



**Program of the 6th
International Symposium on
Advanced Technologies and
Applications in the Internet of Things**

ATAIT 2024



ATAIT 2024

The 6th International Symposium on Advanced Technologies and Applications in the Internet of Things (ATAIT 2024) will be held in Kusatsu, Shiga, Japan, Aug. 19-22, 2024. This conference is sponsored by the VLSI center of Ritsumeikan University and supported by the IEEE CEDA All Japan Joint Chapter. The conference provides an international forum for professionals, academics, and researchers to present the latest developments in IoT technologies and applications, including network, security, processor architecture, high-performance computing, image processing, computational acoustics, FPGAs, GPUs, etc. It particularly welcomes those emerging methodologies and techniques that bridge theoretical studies and applications on the Internet of Things. Novel quantitative engineering and science studies may be considered as well. All the accepted papers will be published at CEUR Workshop Proceedings.

Committees

Organizing Committee

General Chair

Lin MENG (Ritsumeikan University, Japan)

Program Chairs

Xiangbo KONG (Toyama Prefectural University, Japan)

Kota YOSHIDA (Ritsumeikan University, Japan)

Finance Chair

Kenshi SAHO (Ritsumeikan University, Japan)

Registration Chairs

Kyosuke KAGEYAMA (Kindai University, Japan)

Yasuhiro TSUTSUMI (Kindai University, Japan)

Local Arrangement Chairs

Akiyoshi HIZUKURI (Ritsumeikan University, Japan)

Ami TANAKA (Ritsumeikan University, Japan)

Publication Chairs

Hiroki NISHIKAWA (Osaka University, Japan)

Hengyi LI (Zhongyuan University of Technology, China)

Technical Program Committee

Aravinda C V (NMAM Institute of Technology, India)

Akiyoshi HIZUKURI (Ritsumeikan University, Japan)

Changan JIANG (Osaka Institute of Technology, Japan)

Kyosuke KAGEYAMA (Kindai University, Japan)

Yasuhiro TSUTSUMI (Kindai University, Japan)

Xiangbo KONG (Toyama Prefectural University, Japan)

Liang LI (Ritsumeikan University, Japan)

Lin MENG (Ritsumeikan University, Japan)

Hiroki NISHIKAWA (Osaka University, Japan)
Woong CHOI (Kangnam University, South Korea)
Kenshi SAHO (Ritsumeikan University, Japan)
Takeshi KUMAKI (Ritsumeikan University, Japan)
Ami TANAKA (Ritsumeikan University, Japan)
Zhongkui WANG (Ritsumeikan University, Japan)
Kota YOSHIDA (Ritsumeikan University, Japan)
Zhe QIU (Ritsumeikan University, Japan)
Pengcheng LIU (University of York, UK)
Feng ZENG (Central South University, China)
Yan WANG (Zhongyuan University of Technology, China)
Jun YU (Zhongyuan University of Technology, China)
Hengyi LI (Zhongyuan University of Technology, China)
Xuebin YUE (Zhongyuan University of Technology, China)
Zenghui WANG (University of South Africa, SA)

Steering Committee

Steering Chair

Hiroyuki TOMIYAMA (Ritsumeikan University, Japan)

Steering Committee Members

Aravinda C V (NMAM Institute of Technology, India)
Changan JIANG (Osaka Institute of Technology, Japan)
Feng ZENG (Central South University, China)
Junsong ZHANG (Xiamen University, China)
Yu BAI (California State University, Fullerton, USA)
Yunchuan SUN (Beijing Normal University, China)
Yuji IWAHORI (Chubu University, Japan)
Song WANG (Kansai Gaidai University, Japan)
Zhongkui WANG (Ritsumeikan University, Japan)
Zhangbing ZHOU (China University of Geosciences (Beijing), China)
Zhilei CHAI (Jiangnan University, China)

9:00-9:50 Registration (Rohm Plaza, 5th Floor)

9:50-10:00 Opening Remarks (Conference Room, Rohm Plaza, 5th Floor)

10:00-10:40 Plenary Talk (Conference Room, Rohm Plaza, 5th Floor)

Chair: *Hiroyuki Tomiyama* / Ritsumeikan University

Title: Spatial Transcriptomic Atlas of Mouse Intervertebral Disc Reveals Rarity and Distribution of Nucleus Pulposus Progenitor Cells

Prof. Ren Xu (Xiamen University, College of Medical)

10:40-11:00 Coffee Break

11:00-12:20 Session 1 (Conference Room, Rohm Plaza, 5th Floor)

Chair: *Ren Xu* / Xiamen University

1. [11:00] **Verification of Animal External Ear Model-based Microphone Sensor for Hazardous Sound Detection**,
Miho Yamada, Takeshi Kumaki and Kyosuke Kageyama
2. [11:20] **Simultaneous Routing with Washing Droplets in MEDA Biochips**,
Chiharu Shiro, Hiroki Nishikawa, Xiangbo Kong, Hiroyuki Tomiyama and Shigeru Yamashita
3. [11:40] **Research on Rotational Object Recognition Based on HSV Color Space and Gamma Correction**,
Zhujun Nie, Teng Long and Zhangbing Zhou
4. [12:00] **Leftover Food Measurement Using Deep Learning Based Semantic Segmentation**,
Haruhiro Takahashi, Ryuto Ishibashi, Hayata Kaneko and Lin Meng

12:20-13:20 Lunch Break

13:20-14:40 Session 2 (Conference Room, Rohm Plaza, 5th Floor)

Chair: *Takeshi Kumaki* / Ritsumeikan University

1. [13:20] **Behavior Classification for Bed Monitoring Using Short-Term 60 GHz-Band FMCW Radar Images**,
Shuhei Hashimoto, Xiangbo Kong, Kazuhide Kamiya and Kenshi Saho
2. [13:40] **Skeleton-Based Action Analysis for Improving Jump Height in Volleyball**,
Shuma Yoshika, Xiangbo Kong
3. [14:00] **A Real-time Sound Source Separation System**,
Cheng-Yuan Tsai, Ting-Yu Lai, Chao-Hsiang Hung, Hau-Shiang Jung, Syu-Siang Wang and Shih-Hau Fang
4. [14:20] **Enhancing Automotive Safety through Advanced Human Action Recognition Techniques**,
Aravinda C.V, Sannidhan M S, Soumya Aswath, Jyothi Shetty and Arjun B C (India, GMT+5:30, 10:50)

14:40-15:00 Coffee Break

15:00-15:40 Plenary Talk (Conference Room, Rohm Plaza, 5th Floor)

Chair: *Teng Long* / China University of Geosciences (Beijing)

Title: Bio-Inspired Motion Learning in Cluttered and Uncertain Environments

Prof. Pengcheng Liu (University of York, Department of Computer Science) (UK, GMT+1, 7:00)

15:40-16:00, Coffee Break

16:00-17:20 Session 3 (Conference Room, Rohm Plaza)

Chair: *Keshi Saho* / Ritsumeikan University

1. [16:00] **Norm-Regularized Token Compression in Vision Transformer Networks**,
Masayuki Ishikawa, Ryuto Ishibashi and Lin Meng
2. [16:20] **Research Regulation of Movement in Pigeons by Electrical Stimulation of FRM Brain Region**,
Yexin Zhang, Xiaomin Qi, Yongjun Zhu, Dongyun Wang and Xinyu Liu
3. [16:40] **DC Microgrid Subsystems in AC Network Fault Detection and Localization Using Artificial Intelligence: A Review**, (South Africa, GMT+2, 9:40)
Zukisa Nante and Zenghui Wang
4. [17:00] **Development of Battery Management System for Electric Vehicles**, (Pakistan, GMT+5, 13:00)
Muhammad Hamza Mehdi, Ali Ahmad and Qi Li

18:30-20:30, Banquet Award Ceremony

Tuesday, August 20

9:00-10:20 Session 4 (Conference Room, Rohm Plaza, 5th Floor)

Chair: *Chengyan Zhao* / Ritsumeikan University

1. [9:00] **An Iot-Based Real Time Inner-State Monitoring System for Lithium-Ion Batteries**,
Takaki Ojima and Masahiro Fukui
2. [9:20] **Development of A Remote Controlled Robotic System Combined ROS 2 and IoT**,
Makoto Inoue, Zhe Qiu and Zhongkui Wang
3. [9:40] **An Improved YOLOv8 Tomato Leaf Disease Detector Based on Efficient-Net backbone**,
Runqian Zhang, Yifei Ge, Qi Li and Lin Meng
4. [10:00] **Simulation of 4D Printed Hydrogel Using RNN**,
Yifan Xu, Mengtao Wang, Zhongkui Wang and Lin Meng

10:20-10:40, Coffee break

10:40-12:00 Session 5 (Conference Room, Rohm Plaza, 5th Floor)

Chair: *Zhe Qiu* / Ritsumeikan University

1. [10:40] **Time-Series Clustering Analysis of Vegetation Indices Obtained from UAV to visualize Fertilization Effect and High Temperature Influence**,
Taichi Ito, Ken'ichi Minamino and Shintaro Umeki
2. [11:00] **Evaluation of Self-localization Estimation in Indoor Environments Using Cameras for Small Drones**,
Genki Higashiuchi, Tomoyasu Shimada, Hiroki Nishikawa, Xiangbo Kong and Hiroyuki Tomiyama
3. [11:20] **Parked Vehicles Assisted Task Offloading Based on Deep Reinforcement Learning**,
Guangting Lu, Zhuojun Lv, Zheng Zhang and Feng Zeng
4. [11:40] **A Review on FPGA-Based Optimization and Applications of Deep Learning Convolutional Neural Networks**,
Zhongyu Wang, Qi Li, Yifei Ge and Lin Meng

12:00-12:10 Closing Remarks (Conference Room, Rohm Plaza, 5th Floor)

12:10-13:10 Lunch

14:00-17:00 Technical tour

Presenter Guidelines

1. To onsite presenters, please bring your computers to the conference for presentation. Use a break prior to your presentation to set up your computer and make sure everything works properly. Only HDMI port is supported.
2. The presentation consists of
 - Plenary Talk: 30-minute presentation and 5-minute Q&A.
 - Regular Section: 15-minute presentation and 5-minute Q&A.
3. To online presenters, Zoom URL will be announced via registered e-mail. Use a break prior to your presentation to set up your online presentation and make sure everything works properly.