# **CONFERENCE PROGRAM**



### 2023 The 11th International Conference on Information Technology:

# **IOT AND SMART CITY**

DECEMBER 14-17, 2023 | KYOTO, JAPAN



Technical Sponsored by



### Hybrid

#### Clock Tower, Kyoto University, Japan

December 14-17, 2023



### **Onsite Venue**

**Online Link** 

2F, Clock Tower Building, Kyoto University, Japan Hall I and Meeting Rooms II, III, IV Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001



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Optional One-day Tour (paid)	

# AGENDA OVERVIEW

\* All schedules will be scheduled in Japan Standard Time (UTC+9)

### Day 1: December 13, 2023 | Wednesday

11:00-16:00	<b>Online Participants Test</b>		870 1671 1001
13:00-17:30	Onsite Registration	2	Meeting Room I (2F)
Day 2: Dec	ember 14, 2023   Thursday		
9:30-12:10	<b>Opening and Guest Speeches</b>		Hall I (2F)
12:10-13:30	Lunch	2	Hall I (2F)
14:00-15:45	Session 1-3	2	Hall I and Meeting Rooms II, III (2F)
17:00-19:30	Dinner	2	Hall II (2F)
Day 3: Dec	ember 15, 2023   Friday		
10:00-11:45	Session 4-5	2	Meeting Rooms III, IV (2F)
15:00-17:30	Guest Speech and Session A		870 1671 1001
Day 4: Dec	ember 16, 2023   Saturday		
10:30-16:45	Guest Speech and Session B-C		870 1671 1001
Day 5: Dec	ember 17, 2023   Sunday		

10:30-13:00	Guest Speech and Session D		870 1671 1001
10:00-18:00	Optional One-day Tour (paid)	2	Kyoto

# WELCOME

Dear distinguished delegates,

On behalf of the conference Committee, we warmly welcome you to 2023 The 11th International Conference on Information Technology: IoT and Smart City (ICIT 2023) and The 7th International Conference on Video and Image Processing (ICVIP 2023), which will take place on December 14-17, 2023 in Kyoto, Japan, organized by Kyoto University, Japan.

Through this conference, we would like to engage with all of you in an open and constructive dialogue about Information Technology: IoT and Smart City, and Video and Image Processing, which aims to provide a platform for experts and scholars from home and abroad who engaged in related fields research to share scientific research results and cutting-edge technologies, understand academic development trends, broaden research ideas, strengthen academic research and discussion.

It is the clear intent of the conference to offer excellent mentoring opportunities to participants. Besides, we'd like to express our sincere gratitude to everyone who has contributed to this conference as its success could have only been achieved through a team effort. A word of special welcome is given to our speakers who are pleased to make contributions to our conference and share their new research ideas with us. Additionally, our special thanks go to all committee members for their excellent work in reviewing the papers and their other academic support efforts.

We believe that by this excellent conference, you can get more opportunity for further communication with researchers and practitioners with the common interest in this field. We are dedicated to higher and better international conference experiences. We will sincerely listen to any suggestions and comments.

Wish all of you will have an unforgettable experience in the conference.

Yours sincerely, Conference Organizing Committee



# COMMITTEE

#### **Conference Chairs**

Xuefeng Liang, Xidian University, China Liang Zhao, Kyoto University, Japan

#### **Program Chairs**

Manhua Liu, Shanghai Jiao Tong University, China Hongwei Du, California State University, United States Weiwei Du, Kyoto Institute of Technology, Japan Minho Jo, Korea University, South Korea Yanlin Geng, Xidian University, China Leida LI, Xidian University, China

#### **Program Co-chairs**

Guowei Lu, The University of Aizu, Japan Hongbo Jiang, Hunan University, China Yaohua Deng, Guangdong University of Technology, China Guoyue Chen, Akita Prefectural University, Japan

#### Local Chair

Chang Kai-Chun, Kyoto University, Japan

#### **Student Program Chairs**

Xiangjie Kong, Zhejiang University of Technology, China Qiu Daowen, Sun Yat-sen University, China Jerry Chun-Wei Lin, Western Norway University of Applied Sciences, Norway Sheng Li, Fudan University, China Ken Gorro, Cebu Technological University, Philippines

#### **Regional Chairs**

Liu Fang, Singapore University of Social Sciences, Singapore Xuehe Wang, Sun Yat-sen University, China Shancheng Zhao, Jinan University, China Yanhan Zeng, Guangzhou University, China Weiwei Guan, Dalian Ocean University, China

#### **Publicity Chairs**

Warusia Mohamed Yassin, Technical University of Malaysia, Malaysia Jianpeng Hu, Shanghai University of Engineering Science, China Viany Utami Tjhin, Bina Nusantara University, Indonesia



# VENUE

### 2F, Clock Tower, Kyoto University

(<u>https://www.kyoto-u.ac.jp/en/about/profile/facilities/staff/clocktower</u>) Location: In front of the main gate of the Kyoto University Main Campus Detail Conference Venue: 36 Yoshidahonmachi, Sakyo Ward, Kyoto, 606-8317, Japan





How to get there?

### 🛧 From Osaka Kansai International Airport

Taxi: 104 kilometers | 1h40mins Railway and Bus: walk 900m (9min)—HARUKA 44 (1h18mins)—Kyoto Station—Bus 206 (28mins)— Kyoto University



Accommodation is not included in the registration.

# **ONLINE GUIDELINES**

#### **Before the Conference**

#### **Time Zone**

#### Japan Standard Time (GMT+9)

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

#### **Platform: ZOOM**

\* You can download Zoom Platform from the link below: https://zoom.us/download

<u>https://zoom.com.cn/download</u>(Chinese authors' option)

#### **Equipment Needed**

- A computer with internet connection and camera
- Headphones

#### **Environment Needed**

- A quiet place
- Stable internet connection
- Proper lighting and background

#### **Test Your Presentation Date: December 13, 2023**

Prior to the formal meeting, presenters shall join the test room to ensure everything is on the right track. Please check your test time on this program.

Every presenter or listener enter the ZOOM, please rename as SESSION NUMBER + PAPER ID + YOUR NAME.

#### \*For example:

Presenter: KT1-001+David Listener: L001+David

#### **During the Conference**

#### **Voice Control Rules**

- The host will mute all participants while entering the meeting.
- Speakers can unmute microphone when it is turn for his or her presentation.
- Q&A goes after each speaker, the participant can raise questions.

#### **Oral Presentation**

- Timing: a maximum of 15 minutes in total, including 2-3 minutes for Q&A. Please make sure your presentation is well timed.
- Please join the meeting room 10 minutes in advance.
- We encourages all presenters to make live oral presentations. For technical problems such as network instability, we suggest you email a record video/slide to conference secretary as backup before on December 10, 2023.

#### **Conference Recording**

• We will not record the whole conference, but will screenshot for each presenter as conference participation proof. If you need a record of your presentation, please tell the staff in advance.

# **DETAILED AGENDA**

\* All schedules will be scheduled in Japan Standard Time (UTC+9)

### Day 1

December 13, 2023 | Wednesday

Onsite Re	gistration
13:00-17:30	<b>Meeting Room I   2F</b>
• Give your <b>Paper ID</b> to the staff.	
• Sign your name in the attendance list a	and check meal information.
• Check your conference kit, which inclu conference program, the receipt of the p	ides conference bag, name tag, meal voucher, payment, the USB of paper collection.

Online Test	
	ID: 870 1671 1001
Lin	k: https://us02web.zoom.us/j/87016711001
11:00-11:30	Prof. Gang Zhou, Prof. Habil.Udo Birk,
	Assoc. Prof. Siti Hajar Binti Halili, Prof. Anand Nayyar
11:30-12:30	Prof. Rung-Ching Chen; session chairs
15:00-16:00	<ul> <li>Session A: KT1-139, KT1-191, KT2-003, KT2-0028, KT2-1001, KT2-0022, KT1-184, KT1-159</li> <li>Session B: KT1-190, KT2-0061, KT2-0010, KT2-0018, KT2-0031, KT2-0040, KT2-0058, KT1-074</li> <li>Session C: KT1-144, KT1-110, KT1-148, KT1-155, KT1-142, KT1-182, KT1-106</li> <li>Session D: KT1-086, KT1-087-A, KT1-100, KT1-140, KT1-146, KT1-180, KT1-192, KT1-174</li> </ul>

### Day 2 December 14, 2023 | Thursday

Conference Opening & Guest Speeches		
Onsite: Hall I - 2F		
Onl	ine: 870 1671 1001; Lin	ık: https://us02web.zoom.us/j/87016711001
Japan Standard Time	Event	Speaker
9:30-9:40	Opening Remarks	Prof. Liang Zhao, Kyoto University, Japan
9:40-10:15	Keynote Speech 1	Prof. Fumiyuki Adachi, IEEE Life Fellow, Tohoku University, Japan Speech title: Recent Advances in Wireless Technology Towards B5G/6G
10:15-10:50	Keynote Speech 2	Prof. Gang Zhou, IEEE Fellow, William & Mary, USA Speech title: Wearable Computing for Healthcare and Motion Analysis
10:50-11:20	Group Photo and Con	ffee Break
11:20-11:50	Keynote Speech 3	Prof. Ainuddin Wahid Bin Abdul Wahab, University of Malaya, Malaysia Speech title: Internet of Things (IoT) Applications in GLAM(Gallery, Library, Archive and Museum) Services
11:50-12:10	Invited Speech 1	Prof. Seokwon Yeom, Daegu University Gyeongsan, Korea Speech title: Long Distance Ground Target Tracking with a Drone
12:10-13:30	Lunch   Hall I (2F)	
		Session 1-3
Japan Standard Time	Venue	Presenter
14:00-15:45	Hall I (2F)	Session 1: Image denoising and synthesis KT1-066, KT1-008-A, KT2-009-A, KT2-0043, KT1-058, KT1-060, KT1-059
14:00-15:45	Meeting Room II (2F)	Session 2: Intelligent monitoring systems and urban applications KT1-020, KT1-065, KT1-067, KT1-072, KT1-055, KT1-157, KT1-063
14:00-15:30	Meeting Room III (2F)	Session 3: ICT based information management system and practical analysis KT1-068, KT1-006-A, KT1-016, KT1-046, KT1-062, KT1-064
17:00-19:00	Dinner   Hall II (2F)	

### Day 3 December 15, 2023 | Friday

Session 4-5		
Japan Standard Time	Venue	Presenter
10:00-11:30	Meeting Room III (2F)	Session 4: Data security and intelligent computing in the iot and information network KT1-025, KT1-049, KT1-137, KT1-150, KT1-057, KT2-0049
10:00-11:45	Meeting Room IV (2F)	Session 5: Software testing and reliability analysis KT1-036, KT1-040-A, KT1-050-A, KT2-007-A, KT1-136-A, KT1-061, KT1-022
	Guest	Speech & Session A
Onl	ine: 870 1671 1001; Lir	nk: https://us02web.zoom.us/j/87016711001
Japan Standard Time	Event	Speaker
15:00-15:30	Invited Speech 2	Prof. Habil. Udo Birk, University of Applied Sciences of the Grisons, Switzerland Speech title: Smart Surveillance Sensors
15:30-17:30	Session A	Image computing models and analysis methods KT1-139, KT1-191, KT2-003, KT2-0028, KT2-1001, KT2-0022, KT1-184, KT1-159

### Day 4

### December 16, 2023 | Saturday

Guest Speech & Session B		
Onl	ine: 870 1671 1001; Lin	ık: https://us02web.zoom.us/j/87016711001
Japan Standard Time	Event	Speaker
10:30-11:00	Invited Speech 3	Assoc. Prof. Siti Hajar Binti Halili, Unversity of Malaya, Malaysia Speech title: Digital Innovation & strategies in e-learning
11:00-13:00	Session B	Visual based image detection and application KT1-190, KT2-0061, KT2-0010, KT2-0018, KT2-0031, KT2-0040, KT2-0058, KT1-074
Session C		
Onli	ine: 870 1671 1001; Lin	ık: https://us02web.zoom.us/j/87016711001
Japan Standard Time	Event	Speaker
15:00-16:45	Session C	Data-driven recommendation systems and information security KT1-144, KT1-110, KT1-148, KT1-155, KT1-142, KT1-182, KT1-106

### Day 5 December 17, 2023 | Sunday

Guest Speech & Session D		
Onl	ine: 870 1671 1001; Lin	ık: https://us02web.zoom.us/j/87016711001
Japan Standard Time	Event	Speaker
10:30-11:00	Invited Speech 4	Prof. Anand Nayyar, Duy Tan University, Vietnam Speech title: Autonomous Vehicles: Reimagining Transportation for the Future
11:00-13:00	Session D	Modern Information Technology and Engineering Applications KT1-086, KT1-087-A, KT1-100, KT1-140, KT1-146, KT1-180, KT1-192, KT1-174
10:00-18:00	Optional One-day To	our (paid)



#### Prof. Fumiyuki Adachi

IEEE Life Fellow, Tohoku University, Japan

Speech Time: 9:40-10:15 on December 14, 2023 (UTC+9) Venue: Hall I, Clock Tower, Kyoto University, Japan (2F) Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001

**B**<sup>10</sup>: Fumiyuki Adachi (Life Fellow, IEEE) received the B.S. and Dr. Eng. degrees in electrical engineering from Tohoku University, Sendai, Japan, in 1973 and 1984, respectively. In April 1973, he joined the Electrical Communications Laboratories with Nippon Telegraph and Telephone (NTT), Tokyo, Japan, and conducted research on digital cellular mobile communications. From July 1992 to December 1999, he was with NTT DOCOMO, Tokyo, where he led a Research Group on wideband/broadband wireless access for 3G and beyond. Since January 2000, he has been with Tohoku University. He is currently leading a Resilient Wireless Communication Research Group with the International Research Institute of Disaster Science, Tohoku University, towards the development of beyond 5G systems. His research interests include the area of wireless signal processing and networking, multi-access, equalization, antenna diversity, adaptive transmission, channel coding, radio resource management. Dr. Adachi was the recipient of IEEE VTS Avant Garde Award 2000, IEICE Achievement Award 2002, Thomson Scientific Research Front Award 2004, Prime Minister Invention Award 2010, C&C Prize 2014, IEEE VTS Stuart Meyer Memorial Award 2017, IEEE ComSoc RCC Technical Recognition Award 2017, APCC2019 Best Paper Award.

#### itle: Recent Advances in Wireless Technology Towards B5G/6G

Over the past 40 years, mobile communication systems have evolved from 1G to 5G. Advances in wireless technology have greately contributed to this evolution. This talk concerns recent advances in wireless technology towards Beyond 5G (B5G)/6G. Due to the rapid growth of broadband data services and proliferation of IoT devices, mmWave band is utilized for 5G systems. Unfortunately, however, its deployment is rather slow. Considering that the mmWave band is indispensable for radio access in B5G/6G, it is necessary to find a way to accelerate its utilization by changing the disadvantage of the mmWave short distance communication into an advantage. Ultra-densification of radio access not only greatly improves spectral efficiency, but also makes it possible to utilize the mmWave band. This talk will introduce the concept of scalable and flexible cell-free/distributed multi-user MIMO.



Prof. Gang Zhou IEEE Fellow, William & Mary, USA

Speech Time: 10:15-10:50 on December 14, 2023 (UTC+9) Speaker's Local Time: 20:15-20:50 on December 13, 2023 Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001

**IO:** Dr. Gang Zhou is a professor of computer science at William & Mary, where he previously served as the Graduate Program Director from 2015 to 2017. He is an IEEE Fellow, an AAIA Fellow, a co-Editor-In-Chief of ACM Transactions on Computing for Healthcare, and a co-Area-Editor of IEEE Internet of Things Journal. He earned his Ph.D. degree from the University of Virginia in 2007. His research interests encompass a range of cutting-edge topics, including wearables & sensor systems, smart health, internet of things, wireless, ubiquitous & mobile computing. Dr. Zhou has served as a Steering Committee member (2018-present), General Chair (2019), and TPC Chair (2018 and 2023) of CHASE---ACM/IEEE's premier conference on Connected Health: Applications, Systems and Engineering Technologies. He has also been recognized with several prestigious awards, including the NSF CAREER Award in 2013, the Best Paper Award from IEEE Internet Computing in 2020, and the Best Paper Award from IEEE ICNP in 2010.

**T**itle: Wearable Computing for Healthcare and Motion Analysis

Healthcare is a fundamental human need that has been revolutionized by computing in the past century. Technology has transformed the way we approach healthcare from paper and pencil to individual computers, to connected devices via the internet, and now to wireless and mobile smartphones and wearables. In recent years, sensors have been integrated into these mobile and wearable devices, making healthcare a potential game-changing application for wearables. Additionally, non-contact sensing based on radio technologies is emerging as a promising new approach. As mobile and wearable computing can potentially dominate the healthcare landscape, I am excited to introduce three wearable computing platforms that my research group has been developing for Parkinson's Disease patients and other subjects for gait and motion analysis and real-time intervention. These platforms include IMU, magnet, and textile sensors. Using these sensors, we can provide personalized and targeted interventions to improve patient outcomes and well-being. Join me as we explore the possibilities of wearable technology in healthcare and motion analysis and how these innovative platforms can help us provide better care to those in need.



#### Prof. Ainuddin Wahid Bin Abdul Wahab University of Malaya, Malaysia

Speech Time: 11:20-11:50 on December 14, 2023 (UTC+9) Venue: Hall I, Clock Tower, Kyoto University, Japan (2F) Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001

**B** 10: Ainuddin Wahid Abdul Wahab earned his Ph.D. in Computing from Surrey University, United Kingdom. He is currently an Executive Director of GLAM (Gallery, Library, Archive and Museum) of Universiti Malaya and a Professor at the Department of Computer System and Technology, Universiti Malaya, Kuala Lumpur, Malaysia.

itle: Internet of Things (IoT) Applications in GLAM (Gallery, Library, Archive and Museum) Services

In recent years, the Internet of Things (IoT) has gained more interest from industry and academics. GLAM (Gallery, Library, Archive and Museum) uses IoT to preserve cultural heritage items to benefit academia and the public while facilitating efficient access to knowledge. In addition to a report on upcoming trends and research challenges, this talk aims to present the existing state of IoT deployment in GLAM operations and services.



#### Prof. Seokwon Yeom Daegu University Gyeongsan, Korea

Speech Time: 11:50-12:10 on December 14, 2023 (UTC+9) Venue: Hall I, Clock Tower, Kyoto University, Japan (2F) Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001

**B** 10: Seokwon (Seok-Won, Sekwon) Yeom has been a faculty member of Daegu University since 2007. He is now a full professor of the same university, School of AI. He has a Ph.D. in Electrical and Computer Engineering from the University of Connecticut in 2006. His research interests are intelligent image/optical information processing, deep/machine learning, and

His research interests are intelligent image/optical information processing, deep/machine learning, and target tracking. He has researched on multiple target tracking for the airborne early warning (AEW) system, three-dimensional image processing with digital holography and integral imaging, photon-counting linear discriminant analysis (LDA) and photon-counting nonlinear matched filter, millimeter wave (MMW) and infrared (IR) image analysis, and long-distance target tracking for aerial surveillance and search and rescue (SAR) mission with a small drone. He has been a guest editor of Applied Sciences and Drones in MDPI since 2019. He has served as a board member of the Korean Institute of Intelligent Systems, and a member of the board of directors of the Korean Institute of Convergence Signal Processing. He was program chair of ICCCS2015, ISIS2017, iFUZZY2018, ICCCS2019, ADIP2021-2023, IPMV2024, ICESP2024. He was a vice director of the AI homecare center and a head of the department of IT convergence engineering at Daegu University in 2020, a visiting scholar at the University of Maryland in 2014, and a director of the Gyeongbuk techno-park specialization center in 2013.

#### itle: Long Distance Ground Target Tracking with a Drone

In the invited talk, multiple ground target tracking with a small drone is presented. The coordinates of the image are converted to real-world based on the angular field of view, tilt angle, and altitude of the camera. Through the image-to-position conversion, the threshold of the actual object size and the center position of the detected object in real-world coordinates are obtained. Moving object detection consists of frame-to-frame subtraction and thresholding, morphological operation, and false alarm removing based on the object size and shape properties. The measurement that is statistically nearest to the state prediction updates the target's state. With the improved track-to-track association, the fittest track is selected in the track validation region, and the direction of the displacement vector and velocity vectors of the two tracks are tested with an angular threshold. In the experiment, total track life (TTL) and mean track life (MTL) are obtained for 86 targets within approximately 1 km of the drone. The interacting multiple mode (IMM)-CV and IMM-CA schemes are adopted with varying angular thresholds.



Prof. Habil. Udo Birk

University of Applied Sciences of the Grisons, Switzerland

Speech Time: 15:00-15:30 on December 15, 2023 (UTC+9) Speaker's Local Time: 7:00-7:30 on December 15, 2023 Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001

**B** IO: Udo Birk is Head of Advanced Training Technics and Professor at the University of Applied Sciences of the Grisons in Chur, Switzerland. Udo Birk obtained his PhD in 2004 at the University of Heidelberg. As Marie Curie Fellow he developed optical imaging devices at King's College, London, UK and at FORTH, Heraklion, Greece. He worked on tissue imaging and spectroscopy at Roche Diagnostics and at the Medical Laser Center Lübeck and obtained his venia legendi in Experimental Physics from the University of Mainz in 2017. He is lecturer on Image Processing and Artificial Intelligence at University of Applied Sciences of the Grisons.

itle: Smart Surveillance Sensors

Smart Surveillance Sensors allow to detect, identify, and track people and objects. Additionally, such sensors may provide means for human machine interaction. These devices are constantly being redefined and augmented and applied to broad fields ranging from mobile devices to smart homes to smart cities. We review challenges encountered in the application of smart surveillance sensors and illustrate some use cases e.g., in traffic monitoring and for automated doors. We use a miniaturized door automation system to study such systems far beyond the conventional detection capabilities required for opening and closing the door: Doors are only partially opened where needed, and at a higher level, the results of image and ranging sensor data evaluation such as customer identification, gestures, facial expression etc. can be fed into smart building surveillance, providing a novel user interaction experience.



#### Assoc. Prof. Siti Hajar Binti Halili Unversity of Malaya, Malaysia

Speech Time: 10:30-11:00 on December 16, 2023 (UTC+9) Speaker's Local Time: 9:30-10:00 on December 16, 2023 Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001

**B**<sup>10:</sup> Ts.Dr. Siti Hajar Halili is an Associate Professor at the University of Malaya, Kuala Lumpur. She is the Head of the Department of Curriculum & Instructional Technology. She was formerly with the Research Division, Prime Minister Department, Malaysia. She holds a Degree in Information System Management from the University Technology MARA, a Master's in Educational Technology, and PhD. in Adult Education Technology from the University Sains Malaysia. Her works are published in ISI, SCOPUS, Malaysian and International journals. She has also published books and chapters in books. She also serves as Chief Editor of Jurnal Penyelidikan Pendidikan, and article reviewer for several journals and conferences. She is also being appointed as the university open distance learning (ODL) expert, Programme Coordinator for the university ODL and Master of Instructional Technology program, Head of Auditor for the faculty of education, and one of the committee members of the University Malaya Family Research & Development Center. Currently, she is active in research and publishes in Instructional Design & Technology, Open Education, Curriculum Instructional Design & Technology, Educational Technology And Media (Flipped Learning, Open-Badges Learning, and Digital Learning).

#### itle: Digital Innovation & strategies in e-learning

Digital innovation in e-learning has transformed traditional training methods, ushering in a new era of accessible and flexible education. This shift is characterized by learning experiences that can be accessed through web technology, supported by various web-enabled tools. The fundamental concept revolves around enabling individuals to learn at their own pace and convenience, breaking away from the constraints of traditional classroom settings. At its core, e-learning is any form of learning that leverages digital technology to deliver educational content. Digital innovation has revolutionized the field of e-learning, moving away from traditional methods towards a more flexible, accessible, and interactive education is evolving to meet the diverse needs of learners in the digital age. As an instructional designer, the role is crucial in proactively introducing new teaching strategies and methods to enhance the teaching and learning experience. Proactively introducing new teaching strategies and methods ensures that education remains relevant, engaging, and tailored to the diverse needs of all students.



#### Prof. Anand Nayyar Duy Tan University, Vietnam

Speech Time: 10:30-11:00 on December 17, 2023 (UTC+9) Speaker's Local Time: 8:30-9:00 on December 17, 2023 Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001

IO: Dr. Anand Nayyar received Ph.D (Computer Science) from Desh Bhagat University in 2017 in the area of Wireless Sensor Networks, Swarm Intelligence and Network Simulation. He is currently working in School of Computer Science-Duy Tan University, Da Nang, Vietnam as Professor, Scientist, Vice-Chairman (Research) and Director- IoT and Intelligent Systems Lab. A Certified Professional with 125+ Professional certifications from CISCO, Microsoft, Amazon, EC-Council, Oracle, Google, Beingcert, EXIN, GAQM, Cyberoam and many more. Published more than 180+ Research Papers in various High-Quality ISI-SCI/SCIE/SSCI Impact Factor- Q1, Q2, Q3, Q4 Journals cum Scopus/ESCI indexed Journals, 70+ Papers in International Conferences indexed with Springer, IEEE and ACM Digital Library, 40+ Book Chapters in various SCOPUS/WEB OF SCIENCE Indexed Books with Springer, CRC Press, Wiley, IET, Elsevier with Citations: 11600+, H-Index: 57 and I-Index: 210. Member of more than 60+ Associations as Senior and Life Member like: IEEE (Senior Member) and ACM (Senior Member). He has authored/co-authored cum Edited 50+ Books of Computer Science. Associated with more than 600+ International Conferences as Programme Committee/Chair/Advisory Board/Review Board member. He has 18 Australian Patents, 7 German Patents, 4 Japanese Patents, 34 Indian Design cum Utility Patents, 10 UK Patents, 1 USA Patent, 3 Indian Copyrights and 2 Canadian Copyrights to his credit in the area of Wireless Communications, Artificial Intelligence, Cloud Computing, IoT, Healthcare, Drones, Robotics and Image Processing. Awarded 46 Awards for Teaching and Research-Young Scientist, Best Scientist, Best Senior Scientist, Asia Top 50 Academicians and Researchers, Young Researcher Award, Outstanding Researcher Award, Excellence in Teaching, Best Senior Scientist Award, DTU Best Professor and Researcher Award- 2019, 2020-2021, 2022, Distinguished Scientist Award by National University of Singapore, Obada Prize 2023, Lifetime Achievement Award 2023 and many more. He is listed in Top 2% Scientists as per Stanford University (2020, 2021, 2022), Ad Index (Rank No:1 Duy Tan University, Rank No:1 Computer Science in Viet Nam) and Listed on Research.com (Top Scientist of Computer Science in Viet Nam- National Ranking: 2; D-Index: 31).

He is acting as Associate Editor for Wireless Networks (Springer), Computer Communications (Elsevier), International Journal of Sensor Networks (IJSNET) (Inderscience), Frontiers in Computer Science, PeerJ Computer Science, Human Centric Computing and Information Sciences (HCIS), Tech Science Press- IASC, Computers Materials and Continua (CMC), IET-Quantum Communications, IET Wireless Sensor Systems, IET Networks, IJDST, IJISP, IJCINI, IJGC, IJSIR. He is acting as Managing Editor of IGI-Global Journal, USA titled "International Journal of Knowledge and Systems Science

(IJKSS)" and Editor-in-Chief of IGI-Global, USA Journal titled "International Journal of Smart Vehicles and Smart Transportation (IJSVST)". He has reviewed more than 2500+ Articles for diverse Web of Science and Scopus Indexed Journals. He is currently researching in the area of Wireless Sensor Networks, Internet of Things, Swarm Intelligence, Cloud Computing, Artificial Intelligence, Drones, Blockchain, Cyber Security, Healthcare Informatics, Big Data and Wireless Communications.

#### itle: Autonomous Vehicles: Reimagining Transportation for the Future

The landscape of transportation is on the cusp of a revolution, driven by the exciting potential of autonomous vehicles (AVs). This lecture delves into the heart of this transformative technology, exploring its current state, its boundless possibilities, and the key challenges that lie ahead. We begin by examining the intricate interplay of sensors, algorithms, and computational muscle that empowers AVs to navigate the complexities of the road. LiDAR, radar, and cameras become the eyes, perceiving the environment with superhuman precision. AI algorithms, fueled by vast datasets, translate that perception into action, enabling intelligent decision-making and maneuver planning. This symphony of technology allows AVs to not only replicate human driving, but to surpass it in terms of reaction times, adherence to traffic rules, and the potential to optimize traffic flow. Next, we shift our focus towards the horizon, envisioning the transformative impact AVs could have on our world. Imagine a future where roads become safer havens, with accidents drastically reduced due to the elimination of human error. Envision cities reimagined for pedestrians and cyclists, as AVs reclaim parking lots and prioritize shared mobility options. We explore how AVs could revolutionize not just personal transportation, but also public transit, logistics, and even on-demand services, weaving a seamless tapestry of mobility solutions. However, the path to this autonomous future is not without its hurdles. Ethical dilemmas surrounding liability and decision-making in unavoidable accidents demand careful consideration. Regulatory frameworks need to evolve to accommodate this new breed of driver. Public acceptance hinges on addressing concerns about privacy, security, and potential job displacement. These challenges require collaboration between policymakers, technologists, and the public to ensure a responsible and equitable AV rollout. In conclusion, this lecture paints a vivid picture of autonomous vehicles, not just as technological marvels, but as catalysts for a paradigm shift in transportation. We stand at the precipice of a future where cars drive themselves, roads become safer, and mobility becomes accessible to all. By embracing the potential and navigating the challenges, we can pave the way for a future where autonomous vehicles redefine the very meaning of getting around.

# **SESSION**

#### \* All schedules will be scheduled in Japan Standard Time (UTC+9)

14:00-15:45	Session 1 – Image denoising and synthesis		
December 14, 2023	Venue: Hall I, Clock Tower, Kyoto University (2F)		
Session Chair: Asso	Session Chair: Assoc. Prof. Vallidevi Krishnamurthy, Vellore Institute of Technology Chennai, India		
14:00-14:15 KT1-066	Title: Pluralistic Face Completion of Masked Face based on 3D priors Author(s): Vallidevi Krishnamurthy Presenter: Vallidevi Krishnamurthy Vellore Institute of Technology Chennai, India Abstract: The pluralistic face completion system is developed as a web application that generates multiple face images for a face which is covered under a face mask. The web application consists of five modules where it deals with, 1) Applying a face mask to the person's image, 2) Removing face mask in the masked face image by generating the covered part of the face corresponding to rest of the face part with multiple outputs, 3) Checking similarity between resultant images and input images given by user, 4) Querying a person's availability in group image and 5) Face aging module where a person of any age is given along with the desired age number, where it generates the face image of the required age of a person. The found similar person can be checked for his outlook on various angles, by ro-tating the person's face. Face generation algorithms are prone to generate differentiating outputs then the ground truth image. As these algorithms generate only single output, there is a high scope these outputs not being closely matched with the original image. Hence, in this project multiple diverse output images are generated, which increases the probability of achieving the highest similarity with the original image. Masking the face is attained by using Dlib library while the rendering of the face is achieved by using Genera-tive Adversarial Networks (GAN). The proposed project is designed such that, it solves the dependency of manually labelling missing regions of the face (i.e., mask region on the face), identifying the best matching similar face for the generated face image from the former network and identifying the person of interest in a given group image.		
14:15-14:30 KT1-008-A	Title: Ultrasound to MRI Fetal Brain Image Synthesis based on the Cycle Denoising Diffusion Probabilistic Model Author(s): Jincheng Peng and Guoyue Chen Presenter: Jincheng Peng Akita Prefectural University, China		
	Abstract: In recent years, the brain health of fetuses has been increasingly prioritized by their parents. The low-cost and efficient acquisition of fetal brain images has become a hot research topic. With the application of deep learning in medical image		

synthesis, the technology of converting high-quality medical MRI images into CT images has become the mainstream research method and has gradually matured. However, there has been little research on synthesizing magnetic resonance imaging (MRI) images from ultrasound images due to the difficulty in obtaining high-quality paired images in the dataset. In this case, this paper proposes a novel approach that combines the denoising diffusion probabilistic model (DDPM) and the cycle gan model to synthesize pseudo Magnetic Resonance Imaging (MRI) images from fetal brain ultrasound images. The network utilizes an encoder-decoder architecture to sample latent variables from both domains. It leverages underlying network layers to extract information such as edges, shapes, and textures from images in both domains. Additionally, a cycle consistency loss is employed to establish a mapping function between the latent variables of the two domains. By learning the model parameters from a given dataset of fetal ultrasound images and MRI images, the network employs the reverse sampling process of the denoising diffusion model to reconstruct synthesized MRI images. This network model addresses the problem of synthesizing images from non-paired datasets and achieves satisfactory synthesis results on the fetal-ultrasound-brain and MRI Brain Tumor Classification datasets. In the future, further improvements can be made based on this framework to synthesize high-quality fetal brain MRI images, providing richer auxiliary information for clinical diagnosis. Title: Anticipating object motion in complex scenarios using optical flow

Author(s): Soraya Mora,Cesar Ravello,Tomás Perez-Acle

Presenter: Soraya Mora

Universidad San Sebastian, Chile

Abstract: The theory of predictive coding asserts that the central nervous system utilizes perceived information to create predictions and endow perception with meaning. Inspired by this biological model, artificial intelligence algorithms based on predictive theory have been crafted to generate predictions for sequences of sound, images, and videos. In this research, we introduce an innovative method to forecast object movements by predicting optical flow in sequences of images extracted from videos, aiming to reduce spatial and temporal redundancy, thereby enhancing data compression efficiency and achieving more accurate predictions.

Our approach encompasses a convolutional neural network (CNN) that estimates optical flow from image sequences obtained from the KITTI dataset. The optical flow is then encoded by convolutional residual blocks, and the outputs of consecutive frames are fed into an autoregressive function. This process allows for a comprehensive representation of scene history, which is utilized to predict subsequent motion sequences.

The method has proven its ability to provide dependable predictions regarding the future trajectories of objects in contexts involving multiple moving entities. We assessed performance using cosine similarity to compare predicted optical flow with the actual future flow and the Structural Similarity Index (SSIM) to evaluate the

#### 14:30-14:45 KT2-009-A

	reconstruction of images from optical flow against real future images. As a whole, our research offers an impactful fusion of predictive coding with optical flow estimation through autoregressive models, facilitating the anticipation of object movement with high precision. Of note, the proposed approach contributes substantially to efficiency and accuracy in predictions through enhanced data compression. This fresh perspective offers vast potential in applications where object movement is vital, such as video analysis, tracking systems, and the control of autonomous devices like cars, robots, or drones.
	Title: Underwater Image Dehazing in YCbCr Color Space Using Superpixel Segmentation Author(s): Mrinmoy Kumar Das, Nitya Varshini Gaddala, Pratinav Reddy Bommireddy, Rahul Roy Presenter: Nitya Varshini Gaddala Mahindra University, India
14:45-15:00 KT2-0043	Abstract: The article introduces a novel technique to improve underwater image quality, addressing challenges such as light absorption, poor contrast, scattering effects, and color distortions. The algorithm uses the YCbCr color space to separate image luminance and chrominance, allowing a targeted treatment of these elements. It begins by converting the RGB underwater image to YCbCr, followed by decomposing it into luminance and chrominance components. The luminance undergoes dehazing using the underwater normalized total variation (UNTV) method and superpixel segmentation to improve clarity and reduce haze. Atmospheric light estimation through superpixel segmentation contributes to accurate scene radiance restoration. Chrominance is then refined using the dehazed luminance and chrominance components are recombined in the YCbCr space, and the final image is converted back to RGB. The efficacy of the algorithm is demonstrated on two benchmark datasets, showing its promise and highlighting the potential of the YCbCr color space for effective underwater image enhancement.
	Title: Optimizing Parkinson's Disease Classification and Severity Assessment Using Dense Multiscale Sample Entropy and Hybrid Feature Selection Author(s): Quoc Duy Nam Nguyen, Tadashi Nakano and Thi Hong Tran Presenter: Quoc Duy Nam Nguyen Osaka Metropolitan University, Japan
KT1-058	Abstract: Parkinson's disease (PD) is a neurodegenerative disorder that pri-marily affects the central nervous system and has noticeable effects on movement. Previous studies have explored the usefulness of Vertical Ground Reaction Force signals in developing algorithms for diagnosing and assessing the severity of Parkinson's disease. These efforts may encounter methodological challenges, particularly the possibility of overfitting particularly in the context of deep learning approaches. This study

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	introduces a new approach to feature extraction called Dense Multiscale Sample Entropy. It is an improved version of the conventional Multiscale Sample Entropy method, addressing its limitations. The algorithm is carefully pro-posed to effectively reduce feature dimensions. This investigation combines Correlation-based Feature Selection (CFS) with Sequen-tial Backward Selection (SBS) to develop an optimal framework for effective feature selection, demonstrating the importance of the selected features. In the field of classification, three classifiers, namely KNN, SVM, and NN, were diligently utilized. Both KNN ( $k = 10$ ) and SVM (RBF) were found to be highly effective in highlight-ing the extensive trade-offs in feature selection when comparing SBS and the integrated SBS-CFS. The algorithm showed excellent performance in accurately classifying (98.39%) and assessment the severity (97.95%) of PD. This highlights its potential usefulness in clinical settings for distinguishing between patients with PD and healthy individuals.
	Title: A Method to Estimate Obstacle Presence on Narrow Roads Using Smartwatch-Based Multi-Cycling Data Author(s): Yuya Kanbetsunawa and Ryo Katsuma Presenter: Yuya Kanbetsunawa
15:15-15:30 KT1-060	Osaka Metropolitan University, Japan Abstract: Obstacles on the road can hinder bicycle riders from having a comfortable and safe cycling. The impact of obstacles becomes more significant as the road narrows. Therefore, it is important for cyclists to select obstacle-free routes. To enable this route selection through navigation systems, it is essential to accurately determine the presence of obstacles on narrow roads. In this paper, we propose a method for estimating obstacle presense based on the multiple sets of cycling data collected from riders' smartwatches. This enables everyone, except for a few riders who are the first to pass the road, to be aware of the presence of obstacles. As a result, when the clearance between the obstacle and the path is 0.50m, we can accurately estimate the presence of an obstacle within approximately 8.3m by utilizing at least three sets of cycling data. When the clearance between the obstacle and the passage is 0.75m, we can nearly pinpoint the obstacle's location within about 16.7m by utilizing at least five sets of cycling data.
	Title: Vehicle Counting Tool Interface Design For Machine Learning Methods Author(s): Benny Hardjono Presenter: Benny Hardjono Universitas Pelita Harapan, Indonesia
15:30-15:45	
К I I-039	Abstract: Simulators and software visualization tools can be useful for any research to progress. Similarly, in order to predict vehicle traffic or even to improve the use of existing highway, software visualization tools are also needed. In this research, a custom-made software visualization tool has been developed to obtain automatic vehicle Machine-Method count with better accuracy. The tool's interface design has

been tailored to make various repetitive tests easier. For example, repetitive test by varying constants, parameter values and making resultant visualization (using two displays) of the detection available for further investigation. The tool can be started from either Windows or Linux operating system environment. The application's front-end uses both Electron and React. It communicates with the Python engine (which uses YOLO and OpenCV through a Python-shell). Playback feature with machine counting process label is also made available. A batch mode is made available to cater continuous counting vehicles from numerous videos or photos in subdirectories generated by CCTV along the highways. Consequently, survey results, such as standard deviations and other statistical tests are presented to show that the software tool has been successfully designed to satisfy ease-of-use in human-machine interface requirements.

## **SESSION**

\* All schedules will be scheduled in Japan Standard Time (UTC+9)

14:00-15:45	Session 2 –Intelligent monitoring systems and urban applications
December 14, 2023	Venue: Meeting Room II, Clock Tower, Kyoto University (2F)
Session Chair: Asso	c. Prof. Kai-Chun CHANG, Kyoto University, Japan
14:00-14:15 KT1-020	Title: Wireless Temperature Control Plant Model Using LabVIEW Author(s): Wandee Petchmaneelumka, Apinai Rerkratn and Vanchai Riewruja Presenter: Apinai Rerkratn King Mongkut's Institute of Technology Ladkrabang, Thailand
	Abstract: This paper presents a wireless temperature control plant. The proposed system consists of RTD PT1000 temperature sensor, Wheatstone bridge circuit, amplifier circuit, ESP32 module, SCR power regulator, incandescent lamp, and LabVIEW program for controlling and monitoring temperature of plant. The RTD PT1000 sensor is used for measuring the temperature of plant and converting to voltage by Wheatstone bridge circuit before sent the output voltage to analog input port of ESP 32 module. The TCP/IP protocol is used to communicate between LabVIEW program and ESP32 module via WIFI network. LabVIEW program is employed to monitor and control temperature of plant via display screen. The experimental testing with various conditions shows that the proposed system can monitor and control temperature of plant with satisfactory values without the cables connecting between the temperature plant and the control unit.
14:15-14:30 KT1-065	<ul> <li>Title: Integrative Deep Learning Forecasting of Air Quality Index in India: A Fusion of Bidirectional LSTM and Sensor Data</li> <li>Author(s): Bala Murugan M S, Gopinath M, Manojkumar Rajagopal, Paventhan Arumugam, Vijayan K and Vijayakumar Varadarajan</li> <li>Presenter: Bala Murugan Mudhanai Sanjeevirayar</li> <li>Vellore Institute of Technology, India</li> <li>Abstract: AQI as a vital metric for evaluating pollution levels, which directly impacts the health and well-being of the population. We have devised a hybrid deep learning (DL) framework that combines the Bi-directional LSTM with a sensor fusion approach. Our integrated model combines the strengths of sensor fusion and Bi-LSTM, enhancing both spatial and temporal dependencies in the data. Additional training of the data from independent sensors prior to the AQI calculation and training of the proposed method provided much better AQI prediction capability due to the added information on the spatial variation of the data. Empirical validation with real-world data from the Chennai city in India, demonstrates superior accuracy, achieving a Root Mean Square Error (RMSE) of 21.7 for AQI prediction.</li> </ul>

14:30-14:45 KT1-067	Title: Soil Texture Classification using Dual-Depth Soil Moisture Sensor Author(s): Minjun Kim, Rockwon Kim, Dasong Yu and Hoseok Hwang Presenter: Min-jun Kim Electronics and Telecommunication Research Institute, South Korea
	Abstract: This paper represents a preliminary study aimed at introducing a soil texture classification system utilizing data from soil moisture sensors installed in various locations. In this study, we assume major characteristics varying with soil type are the difference in moisture content between the upper and lower layers of the soil and the rate of moisture reduction. To obtain these two features, we use Dual-Depth moisture sensors and define and employ the cumulative moisture decrease equation to acquire the moisture reduction rate. To classify soil type using the data that includes these features, some models based on KNN, AdaBoost, and Random Forest are applied and compared. Additionally, we propose an algorithm that can better handle soil classification based on the Siamese Residual Network (SRN) to not only classify soil types but also to easily compare how similar any given soil is to known soil types. The proposed SRN model got it right about 76% of the time, which is 4% better than the other models.
14:45-15:00 KT1-072	Title: Leveraging Deep Learning For Improving Real – Time Stolen Vehicle Tracking In Smart Cities Author(s): Karthikeyan Sivasubramanian, Vignesh Balasundaram Sathiya devi, Bala
	Murugan M S and Manojkumar Rajagopal Presenter: Bala Murugan Mudhanai Sanjeevirayar Vellore Institute of Technology, India
	Abstract: Efficiently detecting and tracking stolen vehicles is a crucial aspect of law enforcement and public safety. Traditional methods, reliant on limited data sources, are time-consuming and labor-intensive due to manual efforts. The emergence of deep learning technology offers the potential to streamline these processes, reducing manual work and saving valuable time. This study proposes a deep learning- based system for the surveillance of lost or stolen vehicles, utilizing the YOLOv7 object detection model and the DeepSORT tracking algorithm. The proposed system automates the process of data generation, detection, and tracking across multiple camera feeds, resulting in an interactive map that displays the vehicle trajectory. Using a publicly available dataset containing a set of camera recordings of vehicles, the dataset for the experiment is generated and enhanced by augmentation techniques. The experimental dataset encompasses a video segment highlighting the target vehicle of interest. This footage is processed in detail to yield image-label pairs, encapsulating the target vehicle and its distinctive features, thereby serving as the training foundation. Further, the resultant model is tested on varied video sets within the public dataset and the detection results are recorded for performance analysis. The proposed system's performance, evaluated through various metrics, effectively detects and tracks stolen vehicles in real-time

	scenarios. This research enhances public safety by empowering law enforcement agencies with a powerful tool for rapid identification and recovery of stolen vehicles.
	Title: Intelligent Credit Scoring: A Bayesian Network Model Machine Learning Application Author(s): Carlo Inovero Presenter: Carlo Inovero Polytechnic University of the Philippines, Philippines
15:00-15:15 KT1-055	Abstract: Artificial intelligence-based credit scoring methods are becoming more and more popular because of the big data revolution and recent improvements in computing capacity. Since the accuracy of credit scoring models has a significant impact on the profitability of lending organizations, this has found simple leverage. For the purpose to implement a Bayesian network model in a developed a credit scoring system. Age, income reliability, past debt and payment history, are all significant predictors of customer default payment, according to the results of the Bayesian network analysis. Hence, Financial institutions may use a Bayesian Network model to distinguish between good and bad borrowers and to forecast their behavior.
15:15-15:30 KT1-157	<ul> <li>Title: A Commercial Speaker-transformed Vibrational Energy Harvesting Device– Conceptual Study and Laboratory Trial on a Model Bridge</li> <li>Author(s): K.C. Chang, T. Nishino, M. Onishi, W. Murata, K. Sugihara, K. Arai, T. Onodera, S. Okada, K. Nishiguchi, T. Mishina,H. Tanigawa</li> <li>Presenter: Kai-Chun Chang</li> <li>Kyoto University, Japan</li> <li>Abstract: Advanced structural health monitoring is essential for infrastructure maintenance and management in developing a smart city and could contribute to a carbon-neutral smart city. For long-term bridge health monitoring (BHM), to power various types of wireless sensors, developing a stand-alone sustainable power supply system is of great engineering interest. Solar and wind energy harvesting techniques have been introduced into the long-term BHM field, but they could hardly work well on some monitoring targets that are closed, shadowed, or little sunlight or wind available. Vibrational energy harvesting could be an alternative energy harvesting technique, since almost all bridges vibrate when they are excited by external dynamic forces. This study focused on developing a vibrational energy harvesting device transformed from a commercial speaker, which is tailored for practical long-term BHM</li> </ul>
	and characterized by simple structure, durability, commercial availability, and low cost. To develop this device, first the theoretical background on the vehicle-induced bridge vibrations and speaker principles were reviewed, then the fundamental concept of the commercial speaker-transformed vibrational energy harvesting device was presented. The basic idea was to transform a commercial speaker into a vibrational energy harvester that can convert the kinematic energy of low-frequency bridge vibrations into

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	electric energy to charge batteries or to power sensor nodes. This concept was verified in a laboratory experiment on a model bridge loaded by a moving model vehicle. In this experiment, the current energy harvester could output a maximum voltage of 2.49 mV and an RMS voltage of 0.14 mV from the bridge vibrations of a maximum acceleration 0.3 m/s2 and an RMS acceleration 0.04 m/s2. Also, it was observed that the energy harvester's output voltage was negatively correlated to bridge displacement but positively correlated to bridge acceleration. It suggests that, to harvest more energy from the bridge vibrations using the present device, any means that could excite the bridge with larger acceleration amplitudes might help, e.g., letting vehicles run faster.
15:30-15:45 KT1-063	Title: Evaluating the feasibility of gradual semi-automatic annotation and hybrid model about unauthorized garbage detection Author(s): Hwang HoSeok, Moon Aekyeung and Son Seungwoo Presenter: Hwang HoSeok Electronics and Telecommunications Research Institute, South Korea Abstract: As the amount of unauthorized garbage dumping keeps rising, the existing labor-intensive approach for monitoring dumping actions unleashes the study for automatic detection systems. However, since previous studies focused on explicit dumping behavior, they have difficulty applicable to real-world situations. To find implicit dumping behavior, we propose combining object detection and color classification models to detect unauthorized garbage bags. Our approach employs a gradual semi-automatic annotation method inspired by semi-supervised learning to create a model. After using gradual semi-automatic annotation to extract training data, we train a suitable model for the CCTV datasets. We detect only garbage bags attached to people using IoU (intersection-over-union) dis-tance to reduce false detection. To evaluate the effectiveness of the proposed method, we measured the model's accuracy and compared it with the existing model. The experimental evaluation demon-strates that the proposed annotation method shows 92.8% model accuracy and 90.9% annotation accuracy. In addition, the classifi-cation model using data growth and reduction confirms that the F1-score is increased by 6.3%.

## **SESSION**

\* All schedules will be scheduled in Japan Standard Time (UTC+9)

14:00-15:30 December 14, 2023	Session 3 –ICT based information management system and practical
	analysis
December 11, 2025	Venue: Meeting Room III, Clock Tower, Kyoto University (2F)
Session Chair: Asso Philippines	c. Prof. Dominador M. Acasamoso Jr., Polytechnic University of the Philippines,
14:00-14:15 KT1-068	Title: Tracking Drones with Manual Operation Representation Author(s): Geng Wang and Kazumasa Oida Presenter: Geng Wang Fukuoka Institute of Technology, Japan Abstract: The Global Positioning System (GPS) is a system that provides position information such as latitude, longitude, and altitude anywhere on the earth. If this system is used, however, it may cause (1) position acquisition interruptions in places where GPS signals do not reach, (2) increased power consumption due to the constant processing of numerous satellite signals, and (3) cyber-attacks targeting GPS receivers. Until now, many methods have been proposed to overcome these challenges individually. This study, in contrast, addresses these challenges simultaneously for the quadcopter (abbreviated as drone) case, where the use of GPS is a prerequisite. Drones
	used in logistics, agriculture, surveillance, and other industrial fields are transitioning from manual operation to autopilot due to geographic expansion of services and reduction of labor costs. This study uses Perceiver, the latest deep-learning model, to track a autopilot drone from takeoff to current position in real time by using signals roll, pitch, yaw, and throttle. We call the four signals Manual Operation Representation (MOR) because a drone can be manually controlled with a radio controller that transmits the four signals. Our method can complement GPS at any time and can detect a malfunction or cyber-attack if the flight route calculated by the deep-learning model deviates from the route specified by the autopilot.
14:15-14:30 KT1-006-A	Title: Exploring User Preferences Towards Human and AI Service Agents in Financial and Medical Services Author(s): Ga Young Lim Presenter: Ga Young Lim
	Yonsei University, South Korea
	Abstract: This study examines the role of professional skills in influencing preference between human and Artificial Intelligence (AI) agents across two distinct service professions: medical services, where emotional support abilities are prioritized, and financial services, which emphasize cognitive and computational skills. The research aims to understand the conditions under which humans are preferred over AL and vice

	versa, within the context of these specific professional environments. The first study identified a significant difference in the importance of empathy between doctors and fund managers. The results showed a clear preference for human doctors in healthcare services, and conversely, for financial services, the preference for AI over human agents was more prevalent.
	The second study reaffirmed these preferences, establishing the perceived importance of empathy as a key mediator in shaping these preferences. This observation provides a pathway for designing and marketing AI systems that can better resonate with human emotions and preferences.
	The outcomes of the research echo previous studies, underscoring the conditional nature of human attitudes towards AI, varying across different sectors or services. However, this research differentiates itself by simultaneously comparing two fundamentally different service professions, thereby providing a more nuanced understanding of user attitudes and AI preference.
	In the medical field, the research emphasized the importance of skills such as empathy, experience, and agency in influencing the preference for humans over AI. This finding indicates that user attitudes towards AI are less governed by cognitive aspects like objectivity and more influenced by human-like attributes associated with agency and experience.
	The practical implications of this research are extensive. With AI technology's growing influence across various fields, understanding user-perceived importance of different capabilities is critical. This knowledge can inform decisions regarding the promotion of AI technology as a primary service or a supportive tool for human services, depending on the area.
	Furthermore, we suggest the need for continual development of human-like skills in both human employees and AI systems. For AI, developers should consider incorporating emotional intelligence elements into their systems, potentially reducing the preference for humans in certain areas.
	In conclusion, the study offers a deeper understanding of the role of professional skills in the preference for human or AI agents in different service professions, providing valuable insights for service providers, AI developers, educators, and future research. It also attempts to alleviate anxieties regarding AI replacing human roles by emphasizing the complementary role AI can play in addressing human cognitive limitations.
14:30-14:45 KT1-016	Title: Analysis of Eggs Quality by Using the Nir Author(s): Witsarut Sriratana, Wongwit Iamyang and Lerdlekha Sriratana Presenter: Witsarut Sriratana King Mongkut's Institute of Technology Ladkrabang, Thailand
	Abstract: In this study, fresh chicken eggs that had hatched between 11 to 22 days prior were used to examine and devise a method for assessing chicken egg quality [1]. The samples were separated into three sizes: medium, large, and extra-large, and stored in an environment with controlled temperature and humidity. The eggs were then exposed

	to near-infrared spectra projected onto them by a spectrometer in the wavelength range of 610 to 880 nm [2][6]. The water molecules within the eggs absorb near-infrared thermal radiation. The unabsorbed portion of the thermal energy or near-infrared spectrum reflects some of the spectrometer's light and generates the spectrum's output in terms of radiation intensity. The Haugh unit and yolk index [1] were then utilized to compare the mean values [3]. This study determined, that chicken eggs aged 11 to 22 days had radiation intensities between 16.43 and 48.19, yolk indices between 0.1994 and 0.2601, and Haugh unit values between 54.7345 and 67.2087. The analysis of the data revealed that elder eggs had a greater effect on egg quality. Each of the three variables (radiation intensity reflected, Haugh units, and egg yolk index) there was a direct correlation with egg quality.
	Title: SEAMS: A Smart and Efficient Attendance Management System with Attendance Prediction and Forecasting Author(s): Dominador M. Acasamoso Jr., Ria A. Sagum Presenter: Dominador M. Acasamoso Jr. Polytechnic University of the Philippines, Philippines
14:45-15:00 KT1-046	Abstract: The conventional approaches of managing attendance are going through an essential shift in this era of rapid technological growth. The Smart Attendance and Efficient Management System (SEAMS), a state-of-the-art system, is presented in this study. SEAMS revolutionizes attendance monitoring and forecasting in corporate and educational settings by utilizing cutting-edge data analytics and prediction methodologies. The SEAMS uses facial recognition authentication technique to track attendance and simply integrates with the current infrastructure. The attendance logs of all employees in their respective departments are being transmitted using Local Aera Network (LAN) to the main server which is managed and controlled by the Human Resource Management Department making the consolidation of attendance reports and data at ease and without the need for physical interaction with every department head, this scheme is essential for rapid accounting and payroll preparations for the employees. This system uses machine learning methods to predict and forecast future attendance trends with a high degree of accuracy by examining previous data captured by SEAMS. In experimental applications, the use of SEAMS has produced encouraging outcomes that have improved human resource allocation and staffing, and organizational performance. The technology also has the potential to ease administrative costs, improve decision-making procedures, and promote an accountability culture. By offering a comprehensive, data-driven strategy, this research makes a contribution to the changing attendance trends, which eventually results in more effective and efficient operations.

	Title: An Improved Model for Real-World Social Networks
	Author(s): Wenruo Lyu and Liang Zhao
	Presenter: Wenruo Lyu
	Kyoto University, Japan
15:00-15:15 KT1-062	Abstract: In smart city applications, accurately mapping social connections is crucial. While most existing literature focuses on either spatial or complex network-based approaches, real-world social networks often display characteristics of both. Recognizing this, our study introduces a unique network model that seamlessly blends elements from both spatial and complex network paradigms. Empirical evaluations reveal that this model replicates real-world social network dynamics more effectively than predominant models. Importantly, with a tunable parameter adjusting the spatial connection ratio, the proposed model offers the flexibility to emulate social connections tailored to diverse application contexts.
	Title: De novo Drug Design against SARS-CoV-2 Protein Targets using SMILES-based Deep Reinforcement Learning Author(s): Xiuyuan Hu, Yanghepu Li, Guoqing Liu, Yang Zhao, Hao Zhang and Liang Zhao Presenter: Yanghepu Li
	Tsinghua University, China
15.15 15.20	Abstract: Do novo drug design is an important task within the field of computer eided
KT1-064	drug design and in recent years, numerous machine learning algorithms have been
K11-004	proposed for this purpose. The SARS-CoV-2 virus has posed a severe crisis to
	humanity over the past few years, making drug design targeting its protein targets a
	critical challenge. In this paper, we introduce a SMILES-based deep reinforcement
	learning algorithm to design small molecule inhibitors that bind well with
	SARS-CoV-2 targets. Experimental results demonstrate that our algorithm is capable
	of generating satisfactory drug candi-dates against SARS-CoV-2 protein targets and
	has the potential to be extended to other targets.

### **SESSION**

\* All schedules will be scheduled in Japan Standard Time (UTC+9)

10.00 11.30	Session 4 – Data Security and Intelligent Computing in the IoT and
December 15 2023	Information Network
2000	Venue: Meeting Room III, Clock Tower, Kyoto University (2F)
Session Chair: Dr.	Pujianto Yugopuspito, Universitas Pelita Harapan, Indonesia
	Title: How can Taiwan's broadband program keep improving internet usage: Evidence from panel data Author(s): Shui-Lien Chen, Chih Jen Chen and Yung-Hsin Lee Presenter: Chih Jen Chen Tamkang University, Taiwan Abstract: Since 2002, Taiwan has invested substantial national funds into projects that aim to develop its information and communication infrastructure. The cumulative budget allocated for these programs has exceeded 250 hillion NTD. In 2019. Taiwan's total
10:00-10:15 KT1-025	allocated for these programs has exceeded 250 billion NTD. In 2019, Taiwan's total household internet usage was close to 90.4%, similar to the OECD average of 87.5%. In other words, Taiwan and many advanced countries have similar developmental trajectories and challenges associated with broadband construction. This study uses matched data from five nationally representative datasets from 2014 to 2020 and adopts the least squares dummy variables (LSDV) model to determine the impact between groups and periods. The empirical results show that thirteen county and city inter_x005f_y0f_y0f_y0f_y0f_y0f_y0f_y0f_y0f_y0f_y0
10:15-10:30 KT1-049	Title: IoT Deployment at Smart Office Environment with Edge Server Author(s): Pujianto Yugopuspito, Moh Mubarok, Marthen Amelius Solang, Julinda Pangaribuan, I Made Murwantara and Hendra Tjahyadi Presenter: Pujianto Yugopuspito Universitas Pelita Harapan, Indonesia Abstract: In today's rapidly evolving tech landscape, the Internet of Things (IoT) stands out as a pivotal innovation, redefining our understanding of built environments. IoT offers vast potential for improving energy efficiency in buildings. By linking devices, automation, and insightful data processing, it enables building managers to optimize energy use, boost operational performance, and significantly reduce energy wastage. This

	paper explores the relationship between IoT and energy conservation, shedding light on how its integration can lead to smarter and greener building solutions, supported by edge computing capabilities in a preliminary stage.
	Title: Understanding Integrity of Time Series IoT Datasets through Local Outlier Detection with Steep Peak and Valley Author(s): Jungeun Yoon, Aekyeung Moon and Seung Woo Son Presenter: Jungeun Yoon ETRI, South Korea
10:30-10:45 KT1-137	Abstract: With substantial advances in emerging and enabling technologies in IoT sensors, a vast amount of IoT-based environmental data allows preparation for adverse impacts by providing helpful information for predictive and precise services. However, data acquired by IoT sensors can be corrupted by external environmental factors, which can negatively affect the integrity of data interpretation. To address this problem, a prior study proposed outlier detection techniques using transform-based sparse profiles. However, it would lose its worth without an evaluation methodology for data integrity after probing datasets by outlier detection. In addition, it did not consider data with steep peaks or data that is dependent on other data, which is common in real-world scenarios such as soil moisture data used in this paper. Therefore, we propose a process of preprocessing defective soil moisture sensor data after outlier detection. Our paper specifically aims to: 1) detect outliers of original soil IoT datasets to eliminate fault data possibly giving wrong decisions using local and global outlier detection (OD); 2) exploit the results of statistical evaluation to determine whether the outliers have been well eliminated; and 3) find the ground truth pattern of soil IoT datasets considering precipitation. Experiments using real-world soil moisture datasets show that the LPOD method outperforms other statistical outlier detection methods, suggesting that the preprocessed data can improve the integrity of IoT datasets.
10:45-11:00 KT1-150	Title: Implementation and Analysis on Efficient Proxy-based Multicast Secure Data Sharing Mechanism with CP-ABE Supporting Outsourcing Decryption in IoT Environment Author(s): Po-I Lee, Chih-Hung Wang and Wei-Chun Hsiao Presenter: Po-I Lee National Chiayi University, Taiwan Abstract: According to the International Data Corporation (IDC), by the year 2025, over 40 billion Internet of Things (IoT) devices will be connected to the internet. However, these devices face challenges such as insufficient power supply, weak computing capabilities, and limited communication range. The security of IoT system under these circumstances will become significant issues. MQTT is one of the most popular communication protocols on the Internet of Things, in which the publishing and subscription mechanism are suitable for transmitting messages in the environment with

	limited communication bandwidth and unstable connections. Even though MQTT protocol can secure data transmission via SSL or TLS, it has no native or built-in security mechanisms, and also does not provide enhanced access control for subscribers. In this paper, we integrate MQTT protocol with DAC-MACS, a CP-ABE algorithm proposed by Yang et al., constructing an implementation framework on the efficient proxy-based multicast secure data sharing mechanism with CP-ABE supporting outsourcing decryption. In our construction, we introduce a proxy server during the process of communication between broker and subscribers. By utilizing the computational capabilities of the proxy server, IoT devices can decrease the computational cost of the decryption algorithm by outsourcing the computation-intensive tasks to the proxy server. In addition, we combine the fine-grained access control features of CP-ABE with the publishing/subscription mechanism, along with the proxy server, to achieve multicast communication.
	Title: Robust Deep Learning Approaches for Wireless Communication Systems Author(s): Van Duy Tran, Duc Khai Lam and Thi Hong Tran Presenter: Van Duy Tran Osaka Metropolitan University, Japan
11:00-11:15 KT1-057	Abstract: Multiple Input Multiple Output Orthogonal Frequency Division Multiplexing (MIMO OFDM) is a key technology for wireless trans-mission systems. But if the peak-to-average power ratio (PAPR) is too high, OFDM symbols can be distorted at the MIMO OFDM transmitter. It will make it harder for the MIMO OFDM receiver in the channel estimation and signal detection phase. To explore the possibilities of Deep Learning (DL) in particular and machine learning in general in the MIMO OFDM system and to serve as a foundation for future research, we develop a DL-based MIMO OFDM receiver using DL in this work. From there, DL models can help filter out the noise caused by the high PAPR problem and change some parts at the receiver to improve the receiver's perfor-mance in the point-to-point MIMO OFDM system. The simulations show that the suggested DL-based receivers have a lower bit error rate (BER) than conventional receivers.
11.15 11.20	Title: A Novel Two-Stage Data-mining Model Combining Gait Recognition and Temporal Sequence Mining Author(s): Pu-Tai Yang, Tsu-Tang Liao, Chih-Jui (Ray) Chen Presenter: Pu-Tai Yang National Taipei University, Taiwan
KT2-0049	Abstract: In recent years, artificial intelligence applications have been on the rise. Many enterprises have embraced digital transformation and have established new business models based on artificial intelligence and the Internet of Things, such as the telerehabilitation industry. The companies may utilize sensors or cameras to collect user data, and data mining is applied to discover insights for doctors' aids. This paper establishes a novel two-stage data mining model combining gait recognition and

sequential pattern mining. In the first stage, a particular computer vision application, gait recognition, identifies possible diseases using the subject's walking postures. The gaits in a video can be converted to a temporal sequence according to user-defined events. For example, (normal gait, Parkinsonian gait, normal gait) is a temporal sequence in which the identified gaits are arranged by temporal orders in the sequence. In the second stage, after collecting a dataset of temporal sequences, the frequent patterns are discovered by sequential pattern mining. Our preliminary experiment collected 30 samples from the real world and demonstrated the model's feasibility.

### **SESSION**

\* All schedules will be scheduled in Japan Standard Time (UTC+9)

10:00-11:45	Session 5 –Software testing and reliability analysis
December 15, 2023	Venue: Meeting Room IV, Clock Tower, Kyoto University (2F)
Session Chair: Lect	urer I Made Murwantara, Universitas Pelita Harapan, Indonesia
10:00-10:15 KT1-036	Title: Decentralize Application for Personal Health Record using Ethereum and Interplanetary File System Author(s): Dionysius Sentausa and David Hareva Presenter: David Habsara Hareva Universitas Pelita Harapan, Indonesia
	Abstract: This study explores the integration of Fast Healthcare Interoperability Resources (FHIR) standards in a system designed for secure and efficient management of Personal Health Records (PHRs). PHRs are crucial for patients to have control over their healthcare information and make informed decisions. Ensuring the security of this sensitive data is vital, and blockchain technology offers robust protection. However, the high cost of storing PHRs on the blockchain has led us to investigate the use of the Interplanetary File System (IPFS) alongside blockchain. Our proposed system comprises a PHR Decentralized Application (DAPPS), IPFS, Metamask, and the Ethereum Blockchain. Users input their PHR data through the DAPPS, which is stored in IPFS, and its location is registered on the Ethereum Blockchain via Metamask. Comprehensive testing validates the system's performance, with success across all test cases, confirming the feasibility of utilizing the Interplanetary File System and Ethereum Blockchain for secure PHR management while adhering to FHIR standards, fostering interoperability in healthcare data exchange
10:15-10:30 KT1-040-A	<ul> <li>Title: Minimizing the total completion time in Software Testing Scheduling with Common Setups</li> <li>Author(s): Man-Ting Chao and Bertrand M.T. Lin</li> <li>Presenter: Bertrand M.T. Lin</li> <li>National Yang Ming Chiao Tung University, Taiwan</li> <li>Abstract: This study investigates a scheduling problems of software testing to minimize the total completion time, i.e. eth sum of completion times of all jobs. Each job has a corresponding set of preparatory or setup operations. Any job cannot start its processing unless all of its setup operations are finished. Different jobs may share common setup operations. If two jobs have the same supporting setup operations, the processing cannot be interrupted, i.e. no preemption of any processing is allowed. This problem is known to be NP-hard. In this study, we propose a sequence-based and a</li> </ul>

position-based integer programming models and a branch-and-bound algorithm to find optimal solutions. Two structural properties are deployed to facilitate the development of problem-solution procedures. In addition, we also propose an ant colony optimization algorithm for finding approximate solutions, which will be used as the upper bound of the branch-and-bound algorithm. We design and conduct computational experiments through extensive test instances to examine the performances of all the proposed methods and analyze their performance statistics.

Title: Multi-Instruction Decode Protection on Pipeline Stage using On-chip Error Correction Accelerator Author(s): Yujeong Son and Daejin Park Presenter: Daejin Park

Kyungpook National University, South Korea

Abstract: In embedded systems, the programs and data processed by chips are progressively increasing in size. Consequently, errors during data transmission due to noise or various factors are becoming more frequent. Errors in bits can sometimes stop at the inconvenience for users, but in certain systems with military purposes or vehicles, for example, they can lead to critical issues. The usage of System-on-Chip (SoC) for specific tasks has witnessed a substantial increase in modern times. Within embedded systems, the programs executed by chips are becoming progressively complex, and the volume of processed data is steadily growing. Consequently, the risk 10:30-10:45 of unexpected errors within the system's processors is also gradually escalating. This KT1-050-A paper presents an RTL-level design of an Error Correction Unit (ECU) capable of detecting errors within the processor. This design employs the Hamming code, one of the Error Correcting Code (ECC) algorithms, and enables error detection without requiring an additional pipeline stage within the processor. This technique could be applicable in fields where robustness is highly critical during data transmission processes. The simulation of the proposed ECU was conducted using Icarus Verilog and GTKWave. In this paper, we implemented a 5-stage pipeline processor with an Error Correction Unit (ECU) capable of correcting one error and detecting two errors. Through testing, it was confirmed that in the event of a single error, the processor autonomously recovers from the error. However, when two or more errors occur, signals are conveyed to the processor, enabling it to either re-execute from the point of error occurrence or utilize alternate strategies. Such error-resilient processors hold the potential for applications in real-time data processing domains like automotive systems, where reliability is demanded. In the future work, we will investigate processors with robustness against various errors, including burst errors. Title: Newspaper Article Element Detection Using Multimodal Transformers Author(s): Abdullah Almutairi

10:45-11:00 KT2-007-A Kuwait University, Kuwait

	Abstract: Newspapers are significant sources of news and information throughout the history of printed media. There are wide efforts in digitizing newspapers to extract these troves of historical and current news. However, due to the complex layout of newspapers, Optical Character Recognition (OCR) techniques fail to extract news articles' text correctly. Furthermore, articles contain many elements (title, subtitle, author name, body, etc). These elements are extracted altogether, and their text is merged. Transformers are a recent deep learning architectures that provided state of the art solutions to NLP problems. Transformers are powering Large Language Models (LLMs) such as ChatGPT and PaLM that highly raised the performance of current AI. Even though transformers main input modality is text, there are other models that are using them on other modalities such as images to solve the problems of image classification and object detection. Transformers are even used on multimodal inputs such as image and text. LayoutLM is a multimodal transformer model that extracts information from document images based on the layout and text of the document. I propose using the LayoutLM model to extract the article elements correctly. The model will take as an input a newspaper article image and will label the text as being one of the main article elements (title, subtitle, body, author).
11:00-11:15 KT1-136-A	Title: Precission Farming based on Long Range (LoRa) technology and Web Geographical Information Systems (GIS) Author(s): Muhammad Asri Safi'Ie, Rudi Hartono, Nanang Maulana Yoeseph and Seno Budhi Ajar Presenter: Muhammad Asri Safiie Yamaguchi University, Japan Abstract: Indonesia is a developing country that has good economic growth, which is shown in a GDP increase of 5.1% in 2022. The sector that supports economic growth is contributed by the large number of factories being established in the regions. However, this creates new problems, namely the reduction of agricultural land and the emergence of climate change which has an effect on the agricultural sector. On the other hand, the population in the country continues to increase. For this reason, new innovations are needed to increase the productivity of agricultural products. This paper proposes to increase productivity by applying Internet of Things technology using LoRa technology in the agricultural realm with visualization via web GIS. The implementation of this technology is expected to develop agriculture with precision.
11:15-11:30 KT1-061	<ul> <li>Title: Machine Learning Method for Kidney Chronic Disease on Diabetes Type 2</li> <li>Analysis of A Molecular Experiment</li> <li>Author(s): I Made Murwantara and Andriyani Andriyani</li> <li>Presenter: I Made Murwantara</li> <li>Universitas Pelita Harapan, Indonesia</li> <li>Abstract: This study employs machine learning techniques to uncover insights from</li> </ul>

molecular research on diabetes, derived from laboratory experiments. We sourced our dataset from experiments conducted in a wet lab using Wistar Rats. These rats underwent specific treatments to induce a diabetic state. In our analysis, we quantified various trace elements within the molecular graph of the rat kidneys. Employing a specialized method, we gathered data on the proximal tubules, indicative of the absorption of water, sodium, and glucose into the bloodstream, and the distal tubules, which highlight the augmentation process to expel unnecessary fluids. Understanding these traces is crucial, as they can be indicative of chronic kidney diseases resulting from elevated blood sugar levels. To validate the robustness of our laboratory results, we utilized machine learning algorithms, specifically comparing the performance of Neural Networks, Stochastic Gradient Descent (SGD), and AdaBoost models. Additionally, we sought to understand the potential relationship between the positive/negative impacts of proximal and distal tubules. This relationship is key to discerning how Glucose Transporter 9 (GLUT9) and Sodium Glucose Cotransporter (SGLT2) might influence chronic kidney diseases. It's noteworthy that in the realm of type 2 diabetes, kidney diseases are often caused by the heightened expression of renal transporters like GLUT9 and SGLT2. Upon applying machine learning techniques, our results revealed that the AdaBoost model surpassed other models, achieving a precision value of 0.333 and an F1 value of 0.332.

Title: Real-Time Dress Code Detection using MobileNetV2 Transfer Learning on NVIDIA Jetson Nano Author(s): Laxmi Kantham Durgam and Ravi Kumar Jatoth Presenter: Ravi Kumar Jatoth

Ramkhamhaeng University, Thailand

11:30-11:45 KT1-022

Abstract: The proposed research intends to develop a model for automatically identifying the dress code in companies and educational institutions where appropriate apparel needs to be frequently maintained. The concept focuses particularly on the dress code for school children. Convolutional Neural Networks (CNN), MobileNetV2, and an object detection algorithm with a high level of accuracy are examples of deep learning models. In comparison to manual checks, using an automated system for dress code detection has various advantages. It reduces the number of mistakes and faults that could happen during manual inspections while also saving time. Organizations and institutions can make sure that their staff constantly complies with the dress code rules thanks to the automated system. The Dress code detection model is designed, trained, and implemented using the Edge impulse API. The proposed Transfer learning MobileNetV2 and CNN TINY ML models were implemented on an NVIDIA Jetson Nano edge device for real-time Dress code classification. F1 Score, precision, recall, latency, and storage space are common evaluation metrics for object detection models. The goal of this project is to create a model for automatically identifying dress rules in businesses and educational institutions that must maintain suitable attire on a regular basis. The proposed model offers a practical approach to tracking workplace and educational dress code observance. A disciplined environment is created and the professionalism of the individuals inside the organization is reflected by the accuracy of the MobilenetV2 and CNN models in detecting business formal clothes. The Proposed transfer learning MobileNetV2 model performs better results compared to all other CNN models in accurately detecting business and school children's formal attire.

### **SESSION**

#### \* All schedules will be scheduled in Japan Standard Time (UTC+9)

15:00-17:30 December 15, 2023	Session A – Image computing models and analysis methods Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/j/87016711001
Session Chair: Prof.	Rung-Ching Chen, Chaoyang University of Technology, Taiwan
15:00-15:30 Invited Speech 2	Prof. Habil. Udo Birk, University of Applied Sciences of the Grisons, Switzerland Speech title: Smart Surveillance Sensors
15:30-15:45 KT1-139	<ul> <li>Title: Color Constancy Algorithm Based on Pyramid Pooling</li> <li>Author(s): Yuxin Zhao, Tong Li and Guanghui Fu</li> <li>Presenter: Yuxin Zhao</li> <li>Beijing Institute of Graphic Communication, China</li> <li>Abstract: Color is an important feature in the field of computer vision. However,</li> </ul>
	different lighting can cause color deviation of the target, and the human visual system itself has the characteristic of color constancy, which can distinguish the color of the tar-get. In order to better imitate human visual characteristics, the theory of color con-stancy is used to eliminate the interference of background light on the target color, thereby obtaining accurate target color.
	The confidence weighting algorithm calculates the confidence of each image block and sets and adjusts weights based on the region of the block, allowing the network to focus more on key features, thereby reducing the interference of non critical features. Due to the excellent context extraction ability of pyramid pooling, it is introduced into the multi head self-attention module of Visual Transformer to shorten the length of image word sequence and obtain better contextual infor-mation
	The existing color constancy algorithms have inaccuracies and instability in light source estimation, and the feature effects obtained through single-layer pooling transformers are not very accurate. Therefore, this paper proposes a color constancy algorithm based on a pyramid pooling transformer network that integrates confi-dence.
15:45-16:00 KT1-191	Title: Accurate segmentation based on heuristic shape attention for occlusal tooth on CBCT Author(s): Jiancheng Cai, Zheng Zou and Yi Wu Presenter: Zheng Zou
	Fujian Normal University, China
	Abstract: Accurate occlusal tooth segmentation for dental CBCT is essential for traumatic occlusal force diagnosis. As tiny multi-objects, adhesion from surrounding touching would largely hinder the correct detection. Especially, the convex and

	concave occlusal surface appears irregular and unconnected and increase the difficulties for separation. We proposed a three-stage segmentation framework. First, the panoramic view is incorporated for better dental spatial relationship understanding. Second, a tracking based on heuristic shape is specially designed for the adhesions among occlusal crown. Finally, the heuristic shape is further encoded as an attention in an improved 3DUnet to enhance the segmentation accuracy. To get the specific features of our dataset without large-scale samples, we propose a strategy from 2D coarse to 3D fine segmentation to reduce the unnecessary computation. In experiments, comparison and ablation studies demonstrate that our method generates more accurate results and outperforms other three state-of-the-art segmentations.
	Title: Image classification trusted model based on horizontal federated learning and SGX Author(s): Xinlin Wang, Shunxiang Lou, Haicheng Qu Presenter: Shunxiang Lou Liaoning Technical University, China
16:00-16:15 KT2-003	Abstract: The rapid development of computer image processing has greatly improved the progress of artificial intelligence. When big data and distributed machine learning interact, the accuracy and efficiency of algorithm recognition can be greatly improved, but its security cannot be guaranteed in terms of privacy data protection. The traditional horizontal federated learning algorithm FedAvg can perform model training under the premise of protecting user data, but the security vulnerabilities in the parameter interaction process and the local data training process may be exploited by internal or external attackers. In order to balance the efficiency and security of the algorithm, this paper proposes an image classification model SGX-FedAvg. The model adds Intel SGX based on hardware encryption mechanism on the basis of horizontal federated learning FedAvg, which loses a small part of the algorithm efficiency of federated learning and adds reliable security to its model. In this paper, two data sets, Cifar-10 and Mnist, are selected for training. The model proposed in this paper is compared with Native local distributed machine learning and FedAvg horizontal federated learning. It is analyzed that SGX-FedAvg has good performance in execution efficiency and security within acceptable overhead, and its feasibility is verified. Finally, it points out which fields the model can be applied to.
16:15-16:30 KT2-0028	Title: Super-resolution reconstruction of remote sensing image by fusion of receptive field and attention Author(s): Xiao Zhenjiu, Su Ting, Zhai Yuqi Presenter: Su Ting Liaoning Project Technology University, China
	Abstract: Aiming at the problem that the existing models are not enough to extract the spatial details and feature channel information of remote sensing images, a super-resolution reconstruction model of remote sensing images is proposed, which

integrates the receptive field and the attention mechanism. In the depth feature extraction stage of the model, several cascaded receptive field and coordinate attention blocks (RFCAB) are designed to fully extract the depth features of the image: Firstly, an RFB-CA module is designed inside the residual in residual dense block (RRDB). The model can use convolution of different scales to extract multi-scale spatial features and make both channel and space dimensions get attention. At the same time, in the process of learning features, the model pays more attention to the useful channels for the current task, so as to improve the feature representation ability of the model. In order to further improve the recovery ability of the model to detail information, a multi-scale fusion module (MSFM) was designed to obtain more detailed features by weighted fusion of features at different levels. In the 2x, 3x and 4x overscore reconstruction of DOTA dataset, the PSNR/SSIM value of this model is increased by 0.13dB/0.003, 0.17dB/0.007 and 0.24dB/0.013 compared with ESRGAN, respectively. In the 2x, 3x and 4x over-fraction reconstruction of AID dataset, the PSNR/SSIM value is increased by 0.15dB/0.004, 0.20dB/0.009 and 0.26dB/0.015 compared with ESRGAN, respectively. The experimental results show that the reconstruction effect of this model is better than other classical algorithms, and it has certain practical significance.

Title: Dynamic posture measurement accuracy evaluation technology based on mobile robots Author(s): Ning Nning Li, Bing Hua Hu, Hai Yang Chen Presenter: Ning Nning Li Chinese Flight Test Establishment, China

16:30-16:45 KT2-1001 Abstract: At present, in the process of performing the dynamic visual measurement task of the flight test, the method of theoretical analysis and static verification is mainly used to evaluate the accuracy of the measurement data. This method cannot fully reflect the impact of the error on the measurement accuracy in the motion scene, and the measurement data of the whole station is used as the evaluation benchmark, which cannot meet some Requirements for higher-precision (sub-millimeter) measurement tasks. Therefore, this paper designs and builds a dynamic posture measurement accuracy evaluation system. Based on the principle of visual measurement and the typical target motion law, it comprehensively analyzes the error impact factor, plans and designs a variety of test verification scenarios, completes the ground simulation of the target motion, and combines the reference data generated by the mobile robot with the number of position obtained by visual measurement. According to the comparison, error traceability and quantitative analysis are realized to provide effective technical support for the optimization design, feasibility demonstration and precision analysis and evaluation of specific task implementation plans.

16:45-17:00 KT2-0022	Title: Underwater Image Enhancement with Color Correction using Convolutional Neural Networks Author(s): Xueli Shen, Liumei Guan, Yuqi Zhai Presenter: Liumei Guan Liaoning Technical University, China
	Abstract: In the underwater environment, the color distortion and low contrast of the image are caused by environmental problems such as light absorption and scattering, which leads to the degradation of image quality. In order to improve the visual effect of the image, this paper proposed a color correction underwater image enhancement algorithm based on convolutional neural network. Firstly, a new underwater imaging model was used to correct the color cast problem of underwater images. Then, the convolutional neural network is used to extract the channel features of the corrected image, and the channel features are re-weighted by the multi-scale attention module to enhance the consistency of different feature maps, and the feature fusion is performed with the color corrected image. Finally, the image enhancement effect was improved by the fusion of features through the reconstruction calculation module. Experimental results show that the proposed algorithm can better correct the color distortion of the image and improve the image contrast. The main advantage is that the running speed of the proposed algorithm is two times faster than other advanced underwater image enhancement methods.
17:00-17:15 KT1-184	Title: Enhancing Sentiment Analysis on SEED-IV Dataset with Vision Transformers: A Comparative Study Author(s): Imad Eddine Tibermacine, Ahmed Tibermacine, Walid Guettala, Christian Napoli and Samuele Russo Presenter: Imad Eddine Tibermacine Sapienza University of Rome, Italy
	Abstract: This paper introduces a new approach to emotion classification utilising deep learning models, specifically the Vision Transformer (ViT) model, in the analysis of electroencephalogram (EEG) sig-nals. A dual-feature extraction approach was implemented in our study, utilising Power Spectral Density and Differential Entropy, to analyse the SEED IV dataset. This methodology resulted in the detailed classification of four distinct emotional states. The ViT model, which was originally designed for image processing, has been successfully applied to EEG signal analysis. It demonstrated remarkable performance by attaining a test accuracy of 99.02% with little variance. Notably, it outperformed conventional models like GRUs, LSTMs, and CNNs in this context. The findings of our study indicate that the ViT model has a high level of effectiveness in accu-rately identifying complex patterns present in EEG data. Specifically, the precision and recall rates achieved by the model surpass 98%, while the F1 score is estimated to be about 98.9%. The results of this study not only demonstrate the efficacy of transformer-based mod-els in analysing cognitive states,

but also indicate their considerable potential in improving systems for sympathetic human-computer interaction. Title: eGlucoSkin: A Skin Analysis for Diabetes Detection System using Image **Processing Technique** Author(s): Jose Marie B. Dipay Presenter: Jose Marie B. Dipay Polytechnic University of the Philippines, Philippines Abstract: This study was planned to develop, establish, and execute the eGlucoSkin: A Skin Analysis for Diabetes Detection System using Image Processing Technique. It specifically recognized the necessary limits in perceiving diabetes detection using image processing technique; the fitting features of the instrument that can be made to determine the issues encountered; and the respondents' level of beneficiary validation toward the made system in terms of value, unwavering quality, convenience, and execution. The investigation employed an abstract quantitative assessment approach, incorporating an examination framework, an expert-generated survey, and a set of 17:15-17:30 inquiry questions. The study participants consisted of two (2) Skin Clinic KT1-159 Representatives, one (1) Dermatologist, one (1) Endocrinologist and one hundred (50) Diabetes Patients from better places. Due to the limitations in detecting skin infections through image analysis related to factors such as surface and color, the study ultimately rejected the hypothesis because it revealed a significant disparity. The instrument's advantageous features that could address the encountered issues included the identification of diabetes-related ailments and the utilization of image processing techniques for documenting and analyzing skin conditions, thus streamlining the process of diabetes detection through skin analysis. The respondents' evaluations of the eGlucoSkin system, which is designed for diabetes detection through image processing, were highly positive in terms of functionality (rating of 4.92), reliability (rating of 4.94), usability (rating of 4.91), and performance (rating of 4.96). The actual implementation of the Diabetes Detection system, whether by government institutions or diabetes clinics and skin centers, will play a crucial role in its adoption.

## **SESSION**

#### \* All schedules will be scheduled in Japan Standard Time (UTC+9)

10:30-13:00 December 16, 2023	Session B – Visual based image detection and application Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/i/87016711001		
Session Chair:	Session Chair:		
10:30-11:00 Invited Speech 3	Assoc. Prof. Siti Hajar Binti Halili, Unversity of Malaya, Malaysia Speech title: Digital Innovation & strategies in e-learning		
	Title: An object detection network for locating and recognizing cluttered garbage Author(s): Liu Shuxin and Ji Guanjun Presenter: Ji Guanjun Shanghai Dianji University, China		
11:00-11:15 KT1-190	Abstract: The research on garbage classification have made remarkable achievements in the latest work. However, due to the complexity of the location elements of the garbage background, there are still many difficulties in the accuracy of garbage location detection. For complex backgrounds, it is easy to cause false detection and missed detection. In response to the above problems, we explored the improved YOLOv5n network , added the ContextAggregation module and replaced GIOU with Focal-EIOU, and replaced C3 with C3SAC to improve feature extraction for contextual information. The improved algorithm has been proved by experiments to increase mAP by 2.3%. The accuracy rate of Plastic bowl, Power banks, Cardboard boxes, Tea leaves, Plastic hangers and so on has reached more than 80%.		
11:15-11:30 KT2-0061	<ul> <li>Title: Bidirectional Temporal Fusion Video Denoising Based on W-Net</li> <li>Author(s): Derui Li, Haikun Zhang, Yueli Hu</li> <li>Presenter: Derui Li</li> <li>Shanghai University, China</li> <li>Abstract: The paper provided a brief analysis of video denoising characteristics, discussed and analyzed various existing video denoising methods, and proposed a new video denoising algorithm based on bidirectional time fusion and the W-Net architecture, designed to meet the requirements of real-time video denoising. This algorithm effectively combines past and future information, increases the temporal receptive field, and reduces memory usage. Additionally, by selecting a deeper W-Net backbone network, the algorithm achieves high-fidelity real-time video denoising. Comparative analysis with other video denoising models demonstrated that this approach outperforms others in terms of fidelity.</li> </ul>		

Title: NAC-TCN: Temporal Convolutional Networks with Causal Dilated Neighborhood Attention for Emotion Understanding Author(s): Alexander Mehta, William Yang Presenter: Alexander Mehta Independent Researcher, USA Abstract: In the task of emotion recognition from videos, a key improve-ment has been to focus on emotions over time rather than a single frame. There are many architectures to address this task such as GRUs, LSTMs, Self-Attention, Transformers, 11:30-11:45 and Temporal Con-volutional Networks (TCNs). However, these methods suffer from high memory usage, large amounts of operations, or poor gradients. We propose a KT2-0010 method known as Neighborhood Attention with Convolutions TCN (NAC-TCN) which incorporates the benefits of attention and Temporal Convolutional Networks while ensur-ing that causal relationships are understood which results in a reduction in computation and memory cost. We accomplish this by introducing a causal version of Dilated Neighborhood Attention while incorporating it with convolutions. Our model achieves com-parable, better, or state-of-the-art performance over TCNs, TCAN, LSTMs, and GRUs while requiring fewer parameters on standard emotion recognition datasets. We publish our code online for easy reproducibility and use in other projects – Github Link. Title: A Vehicle Detection Method under Strong Infrared Radiation Interference Author(s): Yuan Zhang, Ziyi Chen, Luping Wang, Wuming Wu Presenter: Yuan Zhang Sun Yat-sen University, China Abstract: Strong infrared radiation interference is a common type of interference in optoelectronic countermeasures. An optical system exposed to strong light would disrupt the acquisition of image information and even damage the device. In this paper, 11:45-12:00 we aim to design an infrared system for object detection under the circumstances of KT2-0018 strong infrared radiation interference in order to enhance the countermeasure capability of the optoelectronic system. Firstly, we introduce the Wave-front Coding (WFC) technique to attenuate the damage caused by strong infrared radiation interference. Secondly, we use (Tikhonov) regularization to restore the blurred image caused by wavefront coding and obtain a clear low-light image. Thirdly, we use Recursively Separated and Weighted Histogram Equalization (RSWHE) for image enhancement to improve its contrast. Finally, we use the YOLOv8 algorithm for object detection. Experiments on real infrared images show that this scheme has outstanding performance under strong infrared radiation interference. Title: Infrared Image Enhancement Algorithm Based on Multiscale Guided Filtering Author(s): GuoQiang Ma, Ming Chen, WanWei Huang, YanFei Niu 12:00-12:15 Presenter: GuoQiang Ma KT2-0031 Zhengzhou University of Light Industry, China

	Abstract: Infrared thermal imaging is capable of operating under various lighting conditions, unaffected by external factors, but it often suffers from issues like low contrast and blurry details. This article introduces an infrared image enhancement algorithm based on multi-scale guided filtering. The algorithm employs guided filtering to split the captured infrared image into a base layer and a detail layer. The base layer undergoes non-linear compression via segmented histogram equalization to enhance image contrast, while multi-scale guided filtering extracts diverse detail information from the image, which is then merged into a new detail layer to amplify fine details. Finally, the base layer and detail layer are combined to complete the enhancement of the infrared image. Experimental results demonstrate that this algorithm surpasses suboptimal approaches by 15.2% in terms of Enhancement Measure Evaluation(EME) and enhances the peak signal-to-noise ratio (PSNR) by 7.9%.
12:15-12:30 KT2-0040	<ul> <li>Title: Safety helmet wearing detection algorithm based on lightweight FastesDet Author(s): Haibo Jin, Fei Yuan</li> <li>Presenter: Fei Yuan</li> <li>Liaoning Technical University, China</li> <li>Abstract: Aiming at the problems of long reasoning time and high hardware requirements of workers ' helmet wearing detection model in existing construction sites, a lightweight helmet wearing detection algorithm based on improved FastestDet is proposed. Firstly, the FASTDET backbone network is optimized to further reduce the number of parameters while ensuring accuracy. Secondly, the spatial pyramid pooling module is changed from SPP to SimSPPF proposed by Meituan YOLOv6,</li> </ul>
	which accelerates the recognition speed. Finally, the EMA attention mechanism is introduced at different locations to enhance the perception ability of the model. The experimental results show that the recall rate and mAP of the improved FastestDet algorithm are 1.3 % and 1.7 % higher than FastestDet, respectively. And the inference speed is faster than other models.
	Title: Multi-scale feature and correlation volumes for Video Interpolation Author(s): JiaHao Wang, HaiKun Zhang, YueLi Hu Presenter: JiaHao Wang Shanghai University, China
12:30-12:45 KT2-0058	Abstract: Video frame interpolation involves synthesizing intermediate frames between two consecutive frames to enhance the smoothness of a video. Nevertheless, generating high-quality interpolated frames in videos featuring substantial motion and complex scenes remains a formidable challenge. To produce superior quality frames, this paper introduces an interpolation method based on multi-scale features and correlation volumes. The multi-scale feature connects the deep features of high-resolution frames with the shallow features of lower-resolution frames, thereby

	increasing the number of available pixels and feature details for motion analysis. Correlation volumes are employed to construct correlation features for all pairs of pixels, which are utilized to refine the underlying optical flow field. We propose a unified network approach that eliminates the need for additional complex optical flow network integration, simplifying the training process. The experimental results demonstrate that this method outperforms the baseline approach in both objective and subjective evaluations across various datasets. Particularly, this method exhibits advantages on datasets characterized by complex backgrounds and large motions.
12:45-13:00 KT1-074	Title: Graduate Tracer Monitoring Platform with Decision Support Feature and Mapping Recommendations Analysis Using Rule-Based Algorithm Author(s): Ma.Corazon Fernando, Joseph Gonzales, Ace Lagman and Roman De Angel Presenter: Joseph Gonzales FEU Institute of Technology, Philippines Abstract: The study aims to provide a centralized channel to monitor institutions' graduates in terms of their job employment, to assess academic programs using modified instruments so necessary interventions may be provided, and to provide a matching algorithm that can be used both by industry partners and respective alumni. This study used a Decision Support System and mapping recommendation analysis using a rule-based algorithm to evaluate the results of alumni program evaluation on five areas or dimensions such as curriculum, faculty, facility, laboratory, and student services. The study may set the threshold to determine if the results of the areas mentioned above are beyond the passing rate and implement the interventions for each area. The content management system is also used in this study to change the contents of the Alumni Program Evaluation, the interventions, the threshold, and many more. The results of the Alumni Program Evaluation in all areas like Curriculum, Faculty, Facility, Laboratory, and Student Services. Based on the results no intervention must be implemented in all areas/dimensions since the mean and the composite mean is more than the 4.0 threshold that has been set in the proposed system. Among the five areas, faculty got the lowest passing mean followed by students' services and laboratory respectively. This means these areas have still room for improvement. The overall rating of the respondents using the technology
	acceptance model numerical rating is 4.42 with an interpretation of "Agree". As observed all criteria are rated either agree or strongly agree which indicates a high standard has been set in the development of the system. This means that the system is ready for deployment.

### **SESSION**

#### \* All schedules will be scheduled in Japan Standard Time (UTC+9)

	Session C – Data-driven recommendation systems and information
15:00-16:45	security
December 16, 2023	Zoom ID: 870 1671 1001
	Link: https://us02web.zoom.us/j/87016711001
Session Chair:	
15:00-15:15 KT1-144	Title: A real-time update method for bus stops and routes based on historical bus data Author(s): Hao Shi, Daqiang Zhang, Yanyan Sun, Liye Zhang and Jie Song Presenter: Yanyan Sun Shandong University of Science and Technology, China
	Abstract: Precise bus stops and trajectories are crucial for public transport. However, acquiring accurate information on bus trajectories and stop locations faces the situation of point drift of the global posi-tioning system (GPS), low sampling frequency, and the absence of the latest bus information. Thus, this study developed a method, based on Dumpster Shafer evidence theory and K-Shortest Paths, to update the latest bus stops and routes and automatically remove abandoned bus stops by taking advantage of historical GPS data. To speed up computation, we divided the road network into meshes, dynamically generating a local road network. The effectiveness of the method is validated on Qingdao bus data, and the experiment demonstrates that the method is robust in pinpointing the bus stops and the trajectories of different bus routes.
15:15-15:30 KT1-110	Title: Research on personalized news recommendation based on dynamic knowledge subgraph perception Author(s): Gang Wang, Yue Sun and DanNi Li Presenter: Yue Sun Liaoning Technical University Huludao, China Abstract: Aiming at the problem of how to effectively construct the interpretability of time-sensitive personalized news recommendation, a dynamic knowledge subgraph perception research method is proposed. Firstly, the dynamic knowledge subgraph is extracted by using the time neighborhood perception technology. For each news, a dynamic knowledge subgraph covering the core entities in the news and the neighbor entities related to the news in the knowledge graph is extracted. Secondly, the CNN and Transformer technology sets are used to form a semantic collaborative encoder. The user 's personalized features and news content are encoded by the user news collaborative encoder. Finally, the matching score is calculated by the correlation model and model training. The larger the score, the more interested in that type of news. Compared with the independent modeling of user interest and candidate news,

	experiments are carried out on the data sets MIMD and Feeds, and four indicators of AUC, MRR, nDGG @ 5 and nDGG @ 10 are used for evaluation. The experimental results show that the proposed network model has great advantages over other benchmark models, making the recommended results more interpretable.
15:30-15:45 KT1-148	Title: The Effective of Algorithms on Web Application Development to Detect Repetitive DNA Author(s): Tida Butrak, Surangkanang Charoenrak, Supaporn Chairungsee and Thana Charuphanthuset Presenter: Tida Butrak Suratthani Rajabhat University, Thailand
	Abstract: Repetitive DNA is vital in genetics, particularly in tandem repeats linked to specific genetic disorders and diseases. Identifying duplicate elements within a genome is typically time-consuming and resource-intensive. In response to this challenge, this paper presents an algorithm designed for web applications, which efficiently detects duplicate DNA sequences while operating within linear time and using linear memory space. This algorithm capitalizes on utilizing the Longest Previous non-overlapping Factor (LPnF) table and the suffix tray data structure. The web application in question excels at precisely identifying repeated patterns within genome sequences and expeditiously delivering results. Furthermore, its user-friendly interface simplifies data input and facilitates the visualization of results.
15:45-16:00 KT1-155	Title: HermHD: Enhancing smart contract security based on code obfuscation Author(s): Zekun Hou, Chang Tong Dong and Ying Shang Presenter: Zekun Hou Beijing University of Chemical Technology, China
	Abstract: Due to the transparent nature of blockchain, all transaction information and smart contract code is recorded on the public blockchain. It is easy for exist-ing static analysis tools to analyze and exploit vulnerabilities in smart con-tract code. To mitigate this risk, we propose HermHD, an automated security enhancement tool that protects smart contracts on the Ethereum network. HermHD employs six obfuscation patterns that can rewrite the bytecode of a smart contract without affecting its functionality. By applying these obfusca-tion techniques, we aim to prevent reverse static analysis tools from cracking the contract and thereby enhance the security of smart contracts. To validate the effectiveness of HermHD, we conducted experiments on 121 smart con-tracts from a public dataset. The evaluation results demonstrate that all the protected smart contracts are resistant to two popular reverse engineering tools, and the additional gas cost incurred is minimal.
16:00-16:15 KT1-142	Title: Mining and Analysis of Ship Overtaking Behavior Based on AIS Data Author(s): Zhicheng Ma, Daqiang Zhang, Yan Lu, Jie Song and Liye Zhang Presenter: Zhicheng Ma

	Shandong University of Science and Technology, China
	Abstract: To achieve efficient and accurate identification of ship encounter behavior information in massive Automatic Identification System (AIS) data, understand and analyze the navigation process of en-counter ships, and identify potential safety risk points within ports and waterways. This article takes the AIS data of the main channel area in the Qingdao sea area as the research object, uses Douglas Pucker algorithm and differential algorithm to extract the behav-ioral feature points of ships overtaking in the main channel, quanti-tatively analyzes the relationship between behavior change points and overtaking points, understands the behavioral characteristics of ships overtaking process, and provides a clearer and comprehensive understanding of the overtaking process of ships.
	Title: Server-Aided Revocable Identity-Based Signature over Lattices Author(s): Wang Bingbing Presenter: Wang Bingbing Zhengzhou University of Light Industry, China
16:15-16:30 KT1-182	Abstract: Revocable Identity-Based Signatures (RIBS) incorporate revocation mechanisms into traditional identity-based signatures, allowing for the revocation of signing capabilities for users. Specifically, RIBS periodically assigns update keys to non-revoked users. When a user needs to be revoked, a trusted Key Generation Center (KGC) ceases to assign new update keys to that user, rendering the revoked user unable to sign any message effectively within future time periods. However, previous approaches have imposed significant burdens on users, requiring extensive computational efforts and continuous communication with the KGC. These limitations pose challenges for users with limited computing, communication, and storage capabilities. To alleviate these issues, this paper proposes a Server-Aided Revocable Identity-Based Signature (SR-IBS) scheme with signing key exposure resistance. In this scheme, almost all of the user's workload can be delegated to a third-party server, which manages user public keys and update keys. Additionally, users do not need to communicate with the KGC during the key update phase, and they only need to keep a fixed-sized key. Finally, we prove that the proposed scheme is strongly unforgeable against selective-ID and adaptive chosen-message attacks in the random oracle model.
16:30-16:45 KT1-106	Title: Graph attention neural network social recommendation based on dynamic representation Author(s): Guang Wang, Danni Li and Yue Sun Presenter: Li Danni Liaoning Technical University Huludao, China
	Abstract: Although Few methods of deep learning have been proposed to deal with graphs that are dynamic in nature. Most of the existing recommendation systems based on social trust ignore the heterogeneous trust relationship between users and the

heterogeneous interaction between users and products. And the appeal of a project can change over time, just as the dynamic interests of users are rarely considered, so is the relevance between projects. In order to overcome these limitations, a graph attention neural network Social recommendation (GNN-DR) model based on dynamic representation is proposed. Firstly, it considers the dynamic representation of users and items, and combines the influence of their relationship to model the short-term dynamic and long-term static interactive representation of item attractiveness. Second, the architecture systematically models user-user social diagrams and user-project diagrams, integrating heterogeneous trust and interactions. Finally, the attention mechanism is used to learn the potential factors of users and projects. Experiments on two real recommendation system datasets verify the validity of GNN-DR.

### **SESSION**

\* All schedules will be scheduled in Japan Standard Time (UTC+9)

10:30-13:00 December 17, 2023	Session D – Modern Information Technology and Engineering Applications Zoom ID: 870 1671 1001 Link: https://us02web.zoom.us/i/87016711001	
Session Chair:		
10:30-11:00 Invited Speech 4	Prof. Anand Nayyar, Duy Tan University, Vietnam Speech title: Autonomous Vehicles: Reimagining Transportation for the Future	
11:00-11:15 KT1-086	Title: Research on Edge Computing Task Unloading of a Portable Inspection Terminal for Power Distribution Equipment Author(s): Jian Fang, Xiang Lin, Yan Tian, Min Zhang, Jian Sun and Kairan Li Presenter: Xiang Lin Guangzhou Power Supply Bureau of Guangdong Power Grid Co., Ltd., China Abstract: The power distribution system is an important energy support system for smart cities. In order to meet the needs of efficient and safe operation and maintenance of the distribution grid, this paper designs a portable sensor toolbox including integrated infrared temperature sensor, partial discharge sensor and gas sensor. Sensors are mainly powered by batteries. To improve maintainability and reduce charging time,this paper minimize sensor energy consumption through joint optimization of task segmentation, equipment CPU frequency and transmission time. The simulation results show that the computing offloading strategy based on the proposed algorithm can effectively reduce the energy consumption compared to all local computing or all offloading computing	
11:15-11:30 KT1-087-A	Title: The risks and legal paths of generative AI Author(s): Xioaoqian Ma Presenter: Xioaoqian Ma Dalian Ocean University, China Abstract: The advent of generative artificial intelligence represented by ChatGPT4 means that human society is moving towards the era of "knowledge revolution". The interpersonal interaction achieved by ChatGPT in the form of dialogue is highly human-like and widely applicable, which is conducive to the development of the world's technological revolution and the promotion of high-quality political, economic and social development. But while ChatGPT brings huge dividends to society, it also raises legal risks, including personal information infringement, data source legitimacy, intellectual property disputes, and academic ethics. Therefore, the legislative	

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	department and relevant regulatory agencies should formulate active policies, build reasonable market access rules and responsibility bearing mechanisms, and improve the public's awareness and ability to prevent risks, so as to promote the development of artificial intelligence to effectively promote social order.
	Title: Analyzing the Temporal and Spatial Characteristics of Public Transit Passengers' Travel Behavior Using Multiple Logit Models Author(s): Zhang Liye, Lu Yan, Ma Zhicheng, WEI Ying Presenter: Lu Yan Shandong University of Science and Technology, China
11:30-11:45 KT1-100	Abstract: The accelerating process of urbanization has deepened the contradiction between urban traffic supply and residents' travel demand, posing significant challenges to public transportation within cities. Currently, smart city development is being promoted nationwide, and smart mobility plays a pivotal role as an integral component of smart cities. Utilizing big data, the study of passenger travel behavior has been widely applied. This study integrates multiple Logit models and big data visualization methods. Utilizing card-swiping data from May 2020, recorded every day from 4:00 to 23:00, the research analyzes the travel time, frequency, influencing factors, and spatial distribution of residents in the West Coast New Area. It delves deeply into the travel behavior of public transit passengers. The findings revealed that during weekdays, passengers traveling during the morning and evening peaks are 1.33 times more than those during weekends. Age, peak travel times, whether passengers benefit from discounts, and travel distance significantly impact travel frequency. Furthermore, on weekends, there is a 21% increase in the number of public transit passengers in the eastern coastal regions compared to weekdays.
11:45-12:00 KT1-140	Title: Analysis of urban bus control strategies under the COVID-19 pandemic Author(s): Liye Zhang, Jukong Li, Hao Shi and Jie Song Presenter: Hao Shi Shandong University of Science and Technology, China Abstract: During the peak of the COVID-19 outbreak in Wuhan, there were distinct variations in bus control intensity among cities, influenced by factors such as population size and economic scale. In response to these differences, this study collected and compiled bus control strategies from more than 200 cities across the country. Daily data on the existing confirmed cases (confirmed cases per million population) from January 24, 2020, to March 23, 2020, were gathered as research samples. Statistical analysis using the Kruskal-Wallis One-Way ANOVA (k-sample) test was performed in SPSS, followed by pairwise comparisons of the samples. The study involved comparing epidemic data between cities with high control intensity (implementing complete shutdown) and those with lower control intensity (implementing partial shutdown or non- shutdown). The results of the analysis indicated that there were no significant differences in the existing confirmed

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	COVID-19 cases between many pairs of cities. This finding suggests that the control intensity of bus strategy in these cities may be unreasonable. Pairwise comparison heatmaps also revealed a certain pattern, with the decline of the GDP volume, the proportion of the city pairs with no significant difference in COVID-19 diagnosis statistics continues to increase under the same population size, which furthermore proves that bus control strategies of some cities during COVID-19 is unnecessarily tight, especially in economically underdeveloped areas, which need to adapt to local conditions, develop reasonable control strategies based on actual travel needs. Research on public transportation strategies for COVID-19 can offer valuable insights for response strategies, prompting improvements and strengthening of healthcare infrastructure to better address future threats posed by similar infectious diseases.
	Title: Algorithm of Palindrome Detection Tool Author(s): Surangkanang Charoenrak, Tida Butruk, Thana Charuphanthuset and Supaporn Chairungsee Presenter: Surangkanang Charoenrak Suratthani Rajabhat University, Thailand
12:00-12:15 KT1-146	Abstract: Detecting palindromes in DNA sequences is a fundamental problem in computational biology with implications for understanding genomic instability. DNA sequences containing long adjacent inverted repeats (palindromes) are associated with chromosomal rearrangements. In this article, we present the concept of using the LPrF (Longest Previous reverse Factor) table to develop an algorithm for efficiently detecting palindromes in strings, particularly in long DNA and RNA sequences. To improve processing time and reduce computational overhead, we utilize the Suffix Heap data structure for data preparation before applying the algorithm. These two components are integrated into a user-friendly way of detecting palindromes in DNA sequences, a web-based tool that streamlines the process, saving time and computational resources.
	Title: A Spatiotemporal Trajectory Similarity Measurement Based on Error Ellipses and Stability Author(s): Kailai Zhou and Qinglei Meng Presenter: Qinglei Meng Zhengzhou University of Light Industry, China
12:15-12:30 KT1-180	Abstract: The measurement of trajectory similarity plays a crucial role in the processes of trajectory retrieval, classification, mining, and other trajectory analysis tasks, and it finds widespread application in trajectory data. Existing similarity measurement methods have mostly been developed under the assumption of good data quality, with a predominant focus on spatial aspects while seldom considering both spatial and temporal dimensions simultaneously. An essential challenge related to temporal considerations is dealing with trajectories that have different sampling rates and asynchronous sampling, both of which introduce a degree of uncertainty.To address

	these issues, this paper presents a novel method for similarity measurement, considering uncertainty, based on error ellipses, termed Spatio-Temporal Uncertain Trajectory Similarity Measurement (STUSM). Experimental comparisons were conducted using real trajectory data and related work. The results indicate that the proposed approach exhibits enhanced robustness when dealing with various challenges such as different sampling rates, asynchronous sampling, and outliers.
12:30-12:45 KT1-192	Title: Design of home care system based on edge-cloud collaboration Author(s): Feng Tian, Anfeng Jian, Zhenxing Zuo, Shengyan Yang, Minshu Wu, Dan Zhai Presenter: Feng Tian Guizhou Business College, China
	Abstract: With the aging of the population and the continuous progress of science and technology, more and more elderly care needs no longer rely on the traditional way of elderly care, but through various Internet of things technologies to achieve better elderly care experience and security. The edge-cloud collaborative home care system based on ZigBee technology is a new way of care for the elderly. Through intelligent sensor, data acquisition, communication and control technology, the elderly's life, health and safety status at home can be sensed, monitored and feedbacks in real time, providing the elderly with convenient, intelligent, safe and healthy services for the elderly. This paper will introduce the design scheme of home care system based on zigbee technology in detail, including system architecture, main functional modules, communication mode, sensor selection, data processing and monitoring strategy. Through the introduction of this article, readers can understand how to combine modern technology and elderly care services to create a more humanized and intelligent home care system, to provide better love and care for the life of the elderly.
12:45-13:00 KT1-174	Title: Hierarchical Dropout Regularization Technique for Skin Disease Classification Author(s): Wanus Srimaharaj and Supansa Chaising Presenter: Wanus Srimaharaj Payap University, Chiang Mai, Thailand
	Abstract: This study introduces an innovative approach to skin disease classification by integrating Hierarchical Dropout into a Convolutional Neural Network (CNN) architecture. This method exhibits several advantages, addressing the complexities of skin disease classification effectively. Hierarchical Dropout, operating hierarchically, enables adaptive adjustment of dropout rates across hidden layers, accommodating the diverse spectrum of human skin disease conditions in the dataset. Focusing on network layer outputs rather than modifying input data, it applies a dropout mechanism, crucial for preventing overfitting by reducing feature-specific dependencies. Variable dropout rates, linked to various human skin disease conditions, facilitate model adaptability to different conditions and types. The tailored regulation of dropout extends to both

convolutional and fully connected layers, ensuring comprehensive feature learning while guarding against overfitting. Moreover, the study incorporates Weighted Ensembling, combining predictions from various models with weights assigned based on validation set performance. This technique enhances classification accuracy by capitalizing on the strengths of multiple models. The adoption of Probabilistic Output Layers, employing a Bayesian neural network approach, produces probabilistic predictions presented as probability distributions over classes. This captures the intrinsic uncertainty in skin disease classification, vital for clinical diagnostics. The proposed tailored regularization results in a robust, adaptive, and reliable approach essential for clinicians and dermatologists relying on accurate skin disease diagnoses.

# **Optional One-day Tour (paid)**

Time: 10:00-18:00 on December 17, 2023.

Route Overview —Kiyomizu-dera—Sannenzaka Ninenzaka—Kyoto Gion YASAKA SHRINE—Fushimi Inari Taisha

Kiyomizu-dera, is the oldest temple in Kyoto. It is also famous for maple and cherry blossom viewing, and is one of the three most famous sights in Kyoto, and was inscribed on the World Heritage List in 1994.





Sannenzaka Ninenzaka is a very famous neighborhood in Kyoto, surrounded by old wooden houses and traditional Japanese stores. It's nice street town, with a very strong cultural flavor. It's a great place to find Japanese souvenirs.



Kyoto Gion Yasaka Shrine has a history of more than 1,300 years, making it a genuine 1,000-year old building. It is one of the largest festival sites in Japan. All important events festivals in Kyoto are chosen to be held here. Fushimi Inari Taisha is one of the shrines beloved by the people of Kyoto and has the most powerful incense. The god of Inari is the fox god, and is believed to bless a good harvest of grains, which is derived from commercial prosperity.