2026 16th International Conference on Information and Multimedia Technology

(ICIMT 2026)

November 6-8, 2026

Shenzhen, China

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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 16th International Conference on Information and Multimedia Technology (ICIMT 2026), taking place from 6th to 8th November 2026 at CitiGO Hotel, Nanshan University Town, Shenzhen.

ICIMT 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 and Multimedia Technology. 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 CitiGO Hotel, Nanshan University Town, Shenzhen, a convenient venue nestled within a vibrant academic cluster. This event is organized by Harbin Institute of Technology, Shenzhen.

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 ICIMT 2026!

ICIMT 2026 Organizing Committee
November 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

- **China Standard Time (GMT+8)**

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: **823 6628 9225**

Zoom Link: https://us02web.zoom.us/j/82366289225

* 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-ZT0001-Name
Delegate	Delegate-Name	Delegate-Name

Conference Venue

CitiGO Hotel Shenzhen Nanshan University Town
Address: No. 49 Pingshan 1st Road, Nanshan District, Shenzhen, Guangdong, China



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

Simple Program

November 6, 2026 (Friday)

Onsite Registration

Registration Time: 13:30-16:30

Venue: 1F Lobby, CitiGO Hotel

Address: No. 49 Pingshan 1st Road, Nanshan District, Shenzhen, Guangdong, China

1. Arrive at Conference venue: 1F Lobby, CitiGO Hotel;

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+8

Online Test **Zoom ID: 823 6628 9225** **Link: https://us02web.zoom.us/j/82366289225**	**Duration**
Invited Speaker: Asst. Prof. Sinan Chen	10:30-10:40
Online Session (ZT0014, ZT0015, ZT1004, ZT0024, ZT0025, ZT0028, ZT0029, ZT0031, ZT0032)	10:40-11:25

Note: If you want to do online zoom test after 11:25, please contact your conference secretary.

November 7, 2026 (Saturday)

Morning Sessions Venue: 2nd Floor, CitiGO Room, CitiGO Hotel Zoom ID: 82366289225 Zoom Link: https://us02web.zoom.us/j/82366289225		Duration
Host	Prof. Hao Huang, Harbin Institute of Technology, Shenzhen, China	9:00-9:05
Opening Remark	Prof. Xutao Li, Harbin Institute of Technology, Shenzhen, China	9:05-9:15
9:15-9:25 Group Photo		
Keynote Speech 1	Prof. Qing Li, The Hong Kong Polytechnic University, Hong Kong, China Speech Title: Towards Multi-level Querying Methodology for an Indoor Robot Smart Space	9:25-10:10
Keynote Speech 2	Prof. Xiaoli Li, Singapore University of Technology and Design, Singapore Speech Title: Advancing Design AI: From Industrial Sensor Intelligence to Robotics	10:10-10:55
10:55-11:10 Coffee Break		
Invited Speech 1	Asst. Prof. Tongxin Li, The Chinese University of Hong Kong, China Speech Title: General Intelligence with Finite Models in Big Worlds	11:10-11:35
Invited Speech 2 Online	Asst. Prof. Sinan Chen, Kobe University, Japan Speech Title: Beyond Recognition: Context-Aware Multimodal Intelligence for Real-World Human Behavior Understanding	11:35-12:00
12:00-13:30 Lunch Time		

Afternoon Session **Conference Room: 2nd Floor, CitiGO Room, CitiGO Hotel** **Zoom ID: 82366289225** **Zoom Link: https://us02web.zoom.us/j/82366289225**		
Hybrid Session 1	**Topic:** Intelligent Computing and Interdisciplinary Applications of Digital Media **Session Chair:** Assoc. Prof. Gaomin Zhang, Pingdingshan University, China **Presentations:** ZT0008, ZT0011, ZT1003, ZT0022, ZT0030, ZT0024, ZT1002	13:30-15:50
15:50-16:05 Coffee Break		
16:05-17:05 Campus Visit		
17:30-18:30 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 20 Minutes including 2-3 Minutes for Question and Answer.

November 8, 2026 Online

(GMT+8)

Online Session		Duration
Zoom ID: 823 6628 9225 **Zoom link: https://us02web.zoom.us/j/82366289225**		
Session 2	**Topic:** Sensor-Based Complex Systems and Intelligent Control Engineering Applications **Session Chair:** Assoc. Prof. Vinh Bui, Southern Cross University, Australia **Presentations:** ZT0014, ZT0015, ZT1004, ZT0025, ZT0029, ZT0028, ZT0031, ZT0032	9:30-11:30

Detailed Program

November 7, 2026 (Friday)

Opening Remark

9:05-9:15	**Opening Remark**
Venue	**CitiGO Room: 2nd Floor**



Prof. Xutao Li

Harbin Institute of Technology, Shenzhen, China

Xutao Li is a Tenured Professor and Doctoral Supervisor at the School of Computer Science and Technology, Harbin Institute of Technology, Shenzhen, and a National-level Young Talent. He received his bachelor's degree in Computer Science and Technology from Lanzhou University in July 2007, his master's degree in Computer Science and Technology from the Harbin Institute of Technology Shenzhen Graduate School in July 2009, and his Ph.D. in Engineering from the same institution in November 2013. From December 2013 to September 2015, he conducted postdoctoral research at Nanyang Technological University, Singapore. He joined Harbin Institute of Technology, Shenzhen in September 2015.

His main research interests are data mining and artificial intelligence, with specific foci on graph mining, social network agents, multimodal data mining, and satellite meteorological big data mining. He has published more than 100 papers in top international journals and conferences, including PNAS, TPAMI, TKDE, TIP, TNNLS, TGRS, SIGKDD, SIGIR, ICDE, WWW, WSDM, CVPR, NeurIPS, ACM MM, and AAAI. He was selected for the Harbin Institute of Technology Young Top-Notch Talent Program in 2015; received the Second Prize of the Shenzhen Natural Science Award in

2016 (as the second contributor); and received the Second Prize of the Guangdong Provincial Natural Science Award in 2018 (as the second contributor). He has served as principal investigator for three projects funded by the National Natural Science Foundation of China and one research task under the National Key Research and Development Program.

Keynote Speech 1

Host	Prof. Hao Huang	**Time**	9:25-10:10, November 7, 2026
	Harbin Institute of Technology, Shenzhen, China	**Venue**	CitiGO Room: 2nd Floor



Prof. Qing Li

The Hong Kong Polytechnic University, Hong Kong, China

Qing Li is a Chair Professor and Head of the Department of Computing, the Hong Kong Polytechnic University. He received his B.Eng. from Hunan University (Changsha), and M.Sc. and Ph.D. degrees from the University of Southern California (Los Angeles), all in computer science. His research interests include multi-modal data management, conceptual data modeling, social media, Web services, and e-learning systems. He has authored/co-authored over 500 publications in these areas, with over 74,500 citations and H-index of 108 (source: Google Scholars). He is actively involved in the research community, serving as an Editor-in-Chief of Computer & Education: X Reality (CEXR) by Elsevier; he has also served as an associate editor of IEEE Transactions on Artificial Intelligence (TAI), IEEE Transactions on Cognitive and Developmental Systems (TCDS), IEEE Transactions on Knowledge and Data Engineering (TKDE), ACM Transactions on Internet Technology (TOIT), Data Science and Engineering (DSE), and World Wide Web (WWW) Journal, in addition to being a Conference and Program Chair/Co-Chair of numerous major international conferences. He also sits/sat in the Steering Committees of DASFAA, ACM RecSys, IEEE U-MEDIA, WISE and ICWL. Prof. Li is a Fellow of IEEE and IET/IEE.

Speech Contents

Speech Title: Towards Multi-level Querying Methodology for an Indoor Robot Smart Space

Abstract: Smart Space denotes dynamic, adaptive environments enhanced with robotics and AI technologies. Examples include smart homes/offices/cafes. By leveraging and integrating Computer Vision, Natural Language Processing, AIoT, Data Mining, Recommender Systems, and Sympathetic Computing, Smart Space can help improve efficiency, personalization, and user satisfactions with seamless interactions. In this talk, we introduce PolyRAG, a multi-level knowledge QA framework supporting multi-level querying for an indoor robot application system. Building on top of a naive RAG layer, we construct a knowledge pyramid by adding a knowledge graph layer and an ontology schema, so as to obtain a good balance of recall and precision when applied to a specific domain such as coffee robot interactions. We employ cross-layer augmentation techniques for comprehensive knowledge coverage and dynamic updates of the Ontology scheme and instances. To ensure compactness, we utilize cross-layer filtering methods for knowledge condensation in KGs. An experimental coffee robot prototype is constructed, and preliminary empirical studies are conducted to show the effectiveness of our PolyRAG supporting a waterfall model for querying from ontology to KG to chunk-based raw text.

Keynote Speech 2

Host	Prof. Hao Huang	**Time**	10:10-10:55, November 7, 2026
	Harbin Institute of Technology, Shenzhen, China	**Venue**	CitiGO Room: 2nd Floor



Prof. Xiaoli Li

Singapore University of Technology and Design, Singapore

Professor Xiaoli Li is Chair Professor and Head of the Information Systems Technology and Design (ISTD) Pillar at the Singapore University of Technology and Design (SUTD). Prior to joining SUTD, he headed the Machine Intellection Department at A*STAR, where he established and led Singapore's largest AI research group consisting of more than 130 AI scientists. He is also an Adjunct Full Professor at Nanyang Technological University (NTU) and a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), Asia-Pacific Artificial Intelligence Association (AAIA), and PHM Society.

Professor Li is an internationally recognised researcher in artificial intelligence, machine learning, data mining, and bioinformatics, with a strong emphasis on translating AI research into practical applications. He has published over 400 peer-reviewed papers, received more than 40,000 citations, and achieved an h-index of 96. His research contributions have earned more than ten best paper awards, including the prestigious DASFAA 10+ Year Best Paper Award. He currently serves as an Associate Editor of IEEE Transactions on Artificial Intelligence and ACM Computing Surveys.

Beyond his academic achievements, Professor Li has extensive experience in leading large-scale, industry-driven AI research and innovation. He has established and directed several joint research laboratories and spearheaded strategic R&D collaborations with leading international organisations across aerospace, telecommunications, insurance, professional services, and other industries. His work bridges fundamental AI research and

real-world deployment, advancing intelligent solutions for complex industrial and societal challenges.

His contributions have received international recognition, including being ranked among the world's top 2% of scientists and being named a Clarivate Highly Cited Researcher.

Speech Contents

Speech Title: Advancing Design AI: From Industrial Sensor Intelligence to Robotics

Abstract: Artificial intelligence (AI) delivers transformative value when it moves beyond algorithmic advances to address complex real-world challenges. Achieving this requires intelligent systems that can learn from heterogeneous data, support human decision-making, adapt to dynamic environments, and operate reliably under practical constraints. This keynote presents an integrated perspective on Design AI, highlighting how advances in machine learning can be translated into intelligent, trustworthy, and deployable solutions across education, industry, and robotics.

The keynote begins with AI-enabled education, exploring how intelligent techniques can enhance programming education through automated assessment, personalised feedback, and adaptive learning support. By analysing students' code and programming behaviours, AI systems can identify misconceptions, diagnose learning difficulties, and provide timely, actionable feedback, while enabling instructors to support larger and more diverse student cohorts. The rapid emergence of generative AI introduces new opportunities and challenges, particularly in assessing authentic learning, distinguishing human-written from AI-generated code, and rethinking assessment strategies in AI-assisted educational environments.

The second part focuses on AI-driven industrial intelligence, where modern machines and cyber-physical systems continuously generate large volumes of complex, multivariate sensor data. Learning robust and informative representations from these often noisy, heterogeneous, and sparsely labelled time-series data is essential for applications such as anomaly detection, equipment health monitoring, remaining useful life prediction, and predictive maintenance. Drawing on selected industrial collaborations and deployments, the keynote illustrates how AI can transform raw sensor streams into actionable intelligence, improving operational reliability, reducing unplanned downtime, and enabling timely decision-making. Particular attention is given to developing efficient and scalable AI solutions that can operate in real time, including on resource-constrained edge

devices.

The final part extends these foundations to embodied intelligence and robotics, where AI must move beyond interpreting data to perceiving, reasoning, adapting, and acting in the physical world. Integrating visual perception, temporal sensor information, environmental understanding, and physical interaction introduces new challenges in robustness, autonomy, and adaptability. Research examples spanning underwater mapping, autonomous ship-hull inspection, intelligent navigation, and reconfigurable robotics demonstrate how AI-enabled robotic systems can operate effectively in complex, uncertain, and dynamic environments.

By connecting these three domains through a unified Design AI perspective, the keynote emphasises the importance of integrating data-driven learning, and real-world deployment. The central message is that the future of impactful AI lies not merely in developing increasingly powerful models, but in designing intelligent systems that are reliable, adaptive, trustworthy, and capable of delivering tangible benefits to people, industries, and society.

Invited Speech 1

Host	Prof. Hao Huang	**Time**	11:10-11:35, November 7, 2026
	Harbin Institute of Technology, Shenzhen, China	**Venue**	CitiGO Room: 2nd Floor



Asst. Prof. Tongxin Li

The Chinese University of Hong Kong, China

Dr. Tongxin Li is a tenure-track Assistant Professor in the School of Data Science at The Chinese University of Hong Kong, Shenzhen. He received his Ph.D. in Computing and Mathematical Sciences from the California Institute of Technology in 2022. Prior to that, he obtained dual bachelor's degrees in Mathematics and Information Engineering, as well as a Master of Philosophy degree, from The Chinese University of Hong Kong.

His research focuses on interdisciplinary topics spanning machine learning, control, and optimization, with applications to power systems and sustainable low-carbon clean energy. Specifically, he is interested in developing trustworthy artificial intelligence to enhance the sustainability, robustness, scalability, privacy, and resilience of smart grids. He has been invited to present at numerous international conferences and has published in top-tier journals and conferences. Professor Li also has extensive industry–academia collaboration experience. He interned twice as an Applied Scientist at AWS Cloud Security. He has participated in multiple power system optimization and design projects in collaboration with the National Renewable Energy Laboratory, Pasadena Water and Power, and Caltech Facilities. His smart grid project received the 2021 Impact Grant from the Resnick Sustainability Institute.

Speech Contents

Speech Title: General Intelligence with Finite Models in Big Worlds

Abstract: A difference between two environments may be irrelevant to one task yet determine the optimal action for another. When future tasks are unknown during training, how much must a finite model know about the world in advance? This talk examines that question through reinforcement learning and information theory. In finite Markov decision processes, we measure world complexity by the information needed to distinguish among possible transition dynamics at a given precision. We show that an agent whose policy is fixed at deployment needs both more storage and more offline training data to remain near-optimal across all goals as world complexity grows or accuracy requirements tighten. We then quantify the tradeoff between information retained before deployment and the number of interactions needed afterward. Even with limited prior knowledge, an adaptive agent that can sample transitions from any state can gather enough experience in a single exploration history to identify, with high probability, a near-optimal policy for every goal. This result sharpens a design question for general intelligence in big worlds. What must a finite model retain in advance, and what can it learn through action?

Invited Speech 2 (Online)

Time	**11:35-12:00, November 7, 2026 (GMT+8)**
Zoom ID	**823 6628 9225**
Zoom Link:	**https://us02web.zoom.us/j/82366289225**



Asst. Prof. Sinan Chen

Kobe University, Japan

Sinan Chen received his M.S. degree in System Informatics and Ph.D. degree in Computational Science from Kobe University, Japan, in 2019 and 2021, respectively. He served as a JSPS Postdoctoral Research Fellow at Kobe University in 2022 and is currently an Assistant Professor at the Center for Mathematical and Data Sciences, Kobe University.

His research focuses on human-centered AI, multimodal sensing, computer vision, and behavioral intelligence, with particular interests in temporal behavior modeling, individualized change detection, and context-aware intelligent systems. His recent work covers facial dynamics, hand and finger movements, body motion, gait, and everyday activity sensing, with applications in healthcare, aging, smart environments, interactive systems, and digital technologies for education.

He is a member of IEEE, ACM, Sigma Xi, CAAI, CCF, IEICE, and IEEJ.

Speech Contents

Speech Title: Beyond Recognition: Context-Aware Multimodal Intelligence for Real-World Human Behavior Understanding

Abstract: Recent advances in computer vision and multimodal learning have enabled increasingly accurate recognition of faces, gestures, poses, activities, and other observable human behaviors. However, recognizing what a person is doing is not necessarily equivalent to understanding the meaning of that behavior. Real-world human behavior is highly context-dependent, temporally evolving, and heterogeneous across individuals, making conventional task-specific recognition models insufficient for many human-centered applications.

In this invited talk, I will discuss our recent efforts toward context-aware multimodal intelligence for understanding human behavior in real-world environments. Using examples from facial dynamics, hand and finger movements, body motion, gait, and everyday activity sensing, I will illustrate how heterogeneous behavioral signals can be represented and integrated beyond single-modality or single-task recognition. Particular attention will be given to three challenges: modeling temporal behavioral dynamics, incorporating contextual information, and distinguishing meaningful within-person changes from normal inter-individual variability.

I will further discuss how these ideas point toward a broader research direction of multimodal behavioral intelligence, in which sensing, multimedia representation, temporal modeling, and adaptive AI are jointly designed to move from recognizing isolated observations toward understanding individuals over time. This perspective may provide a foundation for more personalized, reliable, and human-centered intelligent systems across healthcare, smart environments, human–computer interaction, and other real-world applications.

Session 1 (13:30-15:50)

Topic: Intelligent Computing and Interdisciplinary Applications of Digital Media
Time: 13:30-15:50, November 7, 2026
Session Chair: Assoc. Prof. Gaomin Zhang, Pingdingshan University, China
Venue: 2nd Floor, CitiGO Room, CitiGO Hotel

***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.**

ZT0008

Orthogonal partial least squares, principal component analysis, and hierarchical clustering combination algorithms for Feature similarity analysis

Fengfeng Liu[1], **Changsheng Wang**[2], Jiewang He[1], Zhi Lin[2], Yuying Zhou[1] and Yuzhe Wang[1]
1: Hubei tobacco industry Co., Ltd., China
2: Hubei University, China

Abstract- This study proposes a novel combinatorial algorithm to address the challenge of unknown categories in small-sample structural data with multiple features. We introduce a hybrid method integrating Orthogonal Partial Least Squares Discriminant Analysis (OPLS-DA), Principal Component Analysis (PCA), and Hierarchical Cluster Analysis (HCA). First, OPLS-DA is employed to screen key features based on fundamental categories. Subsequently, PCA extracts principal components to reduce dimensionality. Finally, HCA is applied to identify clusters with the highest similarity in component scores, enabling sample classification based on feature vectors. The methodology was evaluated on a tobacco characteristic dataset using SIMCA software with standardized preprocessing. Experimental results demonstrate high model validity: the OPLS-DA model achieved a prediction index (Q2) of 0.900 and an explained variance (R2Y) of 0.938; the PCA model showed an explained variance (R2X) of 0.798 and a Q2 of 0.684. In conclusion, the OPLS-PCA-HCA combination proves effective in analyzing small-sample multivariate data, yielding interpretable and robust statistical resultst.

ZT0011

Navigating the Digital Creative Landscape: A Phenomenological Inquiry into Multimedia

Students' Experiences with Artificial Intelligence, Augmented Reality, and Virtual Reality
Charis Rojas Solo[1] and Marvin De Leon[2]
1: Catanduanes State University, Philippines
2: Mapúa University, Philippines

Abstract-This study investigates the lived experiences of BS Entertainment and Multimedia Computing (BSEMC) students in the Philippines with artificial intelligence (AI) tools, augmented reality (AR), and virtual reality (VR) technologies. Responding to reviewer calls for a more robust dataset, the study expanded its participant pool to 31 purposively selected students at Catanduanes State University (CatSU). Using a qualitative phenomenological design grounded in Husserl's descriptive phenomenology and Davis's Technology Acceptance Model (TAM), this study makes an original theoretical contribution by proposing an extended TAM that incorporates two novel constructs—perceived creative compatibility and perceived ethical alignment—as determinants of technology acceptance specific to arts and creative computing contexts. Thematic analysis following Colaizzi's seven-step procedure yielded five major themes: (1) Creative Empowerment and Workflow Efficiency; (2) Creative Identity Tension and Anxiety; (3) Immersive Novelty and Disorientation in AR/VR; (4) Dual Career Affect: Excitement and Anxiety; and (5) Institutional and Infrastructural Gaps. Findings confirm that while BSEMC students provisionally embrace these technologies as pragmatic tools, they simultaneously negotiate identity tensions, ethical concerns, and institutional limitations. Thematic saturation was confirmed through member checking, validating the qualitative sufficiency of the sample. This study contributes humanistic, qualitative insight to discourse on multimedia education, technology-enhanced creative learning, and the evolving landscape of AI, AR, and VR integration in higher education.

ZT1003

Blockchain-Based Improved A* Taxi Dispatching Under Real-Time Road Condition
Chang Zhou[1], Gaomin Zhang[2], Yijing Zhang[2] and Chenduo Xue[3]
1: Zhengzhou Vocational University of Information and Technology, China
2: Pingdingshan University, China
3: Beijing Haidian Kaiwen Academy, Beijing, China, China

Abstract—To address the problem that path planning in traditional taxi dispatching systems only considers static road distance and cannot reflect real-time traffic congestion, this paper proposes an improved A* algorithm incorporating real-time road conditions, and integrates it into a taxi dispatching system based on a tree-structured blockchain. Leveraging the integration of blockchain and in-vehicle sensors (IoT), the system immutably records road-condition, dispatch-transaction, vehicle-credit and carbon-

footprint data onto a unified ledger, thereby realizing fully traceable and auditable data management that a pure IoT or centralized platform cannot provide. On the basis of the total distance cost function of the traditional A* algorithm, the proposed algorithm adds a real-time road condition cost term, and dynamically updates road conditions through the weighted fusion of historical and current road conditions, thereby realizing dynamic path planning. Experimental results show that the improved algorithm can dynamically adjust the driving path under the influence of real-time road conditions; the road condition update stage accounts for only about 0.25% of the total system running time, and the algorithm complexity is only 12.89% higher than that of the traditional A* algorithm.

ZT0022

Orchestrating Productive Failure: A Pedagogical Control Architecture for LLM-Based Tutoring in Higher Education

Duc Thanh Nguyen[1], Vinh Bui[1], Reza Ghanbarzadeh[1] and Polly K. Lai[2]
1: Southern Cross University, Australia
2: Western Sydney University, Australia

Abstract- Large language model tutors frequently provide solutions upon request, which conflicts with instructional designs such as Productive Failure that require learners to attempt problems prior to receiving explanations. Existing systems communicate this constraint to the model and rely on the model to determine at each interaction whether the constraint has been satisfied. Consequently, enforcement depends on model compliance, and sessions do not retain records of the rationale for permitting instruction. This paper presents a pedagogical control architecture that externalises the sequencing decision from the model. A stateless coding layer assigns rubric-based labels to each learner utterance, while a deterministic control layer aggregates this evidence and computes the authorised pedagogical state based on explicit conditions. Generation is conditioned on the resulting state but does not influence it. The architecture was evaluated using five scripted learner behaviours, each repeated three times. The pedagogical state remained consistent across repeated runs with identical input, and the contingent withdrawal and restoration of support operated as intended. Two limitations were identified: the authorisation conditions permit instruction after a single learner response, and the control layer regulates the timing of instruction but not the content of responses within an authorised state.

ZT0030

Transmission Line Anomaly Detection Using YOLOv8 with Feature Enhancement

Jiayuan Li
The Hong Kong Polytechnic University, China

Abstract—Detecting anomalies in unmanned aerial vehicle (UAV) inspection images is difficult when targets vary in scale, occupy few pixels, or blend into cluttered backgrounds. This paper presents a feature-enhanced YOLOv8 detector that combines semantic feature enhancement (SeFE), efficient multi-scale attention (EMS-Att), and a distance-weighted bounding-box regression loss. SeFE integrates local details and contextual information through grouped convolution, dilated convolution, and global channel reweighting. EMS-Att combines local convolutional gating with attention over pooled features. On a custom dataset assembled from UAV-acquired, online, and shared images, the method achieves a precision of 81.9%, a recall of 75.6%, and a mean average precision (mAP) of 80.9%. These values exceed the YOLOv8 baseline by 2.8, 1.8, and 3.5 percentage points, respectively. Ablation results show improvements from each component, with the complete configuration achieving the highest mAP among the evaluated settings.

ZT0024

Improving Accessibility of E-Vaccination Systems in Senegal through National Language Integration

Fatoumata Balde, Serigne Mourtada Fall and Mouhamadou Korka Diallo
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Abstract-Vaccination remains one of the most effective public health interventions for preventing infectious diseases and reducing child mortality worldwide. However, in developing countries such as Senegal, challenges such as irregular vaccination follow-up, missed appointments, limited access to healthcare information, and language barriers continue to affect immunization coverage. This work proposes an intelligent digital vaccination management system designed to improve accessibility and monitoring of vaccination services. The system integrates a web and mobile application that enables the management of parents, children, vaccination appointments, and digital vaccination records. It also provides real-time dashboards for monitoring vaccination indicators across different administrative levels in Senegal, including regions, departments, districts, and health posts. In addition, an artificial intelligence model based on machine learning techniques is developed to predict the risk of vaccination delay in children using socio-economic and geographical factors such as maternal education level, income, distance to health facilities, and transportation access. The model classifies risk into three categories: low, moderate, and high risk. Furthermore, the system incorporates local languages such as Wolof, Pulaar, and Serer to improve communication and increase user engagement. Experimental results show that the proposed system enhances vaccination follow-up, improves decision-making, and supports early identification of at-risk children.

ZT1002

Research on a Multi-Dimensional Composite Feature Extraction Method for Wind Turbine Blade Acoustic Signals

Gaomin Zhang[1], Yijing Zhang[1], Wenshuai Deng[1, 2] and Bin Zhang[3]
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2: Xi'an University of Posts and Telecommunications, China
3: Kanagawa University, Japan

Abstract—Wind turbine blades are prone to various types of defects after long-term operation in harsh environments. To analyze acoustic wave data of wind turbine blades, this paper characterizes the acoustic signals at multiple scales from multiple dimensions, including auditory perception, harmonic structure, and temporal evolution, and proposes a multi-dimensional composite feature extraction strategy. The mapping relationship between the acoustic features of simulated blades and real blades is also investigated, providing technical support for further research on wind turbine blade acoustic signal detection. The scope of this work is limited to intact (defect-free) blades; defect-identification performance is discussed as an intended downstream application and has not yet been validated on defective samples.

Session 2 (9:30-11:30)

November 8, 2026, Sunday (9:30-11:30, GMT+8)

Topic: Sensor-Based Complex Systems and Intelligent Control Engineering Applications

Session Chair: Assoc. Prof. Vinh Bui, Southern Cross University, Australia

Time: 9:30-11:30, November 8, 2026

Zoom ID: 823 6628 9225

Zoom Link: https://us02web.zoom.us/j/82366289225

***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.**

ZT0014

DEC: Adaptive Degree Decomposition for Influential Node Identification

Xiao Qiao

South China Normal University Guangzhou, China

Abstract—Influential node identification is a fundamental problem in complex network analysis, with applications in information diffusion, epidemic control, and network robustness. Existing local centrality methods often rely on node degree or neighbor degree, treating different local connections as equiva¬lent. This may overestimate nodes in dense local clusters while underestimating nodes with stronger outward expansion ability. To address this problem, this paper proposes DEC, an adaptive degree decomposition centrality method. DEC uses Adaptive Degree Decomposition (ADD) to divide neighborhood degree information into direct connection, local closure, and second-order outward expansion components, and then integrates node ADD, neighbor ADD accumulation, and Eigenvector Centrality (EC) to capture local structural potential, neighbor continuation ability, and global positional information. Experiments on 13 real networks using the SIR model show that DEC outperforms multiple types of baseline methods in terms of Kendall's tau and imprecision, demonstrating its effectiveness and stability for influential node identification.

ZT0015

Multi-Dimensional Automatic Leveling Control System for an Intelligent Plastering

Robot Based on Three-Axis IMU and Dual-Laser Sensing

Hui Xiang[1], Yang Wang[1], Yuhang Xia[1], Zisheng Wang[2], Xueyuan Yan[2], Yang Shen[1], Wei Liu[2] and Changzhu Wu[2]
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2: Hubei Gongjian Intelligent Equipment Co., Ltd., China

Abstract—To address uneven plastering thickness caused by tilted mobile chassis and skewed end-effectors in indoor operations, this paper proposes a multi-dimensional automatic leveling control system for smart plastering robots based on a three-axis inertial measurement unit and dual laser sensors. The system adopts a decoupled architecture comprising an IMU-based chassis attitude estimation loop and a dual-laser-based plastering head parallelism control loop. For chassis control, a six-axis IMU estimates spatial inclination in real time, enabling precise vertical alignment via an anti-overconstraint linkage control algorithm. For end-effector control, distance data from dual laser sensors are fused to model angular deviation, allowing real-time skew correction and wall-finding via closed-loop feedback. Experimental results demonstrate that the proposed system completes multi-dimensional leveling within 20 s, achieving an attitude control precision better than 0.06° and keeping the parallelism deviation under 0.2 mm, thereby ensuring construction quality and enhancing intelligent automation.

ZT1004

Non-Contact Water-Level Measurement Using Frequency-Modulated Continuous-Wave Radar: System Model, Evaluation, and Comparison

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2: Beihang Jinhua Beidou Application Joint Laboratory, China
3: Chinese Academy of Sciences, China

Abstract-Water-level data constitute a critical observational basis for flood early warning, river flow regulation, irrigation district water allocation, and reservoir operation. Frequency-modulated continuous-wave (FMCW) radar estimates the distance from the sensor to the water surface by detecting the beat frequency between transmitted and received signals and derives the water-surface elevation by combining the installation elevation with attitude information, offering distinct advantages including non-contact measurement, ease of digital processing, and networked integration. This paper systematically analyzes the physical mechanisms of FMCW ranging and water-level conversion, and reviews recent research progress in river monitoring, coherent water-surface micro-displacement sensing, frequency-scanning imaging, and broadband array antennas. On this basis, it focuses on advanced techniques such as precise local spectral

estimation, anchor motion compensation, angular-range feature fusion, learning-based super-resolution, and radar-vision cross-validation, and proposes a water-level IoT architecture that accommodates echo quality, geometric reference, event-driven sampling, and remote operation and maintenance. The study points out that improving effective water-level measurement capability cannot rely solely on increasing the carrier frequency or refining the spectral grid, but must address core issues such as the non-stationarity of water-surface scattering, mounting-reference drift, cross-scenario applicability of models, and operation under weak-connectivity conditions. With physically interpretable quality control at its core, combining advanced radar sensing with long-term field validation, edge computing, and digital-twin services is a feasible pathway for scaling the application of this technology.

ZT0025

Bayesian Network Analysis of Aroma Associated Compounds in Flue Cured Tobacco

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2: Hubei University, China

Abstract-Bayesian networks provide a probabilistic framework for examining dependencies among aroma-associated compounds in flue-cured tobacco. This study compares hill climbing (HC) and simulated annealing (SA) using a discrete Bayesian network and a maximized Bayesian information criterion (BIC) score. HC obtained a BIC score of −19,529.16, compared with −20,159.79 for SA, a difference of 630.63 in favour of HC. Bootstrap edge frequencies were examined to distinguish frequently recovered associations from less stable connections. The reported table includes frequencies of 90–100% for several fatty-acid, organic-acid and extract-related links; these percentages remain provisional because the resampling denominator requires verification. The contribution is an application-level comparison of search strategies and structural stability, rather than a new optimization algorithm. A higher BIC in the available comparison does not establish global optimality or general algorithm superiority. Network arrows represent conditional dependencies and generate hypotheses for subsequent experiments; they do not establish biochemical conversion or causal direction. Incomplete dataset documentation, unverified bootstrap counts and the absence of documented independent validation constrain reproducibility and generalization.

ZT0029

Robust Siting of Battery Energy Storage Under Distribution-Topology Uncertainty: An Auditable Decision-Support Pipeline for PV-Rich Feeders

Xinyu Xu, Chunhong Li, Shuangqiu Qian and Wenwen Cai
State Grid Jiangsu Electric Power Co., Ltd. Nantong Power Supply Company, China

Abstract- Siting storage in PV-rich feeders is usually solved on an equivalent radial chain whose nodes are ordered by an engineering prior; this paper treats that ordering as an explicit source of uncertainty. Nine ordering hypotheses are built and the pipeline is re-run under each. Because the newly supplied field records do not include a verified feeder topology, node-voltage series, or source-unit metadata, the numerical siting outputs are retained as an auditable legacy benchmark rather than a field-validated prescription. A robustness-weighted submodular coverage objective adds a provably additive per-site stability reward, keeping the objective monotone submodular and the greedy "1-1/e" guarantee intact; relocate search separates constraint-induced from objective-preferred spacing; uniform sampling propagates line-length and unit-impedance uncertainty; and degenerate hypotheses are reported. On an anonymized 10 kV feeder with 56 PV stations, 6.883 MW of PV and 34 992 gate-meter samples, no node is selected more than three times in nine hypotheses, and two features survive every non-degenerate one: a three-site span within 32.14–37.50% of feeder length, and a middle site at 50.00–57.14% of that span. Six further seeds reproduce both while producing distinct but partly overlapping site triples, and the ordering changes violation severity far more than spatial extent, the worst exposure varying 35.3-fold. Capacity-ascending order, the worst arrangement, is a control only, so the two violation-reduction figures are not comparable.

ZT0028

Comprehensive Feature Similarity Analysis Based on Multivariate Gaussian Distribution Modelling

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2: Hubei University, China

Abstract-We compare tobacco origins through multivariate Gaussian models of ten quality features. The study dataset contains 749 records; analysis of intermediate-aroma middle-stalk leaves uses 284 records from 13 origins. Features are standardized jointly, and Ledoit-Wolf shrinkage regularizes origin-specific covariance matrices. Gaussian 2-Wasserstein distance and Monte Carlo estimates of normalized Jensen-Shannon (JS) divergence are compared, followed by classical multidimensional scaling (MDS) and Ward clustering. Xingshan and Baokang are the closest pair under both measures (W2 = 0.8550; normalized JS approximately 0.272). Pairwise rankings have Spearman correlation 0.944, but only seven of the ten closest pairs are shared. Two-dimensional MDS retains 72.5% and 37.2% of positive eigenvalue mass, respectively. The framework

supports exploratory origin comparison; substitution performance requires independent validation.

ZT0031

Candidate Paths Guided by Historical Load for Low Earth Orbit Satellite Routing

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Abstract- Precomputed routes reduce the need for online path search in low Earth orbit satellite networks, but a fixed candidate budget makes route quality depend on which paths are stored. We propose a history-guided pool that combines propagation cost with mean link-load observations during offline path enumeration. At query time, the router selects the valid candidate with the smallest bottleneck under current observations. On a fixed 300-node reference graph with ten synthetic traffic seeds, the proposed method and a propagation-based control each retained 24 paths per source–destination pair and used the same online rule. The history-guided pool reduced mean true path load by 5.47%, mean true bottleneck load by 7.73%, and the share of requests with a true bottleneck of at least 0.8 by 4.87 percentage points, with an increase of 0.4566ms in mean propagation delay. With 16 candidates, it met the predefined quality tolerances relative to the 24-candidate control for all ten seeds. The measured computation advantage over full-graph minimum-bottleneck routing held for independent queries. For shared batches, full-graph minimum-bottleneck routing took less time per request.

ZT0032

A Spatial–Service-Time Dual-Constrained Group Construction Method for LEO Satellite Handover

Yi Yang, Guannan Song, Guoqing Jia and Jianing Zhang
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Abstract-Spatially adjacent users in low Earth orbit satellite networks can have substantially different remaining service times, limiting the service-stage consistency of spatially constructed handover groups. This paper proposes dual-constraint DBSCAN, which jointly constrains spatial distance and the difference in remaining service time predicted from two-line element data and orbital propagation. An adaptive temporal threshold balances intragroup consistency and clustering coverage, while maximum-size control, coverage-boundary screening, and single-user fallback produce executable groups. With real Starlink orbital data, 500 users, and five random seeds, the weighted intragroup standard deviation is 2.565 ± 0.969s, 44.17% and 78.44% below K-means and

fixed-radius spatial DBSCAN, respectively, on each method's own grouped users. Across 25 five-city experiments on a DC-DBSCAN-conditioned user subset, the proposed method outperforms spatial DBSCAN in all trials and K-means in 15 trials. These results demonstrate improved intragroup service-time consistency, subject to a clustering-coverage tradeoff.

Call for Papers

MLHMI 2027

March 3-5, 2027 | Sapporo, Japan **Submission Deadline: November 25, 2026**

2027 8th International Conference on Machine Learning and Human-Computer Interaction (MLHMI 2027)

Conference Website: https://www.mlhmi.org

E-mail: mlhmi.conference@gmail.com

Conference Venue: Hokkaido University, Sapporo, Japan

All submissions will be peer reviewed by at least 2 reviewers. The accepted and registered paper (after double blind review)will be published in **IEEE Conference Proceedings**, which will be included in IEEE Xplore and be submitted for indexing to Ei Compendex, Scopus.

Submission System: https://www.zmeeting.org/submission/MLHMI2027

Keynote Speaker: Prof. Toshihiko Yamasaki, The University of Tokyo, Japan

Conference will be held in **Sapporo, Japan.**





APIT 2027

January 22-24, 2027 | Osaka, Japan **Submission Deadline: November 10, 2026**

2027 Asia Pacific Information Technology Conference (APIT 2027)

Conference Website: https://www.apit.net

E-mail: apit.conference@gmail.com

Conference Venue: Ritsumeikan University (Osaka Ibaraki Campus), Japan

All accepted papers of APIT 2027 after proper registration and presentation will be published in APIT 2027 ACM conference proceedings, which will be submitted for indexing to Ei Compendex, Scopus.

Submission System: https://www.zmeeting.org/submission/APIT2027

Keynote Speakers: Prof. Qing Li, The Hong Kong Polytechnic University, Hong Kong, China; Prof. Nikola Kasabov, Auckland University of Technology, New Zealand

Conference will be held in **Osaka, Japan**.





Note