

Prof. Amiya Kumar Tripathy

Don Bosco Institute of Technology, India

Dr. Amiya Kumar Tripathy is Professor of Computer Engineering and Dean (Research & Innovation) at Don Bosco Institute of Technology (DBIT), Mumbai, India. He received his Ph.D. from IIT Bombay and has over 30 years of distinguished experience spanning industry, research, innovation, and academia. His research lies at the intersection of Agentic AI, Big Data Engineering, Computer Vision, Remote Sensing, and Intelligent Decision Support Systems, etc.

As the head of the DBIT Incubation Centre, Dr. Tripathy drives innovation, technology commercialization, startup incubation, and AI-enabled digital transformation for industry and Small & Medium Enterprises (SMEs). Earlier, he served as Joint Director of Techgalant Consultancy Pvt. Ltd., leading enterprise technology initiatives and industrial R&D. He previously served as Director of the Centre for GeoAI & Machine Learning and Dean of Research & Development, where he significantly enhanced institutional research capacity, interdisciplinary collaboration, innovation, and research programs.

Dr. Tripathy has established strong international research collaborations, serving as Adjunct Professor at Edith Cowan University, Australia, and Research Mentor for the IoT-enabled Remote Monitoring for Precision Agriculture project at Rajamangala University of Technology, Thailand. He was also a Researcher in the Indo–Japan collaborative project that developed GeoSense, a near real-time decision support system for precision agriculture, contributing to advanced research in data assimilation towards an intelligent climate-resilient decision-support systems (DSS). Additionally, he served as an IT Advisory Committee Member for the Krishi-DSS Project under the Digital Agriculture Division, Ministry of Agriculture, Government of India, supporting AI- and

Big Data-driven decision support for smart agriculture.

Dr. Tripathy has supervised 10 Ph.D. scholars, published more than 160 peer-reviewed research papers, and led numerous nationally and internationally funded research and consultancy projects. An ACM Professional Member, Advisory Panel Member of the IoT Society of India, and former Chairman of the IEEE Geoscience and Remote Sensing Society (GRSS), Bombay Chapter, he actively contributes to the global research community as an editor, reviewer, keynote speaker, Program Chair, Track Chair, etc..

Speech Contents

Speech Title: Agentic AI Powered by Big Data Ecosystems: Architecting the Next Generation of Autonomous Intelligence

Abstract: The rise of Agentic Artificial Intelligence (Agentic AI) is changing the landscape of Big Data Engineering, with AI evolving from predictive models to autonomous systems that can reason, plan, use tools, and make adaptive decisions. With the increasing reliance of enterprises on massive, heterogeneous and real-time data, the main challenge is to engineer scalable data ecosystems for autonomous intelligence with efficiency, trustworthiness and governance.

This talk offers a technological foundation for building intelligent, context-aware systems by integrating Large Language Models (LLMs), Retrieval-Augmented Generation (RAG), knowledge graphs, vector databases, event-driven stream processing, data lakehouses, edge-cloud computing, and multi-agent architectures. This framework enables autonomous agents to perform semantic reasoning, long-term memory management, dynamic workflow orchestration, and collaborative problem solving within distributed environments. The discussion goes on to explore how these technologies can address critical enterprise challenges such as fragmented data infrastructures, interoperability, cybersecurity, and resource constraints, especially for Small and Medium Enterprises (SMEs) looking for cost-effective ways to adopt AI.

It also discusses emerging research challenges such as agent coordination, explainability, privacy preserving analytics, AI governance, energy efficient computing and secure deployment. The session ends with a vision of self-evolving cognitive ecosystems, where interconnected autonomous agents learn, collaborate and optimize decisions over distributed Big Data platforms, thus laying the architectural foundation for the next generation of trustworthy, scalable and autonomous intelligent systems.

Session 1 (11:00-12:00)

Topic: Applications of Generative AI in Organizational Management and Education
Time: 11:00-12:00, August 6, 2026
Session Chair: Associate Prof. Jai Woo Lee, Korea University, Republic of Korea
Venue: Seminar Room 2, 14th Building

***Presenters are recommended to enter the meeting room 10 mins in advance.**
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IM0003

Quantifying Employee Problem Recognition Concentration in Corporate Spin-offs Using Zipf's Law

Naoko Sakamaki and Kazuhiko Tsuda
University of Tsukuba, Japan

Abstract- Understanding employee perceptions during organizational restructuring is crucial for successful corporate transformation. While conventional text mining approaches identify frequent themes through word frequency analysis, they struggle to capture underlying patterns in vocabulary distribution. This study applies Zipf's law to quantify the degree of concentration in employee problem recognition, with the Zipf slope serving as a quantitative indicator of whether employee perceptions are concentrated or dispersed. We analyzed 1,451 free-text survey responses from employees of a Japanese manufacturing company following a corporate spin-off. Of these, 1,069 responses with valid category selections and analyzable text were used for category-level Zipf analyses across nine organizational categories: strategy and direction, business processes and organizational structure, organizational culture and communication, resources, leadership, collaboration, quality and customer focus, performance management, and employee surveys. All categories exhibited strong adherence to Zipf's law ($R^2 \geqslant 0.88$). Slopes ranged from 0.62 to 0.91, forming three distinct groups. High-slope categories (0.83–0.91) reflected concentrated vocabulary, indicating unified concerns. Mid-slope categories (0.72–0.77) showed balanced distributions. Low-slope categories (0.62–0.65) displayed dispersed vocabulary reflecting diverse individual perspectives. These findings suggest that high slopes indicate focused problems suited to targeted interventions, while low slopes signal fragment-ed concerns requiring comprehensive approaches. This

quantitative measure can inform tailored HR strategy design and provides a basis for monitoring shifts in employee perceptions over time.

IM0008

Towards an Artificial Manager: Using ChatGPT to Emulate Team Manager Activities. Research Results

Olaf Flak
Jan Kochanowski University of Kielce, Poland

Abstract- This paper examines the potential of generative artificial intelligence to learn and emulate managerial behavior based on structured behavioral data collected in digital environments. The study addresses the growing interest in artificial management and the role of large language models (LLMs) as decision-support tools in contemporary organizations. As work increasingly shifts toward virtual and digital collaboration, the ability to capture behavioral traces of managerial activity creates new opportunities for modelling and augmenting leadership processes. The research investigates two questions: whether ChatGPT can learn and generate managerial activity patterns from structured representations of organizational actions (RQ1), and how accurately these generated activities reflect real managerial behavior in the later phase of team work (RQ2). A longitudinal non-participant observation was conducted in a real project setting involving 42 students working in 8 virtual teams. Participants collaborated on a complex organizational task using online management tools integrated into the TransistorsHead.com platform, enabling continuous recording of time-stamped behavioral sequences. The results show that ChatGPT can learn dominant managerial activities and general behavioral distributions but demonstrates limited accuracy in predicting specific actions and struggles to capture context-sensitive and socially embedded managerial responses. The findings suggest that AI systems can support managerial work by modelling stable behavioral patterns, while human managers remain essential in adaptive and a relational context.

IM0009-A

Interns'Management Development with Human–AI Collaborative Mentoring: An Application of Affordance Actualization Theory

Pei-Chun Chen[1], **Chieh-Peng Lin**[2] and Chou-Kang Chiu[3]
1: Tamkang University
2: National Yang Ming Chiao Tung University
3: National Chengchi University

Abstract- AI-powered capabilities now allow mentors to engage in human–AI collaborative mentoring, which enables goal-directed actions that strengthen interns'management development in workplace practices. In this context, human–AI collaborative mentoring represents a critical affordance that combines mentors'professional experience with AI's advanced content generation and computational capabilities to enhance interns'management learning across diverse work situations. According to affordance actualization theory (AAT), mentoring affordance is the potential for action that human-AI collaborative mentoring provides to interns in pursuit of their management development goal. In other words, the mentoring affordance describes what interns can widely learn from human-AI collaborative mentoring to achieve their management development outcomes (i.e., actualization). This study develops Affordance–Adaptability–Actualization Theory, which explains how affordance influences psychological adaptability process, subsequently shaping actualization outcomes. Based on this new theory, a theoretical framework is thus proposed to justify how human-AI collaborative mentoring enhances interns'psychological adaptability, leading to improved management development. This study presents a comprehensive agenda for future investigation and highlights promising research avenues to advance workplace training, mentoring, and learning.

IM0026

Governing Generative AI in Higher Education: A Multi-Level Maturity Framework for Aligning Policy, Assessment, and Pedagogy

Mohamed Farah and Alvedi Sabani
RMIT University, Australia

Abstract- Generative artificial intelligence (GenAI) has entered higher education faster than institutions have been able to govern it. While a substantial literature now documents how GenAI affects assessment, academic integrity, and pedagogy, governance is typically treated as a residual concern rather than the central problem of institutional adaptation. This paper reframes the question. Drawing on the governance findings of two systematic reviews of GenAI in higher education and on contemporary external policy instruments UNESCO's Guidance for Generative AI in Education and Research, the European Union AI Act (Regulation 2024/1689), and the Australian regulator TEQSA's 2024 requirement that every provider submit an institutional action plan, we synthesise a multi-level governance maturity framework. The framework distinguishes four governance domains (policy and accountability; assessment and integrity; capability and literacy; and infrastructure and equity) across five organisational layers (task, course, programme, institution, and sector) and four maturity stages (reactive, compliant, integrated, and

generative). We argue that the dominant institutional posture remains reactive or compliance-oriented, that policy is frequently developed in isolation from assessment design and staff capability, and that this misalignment reproduces at institutional scale the same incoherence that misaligned course design produces at the task level. The framework is offered as an analytical heuristic for institutional leaders and policymakers rather than a prescriptive blueprint, and as a basis for further empirical validation across diverse higher education systems.

Session 2 (13:15-15:30)

Topic: AI-Driven Intelligent Information Systems: User Experience Analysis, Technology Acceptance Models, and Consumer Behavior Analysis

Time: 13:15-15:30, August 6, 2026

Session Chair: Prof. Chieh-Peng Lin, National Yang Ming Chiao Tung University

Venue: Seminar Room 2, 14th Building

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IM0015-A

The Role of Artificial Intelligence and Big Data Methodologies in Social Media Misinformation

Donggeun Kim and **Jai Woo Lee**

Korea University, Republic of Korea

Abstract——Social media provides a broad source of information via a user-friendly platform, and it is possible to distribute the abundance of misinformation on social media platforms. Given that the effects of social media news on misinformation depend on various factors including variations in personality traits, researchers can utilize AI-based approaches such as machine learning and natural language processing to detect and handle inappropriate or incorrect news. This study suggests a comprehensive review of the AI methodologies for detection as well as computational and statistical models for big data analytics. This survey covers cutting-edge AI techniques with the current state of the art in explainable detection of incorrect information. The challenges in using AI to identify and investigate misinformation given high-quality social media data with media literacy should be considered to optimize the detection of misinformation in complex systems with efficient AI methodologies and network analysis. This review can contribute to the development and application of effective design of AI algorithms, offering solutions for the difficulties of the current misinformation identification.

IM0036

Understanding Personalized Recommendation Systems in Enhancing User Immersion and

Subscription Renewal Intention on Streaming Platforms

Kien Trung Bui, Luong Huu Nguyen and Luan Trong Nguyen
FPT University, Vietnam

Abstract——As video streaming platforms continue to expand, users increasingly face content saturation and algorithm-driven choice overload, creating new challenges for long-term subscriber retention. Grounded in the DeLone and McLean IS Success Model and Flow Theory, this paper examines how Information Quality, System Quality, Service Quality, and Immersion influence Perceived Value, Purchase Intention, Post-Purchase Satisfaction, and Return Intention within AI-driven streaming ecosystems. Using PLS-SEM on data gathered from 312 viewers of video streaming platforms from Vietnam, these findings reveal how System Quality and Immersion significantly strengthen both Perceived Value and Purchase Intention. By contrast, Information Quality favorably affects Perceived Value but negatively impacts Purchase Intention, suggesting that excessive personalization may weaken users' motivational responsiveness toward subscription decisions. Additionally, Service Quality functions primarily as a maintenance-oriented hygiene factor rather than a direct source of experiential value creation. The study further confirms Immersion as a critical psychological engagement mechanism that intensifies emotional attachment and long-term subscription motivation. The findings contribute to streaming and recommendation-system literature by explaining how technical quality, immersive experiences, and perceived value jointly shape sustainable subscriber retention.

IM0019

A Study on the Evaluation of AI-Enhanced Purchase User Experience for Electric-Assisted Bicycles

Chung-Shun Feng
Chaoyang University of Technology Taichung

Abstract—In the face of global issues such as the greenhouse effect and air pollution, as well as extreme weather events, electric-assist bicycles have emerged as a vital low-carbon mode of transport for promoting environmental sustainability and sustainable urban development. This study aims to explore how to integrate Retrieval-Augmented Generation (RAG) technology with large language models to enhance the purchasing experience for consumers when selecting different types of electric-assist bicycles. During the research process, a dedicated knowledge base was constructed by collecting academic pa-pers and e-commerce social media documents, and the RAG system was tested specifically in relation to pricing information for electric mountain bikes. The findings indicate that integrating large language models with RAG technology significantly

improves the accuracy and relevance of the in-formation provided. By constructing a dedicated knowledge base, this new type of AI tool can effectively assist consumers in querying product specifications, prices and personal preferences, thereby delivering a more comprehensive and optimized e-bike shopping and user experience.

IM0028

Analyzing Technology Consumers' Usage Intentions Toward Smart Agricultural Gen-AI Tools in Emerging Economies: A Cybernetic Perspective on Efficiency and the Awe Phenomenon

Luong Huu Nguyen and Luan Trong Nguyen
FPT University, Vietnam

Abstract—Amid growing climate and labor pressures in Southeast Asia, traditional ex-tension services often fail to provide smallholders with timely, personalized advice. This study examines usage intentions toward smart agricultural Generative AI tools in emerging economies through a Cybernetics-based Cognition–Emotion–Behavior framework. A sequential mixed-method design combined PLS-SEM analysis of survey data from 420 Vietnamese smallholders with SWARA-based validation by 20 experts. All eight hypotheses were supported. Perceived innovativeness emerged as the strongest immediate driver of chatbot efficiency, while efficiency significantly increased awe and, in turn, sustained usage intention. However, experts ranked perceived humanness as the highest strategic priority for reducing skepticism and building institutional trust. The findings reveal a tension between users' preference for immediate innovative utility and experts' emphasis on empathetic, localized interaction. Successful agricultural digital transformation therefore requires balancing functional innovation, reliable performance, and human-like communication to encourage trust, acceptance, and continued use among resource-constrained farming communities over time.

IM0014-A

Datafication with Hybrid Intelligence for Planetary Solutions with a Global Big Data Environment

Juyong Ko, **Donggeun Kim**, Sangjin Kim and Jai Woo Lee
Korea University, Republic of Korea

Abstract- Datafication with hybrid intelligence has the potential to devise solutions for various real-world problems related to natural disasters, climate change, pandemics, resources, social issues, and economy in global big data environment. Collaboration to bridge opinions of experts from various domains and artificial intelligence researchers is

required for data collection, data processing, computational modelling, prediction, and interpretation. This commentary reviewed the effective and efficient use of cutting-edge artificial intelligence techniques for a global big data environment for individuals who need to understand planetary solutions with hybrid intelligence methods. Integrative research can guide innovative and productive research paths to investigate the design of artificial intelligence technologies with interpretation based on human intelligence. The commentary presents an overall picture for prospective integrative research in the fields of interdisciplinary and multidisciplinary fields of studies with responsible artificial intelligence.

IM0032-A

Factors Affecting Digital Supply Chain Adoption among Mexican MSMEs

Santiago Cruz Munoz and Chen Ping Kuo
Ritsumeikan Asia Pasific, Mexico

Abstract- Digital transformation has become increasingly important for enhancing supply chain efficiency, transparency, and competitiveness. However, despite the significant presence of micro, small, and medium-sized enterprises (MSMEs) in Mexico, the implementation of digital supply chain technologies remains relatively limited. This study aims to explore the factors affecting digital supply chain implementation in the Mexican MSME context. Particular attention is given to two contextual factors that may influence adoption decisions: palancas, the use of informal personal connections to facilitate business activities, and organizational tolerance for uncertainty, which reflects a firm's willingness to invest in initiatives with uncertain outcomes. Through a review of the literature on digital transformation, supply chain management, and the Mexican business environment, this study develops a conceptual framework to explain how these factors may shape digital adoption. The findings are expected to provide insights for future empirical research and offer practical implications for managers and policymakers seeking to accelerate digital transformation among Mexican MSMEs.

IM0035

Detecting AI-Inpainted Refund-Claim Images Using Explainable Cues and Deep Ensembles

Usama Zafar[1], Fan Wu[1] and Yin-Chia Hsieh[2]
1: National Chung Cheng University
2: Chaoyang University of Technology

Abstract—Generative AI has introduced new risks of refund fraud in e-commerce. An

attacker can use AI inpainting to add false defects to real product images, creating convincing evidence of damage that never happened. We ask whether interpretable forensic cues can flag AI-inpainted refund images while staying transparent to human reviewers. Using 1,000 source images from the Amazon Product Reviews dataset across six retail sectors and seven complaint types, we developed three types of modifications. The top-performing model, an ensemble of fine-tuned EfficientNet-B0 neural networks scaled by temperature, reached AUC-ROC 0.9133, PR-AUC 0.9134, and F1 0.8315. The best feature-based model was a boosted forensic classifier with AUC-ROC 0.7131. Key forensic indicators included local binary pattern entropy, noise sigma, DCT skewness, and DCT AC energy. Results showed moderate generalization across different domains and complaint types but transfer across modification families was limited. Analyzing operating points provides insights into reviewer workload under realistic fraud prevalence. Overall, the findings suggest a layered review process, with the deep ensemble serving as the primary ranker and transparent forensic cues providing clear, auditable escalation signals.

IM0034

From Personalization to Impulse: Unpacking Consumer Response Pathways in Online Shopping Experiences

Loc Tan Cao and Luan Trong Nguyen
FPT University, Vietnam

Abstract—As personalized technologies reshape online retail, understanding how personalized shopping experiences stimulate impulse buying has become theoretically and managerially important. Drawing on the Stimulus–Organism–Response framework, this study examines how product variety, purchase convenience, information quality, recommendation accuracy, and system interaction design influence consumers' cognitive and affective evaluations and how these evaluations translate into online impulse buying. Survey data from 319 Vietnamese online shoppers were analyzed using confirmatory factor analysis and structural equation modeling. Product variety, purchase convenience, and information quality enhanced perceived usefulness, while system interaction design improved perceived ease of use. Information quality also increased perceived enjoyment, whereas recommendation accuracy did not predict usefulness and product variety did not predict enjoyment. Ease of use increased usefulness, usefulness increased enjoyment, enjoyment stimulated browsing, browsing activated the online urge to buy impulsively, and this urge led to impulse buying behavior. The findings show that personalization drives impulse buying through a sequential cognitive–affective–behavioral pathway rather than through recommendation accuracy alone.

IM0016-A

The Role of Artificial Intelligence and Big Data Methodologies in Drug Discovery

Hyeonjun Nam and Jai Woo Lee
Korea University, Republic of Korea

Abstract—The assessment of pharmacokinetic properties leads to a great transition in artificial intelligence and drug design. Artificial intelligence models strengthen high-dimensional clinical data analysis which can reduce clinical trial failures and improve drug discovery success rates. With molecular descriptors and fingerprints for prediction, AI-powered ADMET prediction can establish pharmacological innovation by optimizing efficiency in drug discovery pipelines. Cutting-edge artificial intelligence models can sharpen the applicability of automated machine learning for ADMET prediction in early-stage drug discovery. Artificial intelligence models have demonstrated significant promise in predicting primary ADMET endpoints, outperforming some traditional statistical methods. The chemical and biological architecture for elements is complex. Artificial intelligence methodologies should be applied to infer the dependency structures of the features using prior knowledge of the biomedical roles.

Session 3 (15:45-17:45)

Topic: Big Data Platform Architecture and High-Performance Retrieval Optimization Techniques
Time: 15:30-17:45, August 6, 2026
Session Chair: Prof. Seungshik Kang, Kookmin University, Republic of Korea
Venue: Seminar Room 2, 14th Building

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IM5003

Scalable Architecture of a Big Data Platform for AI-driven Adaptive Learning Systems

Aray Kassenkhan, Aigerim Abshukirova and Arman Sholpanbayev
Satbayev University, Kazakhstan

Abstract- The rapid growth of digital education platforms has created a demand for scalable and intelligent systems capable of processing large volumes of heterogeneous educational data. Traditional learning management systems often fail to effectively integrate big data analytics with adaptive learning mechanisms, limiting their ability to support personalized education. This paper presents the design and implementation of a scalable architecture for a Big Data platform that enables adaptive learning through data-driven personalization. The proposed system integrates distributed data processing, user behavior analytics, and AI-based modules within a unified framework. The architecture follows a modular client–server design, incorporating a Spring Boot backend, PostgreSQL-based storage, and cross-platform user interfaces developed with Flutter and Angular. A key contribution of this work is the integration of recommendation algorithms and natural language processing techniques for automated generation of personalized learning tasks. The platform processes diverse data streams, including reading activity, assessment results, and interaction patterns, enabling real-time adaptive decision-making through an efficient data pipeline. Experimental evaluation demonstrates that the system achieves low latency (below one second per request) while maintaining high relevance in content recommendations and improving user engagement. The proposed architecture ensures scalability, flexibility, and extensibility, making it suitable for large-scale deployment in modern digital learning environments. The results indicate that the combination of Big Data engineering and intelligent personalization significantly

enhances the effectiveness of adaptive learning systems and provides a strong foundation for next-generation educational platforms.

IM5005-A

Enhanced Optimization Strategies for Big Data Analytics

Carisa Kwok Wai Yu
The Hang Seng University of Hong Kong, Hong Kong, China

Abstract- The role of big data has become increasingly crucial across diverse fields, providing significant benefits while also presenting numerous challenges. Sparse optimization has emerged as a powerful and effective strategy to tackle these challenges. This approach has been successfully applied in a variety of domains, including portfolio optimization, genomic association studies, visual tracking, hyperspectral imaging, and differential optical absorption spectroscopy. Extensive empirical research has shown that nonconvex penalty methods often provide superior sparsity promotion and enhanced robustness in sparse recovery compared to the conventional convex regularization approach.

In this paper, we explore nonconvex penalty methods for sparse optimization and examine their theoretical properties. Specifically, we develop a phase transition theory for nonconvex methods within the framework of random matrix theory. This convergence theory offers strong theoretical support for the sparse recovery capabilities of targeted nonconvex algorithms, addressing existing gaps in the theoretical understanding of nonconvex penalty methods. Additionally, preliminary numerical experiments demonstrate that the proposed methods outperform existing approaches.

IM5006

Improving HNSW Search Efficiency via Group-Aware Upper-Layer Connectivity Balancing

Rumi Uehara and Saneyasu Yamaguchi
Kogakuin University, Japan

Abstract- Hierarchical Navigable Small World (HNSW) is widely used for Approximate Nearest Neighbor Search (ANNS) in vector databases, including those used in Retrieval-Augmented Generation (RAG) systems. However, HNSW assigns hierarchical levels to nodes based solely on a random probability distribution, without considering the inherent structure of the data. In practice, real-world document collections are often semantically clustered, and the mismatch between the random assignment policy and the actual data distribution may degrade search efficiency. In this paper, we first analyze the vector

distribution of the 20 Newsgroups dataset and show that intra-cluster distances are consistently shorter than inter-cluster distances, demonstrating that semantic groupings are reflected in the embedding space. Based on this observation, we propose a groupaware layer balancing method for HNSW that ensures at least one representative node from each group is present in a designated upper layer, which we call the balanced layer. The proposed method consists of three steps: (i) determining the balanced layer based on the total number of nodes and the number of groups, (ii) promoting nodes for groups that lack representatives in the balanced layer, and (iii) reallocating surplus nodes to preserve the overall hierarchical distribution. Experimental results on the 20 Newsgroups dataset show that the proposed method reduces the number of vector distance calculations, particularly under configurations that prioritize search speed such as small M values, while maintaining negligible loss in recall.

IM5009-A

Big Data and the HLA 4 Standard for Distributed Simulation

Frank Morlang
Private Person, Germany

Abstract- Big data in the context of distributed simulation is associated with challenging needs for scalability and interoperability. The IEEE 1516-2025 (known as HLA 4) standard provides important new features to address these advanced requests. This work analyzes how HLA 4 covers the intersection aspects of big data and distributed simulation. The new HLA 4 Federate Protocol, based on a client-server architecture in combination with Protocol Buffers, represents an elemental innovation enabling cloud-native solutions. Data transfer efficiency with respect to wide area networks as well as unreliable connections is smoothed. New Data Distribution Management possibilities with a focus on reduced network load and computational overhead allow enhanced precise filtering of massive datasets. Directed interaction and an improved Federation Object Model extensibility facilitate a better handling of large-scale, heterogeneous and complex scenarios as often represented by today's digital twin use cases. With its support for diverse programming languages and containerization, HLA 4 provides a secure, robust and scalable basis for the simulation of multifaceted systems, fusing the needs of big data environments and highperformance simulation.

IM5017

Big Data Analytics of LTE/5G Network KPIs for Intelligent Assessment of Mobile Network Quality

Zhuldyz Kalpeyeva, **Kyrmyzy Taissariyeva** and Zhansaya Ayapbergen

Satbayev University, Kazakhstan

Abstract- Modern LTE and 5G mobile communication networks generate large volumes of data on a daily basis, including Key Performance Indicators (KPIs), event logs, and operational parameters that characterize the state of the network and the quality of service provided to users. Effective processing and analysis of such data represent important tasks for monitoring, diagnosing, and optimizing mobile infrastructure. This paper proposes an approach to intelligent big data analytics of LTE/5G network KPIs, aimed at the comprehensive assessment of mobile network quality. The methodology is based on the processing and joint analysis of RSRP, SINR, Throughput, Coverage Rate, CQI, and other operational parameters obtained during the operation of an actual network. Real-world data collected during the operation of a mobile network under underground infrastructure conditions were used as the experimental basis. A comparative analysis of key performance indicators before and after network modernization was carried out, which made it possible to identify changes in radio coverage quality, performance, and the stability of user service. The results of the study showed that the application of big data analytics methods provides a more accurate assessment of network status, enables the identification 2 of patterns in KPI variation, and supports decision-making in the optimization of mobile network parameters. The proposed approach can be used by mobile network operators to improve monitoring efficiency, manage service quality, and further develop LTE and 5G networks.

IM5014

Integration of IoT-based Air Quality Monitoring, GIS Visualization and WRF Modeling for Urban Atmospheric Pollution Assessment in Almaty, Kazakhstan

Aiman N. Moldagulova, Zhyldyz B. Kalpeyeva, Ryskhan Zh. Satybaldiyeva, Aizhan B. Kassymova and Aizhan M. Anartayeva
Satbayev University, Kazakhstan

Abstract- Urban air pollution remains a major environmental and public health challenge, particularly in cities with complex terrain and intensive anthropogenic emissions. This study presents an integrated framework for smart environmental monitoring and atmospheric pollution assessment in Almaty, Kazakhstan, combining an Internet of Things (IoT)-based sensor network, geographic information system (GIS) visualization, spatial data analysis, and mesoscale atmospheric modeling. A real-time monitoring platform was developed to collect and visualize concentrations of PM2.5, PM10, CO_2, and total volatile organic compounds (TVOCs), together with meteorological parameters including temperature and relative humidity. The collected data were integrated into an interactive GIS environment that supports dynamic visualization through heat maps, pollution indices,

emission contribution analysis, and spatial interpolation techniques. These tools enable the identification of pollution hotspots and the assessment of temporal and spatial variability in air quality across the city. To investigate pollutant transport mechanisms, the Weather Research and Forecasting (WRF v4.3) model was implemented using a nested-domain configuration adapted to the complex mountainous terrain of Almaty. The modeling framework incorporates Local Climate Zones (LCZs) to account for urban morphology, surface roughness, and urban heat island effects, thereby improving the representation of atmospheric processes within the urban boundary layer. The proposed system provides a comprehensive approach for integrating ground-based observations with numerical atmospheric modeling. The results demonstrate the potential of combining real-time sensor data, geospatial analytics, and mesoscale climate models to support environmental monitoring, air-quality forecasting, and evidence-based urban management. The developed framework can serve as a foundation for future digital twin applications and decision-support systems aimed at mitigating urban air pollution.

IM5016

Data-Driven Assessment of Smart People Participation in Urban Development: A Case Study of Almaty, Kazakhstan

Ryskhan Zhakanovna Satybaldiyeva, Zhyldyz B. Kalpeyeva, Aiman N. Moldagulova, Aizhan B. Kassymova, Aizhan M. Anartayeva
Satbayev University, Kazakhstan

Abstract- This paper proposes a data-driven approach for assessing Smart People participation in urban development using open data from the Almaty Participatory Budgeting platform. The study combines two complementary datasets: aggregated statistics of citizen initiatives by district and official category for 2024–2025, and a project-level sample of 85 public project cards collected for 2024. The aggregated data show that the number of initiatives decreased from 6,175 in 2024 to 4,683 in 2025, while the structure of priorities remained strongly oriented toward everyday urban livability. Urban furniture and recreation represented 47.8% of initiatives in 2024 and 55.8% in 2025. Sports and playground infrastructure, mobility and accessibility, public spaces, greening, sanitation, and urban repair formed the remaining groups. District-level analysis shows that Nauryzbay and Zhetysu districts had the highest numbers of initiatives in 2024–2025. The project-level sample confirms that citizen proposals are mainly focused on physical infrastructure, including courtyards, playgrounds, sidewalks, greening, sanitation and public spaces. An important finding is the absence of a separate ICT-related project category in the official platform classification. The ICT dimension is therefore interpreted not as the content of projects, but as the digital mechanism through which citizens submit, structure and prioritize urban initiatives. The paper contributes to Smart People research

by showing how participatory budgeting data can be transformed into measurable indicators of civic engagement in smart city development.

IM0004-A

Where to Enforce Governance in Modern Information Systems

Michel Schildmeijer
SSC-ICT, Dutch Government, Netherlands

Abstract- Governance remains a central concern in modern information systems, yet its practical enforcement is increasingly unclear in distributed, cloud-native, and platform-based environments. Traditional governance mechanisms rely heavily on organizational processes, audits, and centralized controls, which often fail to scale or provide timely enforcement in highly automated systems. This paper explores where governance should be enforced in modern information systems to remain effective, verifiable, and adaptable. The study examines policy enforcement across different layers of the information system landscape, including organizational governance structures, system architectures, and automated delivery pipelines. By analyzing these enforcement points, the paper argues that governance is most effective when embedded closer to system execution rather than applied solely through post-hoc controls. Particular attention is given to policy-as-code approaches, which enable consistent, repeatable enforcement while maintaining transparency and traceability. Using practical examples from large-scale public-sector information systems, the paper illustrates how shifting governance enforcement toward technical control points improves compliance, reduces ambiguity in responsibility, and supports organizational autonomy within defined boundaries. The findings contribute to information systems management by reframing governance not as an external oversight activity, but as an integral design concern within modern information systems.

Poster Session (15:30-15:45)

Topic: AI-Based Cross-Domain Data Analysis and Optimization Algorithms

Time: 15:30-15:45, August 6, 2026

Venue: Seminar Room 2, 14th Building

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IM0001-A

Hybrid LASSO-Genetic Algorithm Framework for Optimizing Clinical Pathway Interventions in Hip Replacement Surgery

Jia-Min Wu[1], Yu-Shi Ye[2]

1: National Taichung University of Science and Technology

2: Tungs' Taichung MetroHarbor Hospital

Abstract—The Diagnosis-Related Groups payment system requires hospitals to optimize length of stay (LOS) while maintaining high-quality care. Although machine learning has been applied to LOS prediction, few studies address subsequent optimization of intervention portfolios under regulatory constraints. This study proposed a hybrid framework that integrated LASSO regression with a genetic algorithm (GA) to generate efficient intervention configurations for hip replacement within evidence-based quality thresholds. Data from 915 patients were stratified into four cohorts based on surgery type (total or partial hip replacement) and the Charlson Comorbidity Index (CCI), with CCI⩾ 2 indicating high comorbidity and CCI < 2 indicating low comorbidity. The methodology comprised three stages: (1) Random Forest feature screening, (2) comparison of Multiple Linear Regression, Neural Network, and LASSO Regression, and (3) optimization via GA and Particle Swarm Optimization (PSO) with geometric mean LOS as a lower-bound constraint. LASSO regression achieved optimal performance (RMSE: 1.02–1.16 days; MAE: 0.84–0.89 days). GA outperformed PSO in high-CCI cohorts, yielding fewer interventions (62 vs. 65 for total hip, $p = 0.002$) with superior convergence stability (SD: 2.1 vs. 4.3). Intervention portfolios were cross-referenced with clinical pathway protocols, confirming standard care coverage. The LASSO-GA framework provides a foundation for clinical pathway development, reducing screening time from months to hours. Implementation requires expert review to ensure appropriateness.

IM5012-A

Automatic Construction of Emotion Dictionary for Korean

Daehee Jang[1], Seungshik Kang[1] and Minhaeng Lee[2]
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Abstract—Based on Plutchik's (2003) theory of emotion adopted by the NRC, this study classifies Korean emotion nouns into eight basic emotion categories. The list of 590 nouns includes joy, sadness, anger, fear, anticipation, surprise, trust, and aversion; these eight nouns, as expressions of basic emotions, constitute the elements that make up the categorical system of Korean emotion nouns. This categorical system is composed of four pairs of opposing meanings: 'joy' can be analyzed as opposing 'sadness,' 'anger' as opposing 'fear,' 'trust' as opposing 'aversion,' and 'anticipation' as opposing 'surprise.' According to Plutchik, these opposing relationships are linguistically universal and can be considered the basic framework supporting the emotion noun system. These eight emotion categories are highly useful for constructing an emotion dictionary because they provide objective and linguistically universal classification criteria while encompassing the diversity of emotional expressions.

IM5015-A

A Study on High School Teachers' Teaching Well-being, Teaching Self-Efficacy, and Teaching Beliefs: A Big Data Analysis from the PISA 2022 Database

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Abstract—This study uses the latest PISA 2022 database released by the OECD to conduct big data analysis. PISA collects data from students, teachers, school principals, and parents on the learning performance and related factors of 15-year-old students. It conducts international comparative surveys to provide countries with a reference for understanding student learning and carrying out educational reforms. The research results indicate that teachers are a key force in improving students' academic performance. However, nearly 40% of students reported that teachers are not interested in each student's learning, or will not continue lecturing until the students understand the material. This clearly shows that teachers' enthusiasm for teaching is an important factor affecting teaching effectiveness. This clearly shows that teachers' enthusiasm for teaching is an important factor affecting effectiveness. If teachers experience well-being in teaching, such as positive emotions and satisfaction, it helps improve their teaching self-efficacy and beliefs. They then become more willing to devote energy to supporting students'

learning and ongoing instruction, which more effectively improves students' outcomes. This study used factor analysis, multiple regression, and structural equation modeling to analyze questionnaire data from 68,054 teachers in 18 countries or economies. The results showed significant correlations among secondary school teachers' teaching well-being, self-efficacy, and teaching beliefs ($r = .22–.35$, $p < .001$). Structural equation modeling revealed that the hypothetical model fit well and showed that teachers' teaching well-being significantly affected self-efficacy, which in turn affected teaching beliefs. In addition, teaching experience is also an important factor influencing well-being, self-efficacy, and teaching beliefs.

Session 4 (Online)

August 7, 2026, Friday (15:00-17:15, GMT+9)

Topic: Fundamental theories of artificial intelligence and innovative applications in interdisciplinary sciences

Session Chair: Prof. Amiya Kumar Tripathy, Don Bosco Institute of Technology, India

Time: 15:00-17:15, August 7, 2026

Zoom ID: 870 2111 4233

Zoom Link: https://us02web.zoom.us/j/87021114233

***Presenters are recommended to enter the meeting room 10 mins in advance.**

***Presenters are recommended to stay for the whole session in case of any absence.**

***After the session, there will be a group photo for all presenters.**

IM0005

The Impact of Artificial Intelligence Awareness on Employee Creativity

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Abstract—Employee creativity is crucial for the hospitality sector. However, limited research has been done on how employee creative performance is influenced by Artificial intelligence Awareness at individual level. Based on Conservation of Resources theory, the purpose of this research is to investigate whether and how Artificial Intelligence awareness affects employee creativity, while examining the employee change readiness as a mediating mechanism. We recruited 118 hotel employees from China and tested the proposed hypotheses using Hayes's PROCESS macro. The results indicate that AI Awareness is negatively associated with employee creativity (proactive and responsive creativity), and employee change readiness mediates the relationship between AI awareness and employee creativity. This study expands the literature on AI awareness in management studies by moving beyond the organizational level to focus on the employee level in the hospitality sector of China. Additionally, this study offers insights into how managers can mitigate the negative impacts of AI awareness on employee creative performance.

IM0021

Smart Nest Protection System: Integrating IoT, GIS, and Mobile Platforms for Community-Based Pawikan Conservation in Batangas

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Abstract—This study presents the development of a Smart Nest Protection System that integrates Internet of Things (IoT), Geographic Information System (GIS), and mobile technologies to support community-based pawikan conservation in San Juan, Batangas. The system utilizes IoT sensors to collect real-time environmental data, including temperature, soil moisture, light intensity, and humidity, which are critical factors affecting egg incubation. A total of 135 data records were gathered and transmitted to a cloud-based database for analysis. A mobile application was developed to provide real-time monitoring, alerts, and reporting features for volunteers and local stakeholders, while GIS was used to map nesting sites and identify high-risk areas. Results show that most nesting sites maintained optimal conditions; however, variations in soil moisture and light intensity indicate potential threats. The system effectively supports real-time monitoring and decision-making, enhancing conservation efforts. The integration of IoT, GIS, and mobile platforms demonstrates a scalable and sustainable approach to protecting pawikan nesting sites.

IM0023

Factors Influencing Generation Z's Intention to View 3C Product Unboxing Short-Form Videos on Instagram Reels: Extending Advertising Value Theory with Instant Gratification and Visual Characteristics

Hsiu-Chia Ko and **Tung-Yu Lin**
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Abstract—Short-form videos significantly impact Generation Z's (Gen Z) consumer behavior by facilitating product information gathering. For 3C (computer, communication, and consumer) electronics, consumers extensively collect information to compare complex specifications prior to purchase. In this context, whether unboxing short-form

videos can simultaneously deliver adequate information and visual appeal within a limited duration becomes crucial for Gen Z's viewing intention. Based on Advertising Value Theory, this study integrates short-form video characteristics (fragmentation and high visual orientation) to extend the original constructs into "instant information gratification" and "instant entertainment gratification." The model also incorporates two visual dimensions: visual appeal and visual fluency. Data from 150 Taiwanese Gen Z Instagram Reels users were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Results indicate that instant information gratification, visual appeal, and visual fluency significantly and positively affect perceived content value, which further enhances viewing intention. However, the impact of instant entertainment gratification is non-significant. Notably, visual characteristics exert a greater influence on perceived content value than instant information gratification, indicating that visual quality plays a comparatively stronger role in Gen Z's content value evaluation. Furthermore, in 3C viewing contexts requiring information evaluation, value judgment is predominantly information-driven rather than entertainment-driven. This study also offers practical recommendations as references for 3C electronics brands and short-form video creators.

IM0024

The Business Viability of Research on Information Dissemination Methods to Promote Evacuation Behavior During Floods Using Agent-Based Modeling

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University of Tsukuba, Japan

Abstract—The objective of this study is to identify effective communication methods for encouraging evacuation during river flooding and minimizing human casualties. Based on the hypothesis that relatives living outside the affected area can encourage evacuation via phone calls and text messages, we collect-ed survey data in Ise City, Mie Prefecture, and conducted simulations using agent-based modeling (ABM). The simulation results revealed differences among distinct personas, suggesting that tailored strategies for each persona are necessary to promote early evacuation across the entire local community. Furthermore, this study confirmed the potential to strengthen touchpoints that encourage behavioural change during evacuation by linking ABM with local businesses. Ultimately, leveraging such networks of local businesses can enhance the effectiveness of information dissemination and strengthen the resilience of local communities.

IM5001

THAUI-DGS: Top-k high average utility itemset mining algorithm using three-phase hybrid optimization

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North China University of Technology, China

Abstract—High Average Utility Itemset Mining (HAUIM) aims to mine High Average Utility Itemsets (HAUIs) that meet a minimum average utility threshold from transaction databases. Differing from High Utility Itemset Mining (HUIM), HAUIM provides a more equitable assessment of the actual value of itemsets of varying lengths. However, traditional HAUIM algorithms face significant challenges such as difficulty in threshold setting and excessive execution overhead when processing large datasets. To address this issue, this paper investigates the top-k High Average Utility Itemset Mining (top-k HAUIM) problem from a heuristic perspective and proposes a three-phase hybrid optimization algorithm named THAUI-DGS, combining Differential Evolution (DE), Genetic Algorithm (GA), and Simulated Annealing (SA). This algorithm first employs a population initialization strategy based on utility density. Subsequently, the algorithm performs global search through discrete differential mutation in the DE phase, completes genetic recombination using two-point crossover in the GA phase, and executes local search on elite individuals in the SA phase to avoid getting stuck in local optima. This forms a three- phase hybrid optimization framework. Experimental results on six real and synthetic datasets demonstrate that THAUI-DGS significantly outperforms comparison algorithms in terms of runtime and memory consumption while exhibiting ideal mining accuracy

IM5002

A CNN-Based Transfer Learning Framework for Real-Time Suspicious Behavior Detection in Retail Video Surveillance

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Abstract—Retail environments increasingly rely on video surveillance systems to prevent theft, robbery, and other security threats. However, traditional surveillance systems depend heavily on continuous human monitoring, which is labor-intensive, error-prone, and often ineffective in promptly identifying suspicious activities. Although Electronic Article Surveillance (EAS) systems are commonly used in retail stores, their effectiveness is limited because offenders can remove or tamper with product security tags. These limitations highlight the need for intelligent and automated surveillance mechanisms capable of detecting suspicious behavior in real time. This paper proposes an AI-driven surveillance framework that automatically detects suspicious activities from real-time Closed-Circuit Television (CCTV) video streams in retail environments. The system

employs deep learning–based computer vision techniques to analyze visual patterns and behavioral cues captured by CCTV cameras. A Convolutional Neural Network (CNN), enhanced through transfer learning, is used to extract spatial features from video frames and classify activities such as shoplifting, robbery, break-in attempts, and normal customer behavior. The model is trained using publicly available surveillance datasets and curated retail activity datasets containing annotated examples of suspicious and normal behaviors. Data augmentation and preprocessing techniques improve robustness under varying lighting conditions, occlusions, and crowded indoor environments. The framework continuously analyzes live video feeds and generates automated alerts when suspicious activity is detected, enabling timely intervention and enhancing the overall effectiveness of retail surveillance systems.

IM5013

GeoVizAI: An Explainable Multi-Source Framework for Geopolitical Risk Forecasting and Regime-Change Detection

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Abstract—Geopolitical risk significantly influences commodity markets, sovereign debt, and global capital flows. However, existing quantitative measures of geopolitical risk are typically available only at monthly frequency and provide limited explainability and temporal robustness. This paper presents GeoVizAI, an explainable multi-source framework for daily geopolitical risk forecasting and regime-change detection. The framework integrates heterogeneous information from armed conflict events (ACLED), global news analytics (GDELT), and financial market indicators, including Brent crude oil, gold, the S&P 500 Index, and the U.S. Dollar Index. GeoVizAI is evaluated across five active geopolitical conflict regions, including Israel-Palestine, Ukraine-Russia, and Iran-related conflict zones, covering the period from February 2022 to June 2025. The resulting dataset comprises 1201 daily observations. A composite geopolitical risk score is constructed from four pressure dimensions and mapped to four interpretable risk regimes: Stable, Elevated, High, and Crisis. To prevent leaks in methodology a systematic leakage audit has been implemented to measure and remove both time-based leakage and feature based leakage, this will increase the reliability of forecasting. Experimental evaluation demonstrated good predictive capabilities. The best performing model was the XGBoost model which achieved a test R-squared score of .896, .875, and .810 at one day, three days and seven days into the future, respectively. In addition to these high level

metrics split-conformal prediction regions provided an additional layer of uncertainty quantification with empirical coverage over 90% of all tested scenarios. A calibrated classifier detected regime-changes outside of the training set using an area under the curve of .815 and isotonic calibration was found to significantly improve the reliability of probabilities associated with those classifiers. Explainability of the models also evaluated how much conflict intensity, media activity, and financial indicators affect the dynamics of geopolitical risk. This work utilizes an active dashboard to operationalize the analytical framework as it provides transparency during real-time monitoring, forecasting, and decision making activities. These experimental results illustrate the potential for explainable multi-source analytics to support proactive geopolitical risk assessment and early warning systems

IM0030

Modeling Regional Culture and Curriculum in AI-Semantic Art Education

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Abstract—The rapid expansion of generative artificial intelligence, semantic representation models, and educational knowledge graphs is reshaping how art curricula are designed, interpreted, and evaluated. Existing studies on Chinese art education have shown that regional culture influences curriculum formation, yet most discussions remain descriptive and lack a computationally operable model for representing cultural meaning in curriculum texts. To address this gap, this study proposes an AI-semantic modeling framework for analysing the interaction between regional culture and curriculum formation in art education. The framework integrates curriculum text mining, regional cultural ontology construction, sentence embedding, topic modelling, knowledge graph representation, and interpretable curriculum-alignment metrics. Regional culture is modelled not only as cultural content inserted into courses, but also as a semantic structure that affects learning objectives, knowledge selection, studio tasks, evaluation language, and artistic identity formation. Four modelling modules are developed: semantic corpus construction, regional cultural feature extraction, curriculum-culture alignment modelling, and curriculum optimization feedback. Based on curriculum theory, AI in education research, semantic representation learning, and recent studies on Chinese art and aesthetic education, the study establishes four indicators: Regional Culture Semantic Density, Curriculum-Culture Alignment, Pedagogic Mediation Index, and Knowledge Structure Coherence. The proposed framework provides a technically explicit method for identifying whether and how regional cultural resources are embedded in art education curricula. It contributes to AI-assisted curriculum analytics, culturally responsive art education, and semantic modelling of humanities curricula. The study concludes that AI-

semantic analysis can make invisible cultural assumptions in curriculum design more traceable, interpretable, and optimizable, while still requiring human pedagogic judgement to avoid cultural simplification and algorithmic bias.

IM0031

The Impact of AI-Assisted Chinese Classics Recitation on the Humanistic Literacy of Higher Vocational Students

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Abstract—While artificial intelligence (AI) has been widely adopted in technical and language education, its potential to foster humanistic education through classical literature remains largely underexplored. This study investigates the impact of AI-assisted Chinese classics recitation on the humanistic literacy of higher vocational students, a demographic whose curricula traditionally prioritize technical proficiency over humanistic perspectives. Employing a cluster randomized controlled trial (RCT) design, 150 vocational students were equally divided into an intervention group (n=75) and a control group (n=75) over a 16-week academic semester. The intervention group utilized a specialized AI recitation tool featuring voice recognition, personalized recommendations, and real-time feedback, while the control group engaged in traditional recitation methods. Statistical analyses revealed that the AI-assisted group achieved a significantly greater improvement in humanistic literacy scores, with an average increase of 12.4 points compared to the control group's 4.5 points $t=6.32$, $p<0.001$, Cohen's $d=0.85$). Furthermore, a multiple linear regression model ($R2=0.67$) identified recitation accuracy ($\beta=0.52$), AI usage frequency ($\beta=0.45$), and total recitation time ($\beta=0.30$) as highly significant positive predictors of post-intervention outcomes. The findings provide compelling empirical evidence that integrating AI into classical recitation significantly enhances key dimensions of humanistic literacy—including professionalism, empathy, and cultural awareness—by facilitating personalized feedback and deeper cognitive engagement with classical texts.

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Note