



**Program of the 4th
International Symposium on
Advanced Technologies and
Applications in the Internet of Things**

ATAIT 2022



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The 4th International Symposium on Advanced Technologies and Applications in the Internet of Things (ATAIT 2022) will be held in Ibaraki, Osaka, Japan on August 24-26, 2022. ATAIT is sponsored by the VLSI center of Ritsumeikan University and supported by IEEE CEDA All Japan Joint Chapter. ATAIT provides an international symposium for professionals, academics, and researchers to present latest developments in IoT technologies and applications, including the network, security, processor architecture, high performance computing, image processing, FPGAs and GPUs, etc. It particularly welcomes those emerging methodologies and techniques which bridge theoretical studies and applications in the Internet of Things. In 2022, the conference will take place as a hybrid conference due to COVID-19 prevails.

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Invited Talk A

Invited Speaker:

Yuting Geng (Ritsumeikan University, Japan)

Title:

Ultrasonic Audio-spot and Potential Applications in Internet of Things

Biography:

Yuting Geng is currently a specially appointed assistant professor in Ritsumeikan University, Japan. He received the B.E. degree in communication engineering from Northeastern University, China in 2016, the M.E. and Ph.D. degrees in information science and engineering from Ritsumeikan University, Japan in 2020 and 2022, respectively. His current research interests include signal processing for acoustics. He received the 20th Student Presentation Award from the Acoustical Society of Japan in 2020. He is a member of the Acoustical Society of Japan.

Abstract:

Generally, electro-dynamic loudspeakers are widely used for speech and music reproduction. However, the spreading sounds may become noise for non-target listeners nearby. In contrast, parametric array loudspeaker can reproduce audible sounds in a narrow area along the propagation axis utilizing the straightness of ultrasounds. Therefore, an audio-spot can be constructed by parametric array loudspeaker that the audible sound can only be heard at this spot.

In this talk, the basic principles on ultrasonic audio-spot will be introduced. Recent studies on parametric array loudspeaker for performance improvement and novel applications will also be presented. Moreover, the potential applications of ultrasonic audio-spot in internet of things will be discussed.

Invited Talk B

Invited Speaker:

Jiaqing Liu (Ritsumeikan University, Japan)

Title:

Multimodal Deep Learning in Healthcare

Biography:

Jiaqing Liu received the B.E. degree from Northeastern University, Shenyang, China, in 2016, and the M.E. and D.E. degrees from Ritsumeikan University, Kyoto, Japan, in 2018 and 2021, respectively. From 2020 to 2021, he was a JSPS Research Fellowship for Young Science. From October 2021 to March 2022, he was a Specially Appointed Assistant Professor with the Department of Intelligent Media, ISIR, Osaka University, Osaka, Japan. He is currently an Assistant Professor with the College of Information Science and Engineering, Ritsumeikan University. His research interests include pattern recognition, image processing, and machine learning.

Abstract:

Deep learning has been successfully applied in many research fields, such as computer vision, speech recognition and natural language processing. Most of them are focused on single modality. On the other hand, multimodal information is more useful for practical applications. Multimodal deep learning has got a lot of attention and becomes an important issue in the field of artificial intelligence. Compared with traditional single-modal deep learning, there are following challenges in multimodal deep learning: development of multimodal dataset; multimodal representation; multimodal alignment; multimodal translation and multimodal co-learning. The propose of this talk is to introduce efficient and accurate multimodal deep learning methods and apply them to depression estimation.

Wednesday, August 24

10:00-13:00 Registration (Conference Hall, Future Plaza)

12:00-13:00 Lunch (Event Hall, Future Plaza)

13:00-13:05 Opening Remarks (Conference Hall, Future Plaza)

13:05-13:45 Invited Talk A (Conference Hall, Future Plaza)

[13:05] Ultrasonic Audio-spot and Potential Applications in Internet of Things, Yuting Geng.

13:50-14:50 Session 1 (Conference Hall, Future Plaza)

Chair: Kota Yoshida

1. [13:50] A Heuristic Scheduling Algorithm with Variable-Cycle Approximate Functional Units in High-Level Synthesis, Koyu Ohata, Hiroki Nishikawa, Xiangbo Kong and Hiroyuki Tomiyama.
2. [14:10] Evaluation of Power Analysis Attack Resistance of Masked Adders on FPGA, Yilin Zhao, Qidi Zhang, Hiroki Nishikawa, Xiangbo Kong and Hiroyuki Tomiyama.
3. [14:30] An Accuracy-Controllable Approximate Adder for FPGAs, Masaki Sano, Hiroki Nishikawa, Xiangbo Kong, Hiroyuki Tomiyama, Tongxin Yang, Tomoaki Ukezono and Toshinori Sato.

14:50-15:05 Break

15:05-15:45 Session 2 (Conference Hall, Future Plaza)

Chair: Xiangbo Kong

1. [15:05] Dementia Diagnose Based on Machine Learning Using Doppler Radar Image for the Elderly Person, Ryuto Ishibashi, Naoto Nojiri, Kenshi Saho and Lin Meng.
2. [15:25] Gait Classification of Common Pedestrians and Smartphone Zombies Using Micro-Doppler Radar, Kazuki Yasuda, Teppei Tsuyuhara, Masao Masugi and Kenshi Saho.

Thursday, August 25

10:15-10:55 Invited Talk B (Conference Hall, Future Plaza)

[10:15] Multimodal Deep Learning in Healthcare, Jiaqing Liu.

11:00-12:00 Session 3 (Conference Hall, Future Plaza)

Chair: Hiroki Nishikawa

1. [11:00] Deep Learning Side-Channel Attacks against Hardware-Implemented Lightweight Cipher Midori 64, Madoka Sakou, Kunihiro Kuroda, Yuta Fukuda, Kota Yoshida and Takeshi Fujino.
2. [11:20] Deep Learning-Based Side-Channel Attacks against Software-Implemented RSA using Binary Exponentiation with Dummy Multiplication, Seiya Shimada, Kunihiro Kuroda, Yuta Fukuda, Kota Yoshida and Takeshi Fujino.
3. [11:40] A survey of model pruning for deep neural network, Zhuo Li and Lin Meng.

12:00-13:00 Lunch (Event Hall, Future Plaza)

Thursday, August 25

13:00-14:00 Session 4 (Conference Hall, Future Plaza)

Chair: Jiaqing Liu

1. [13:00] Delivery Drone Routing under Load-dependent Flight Speed based on Integer Quadratic Programming, Mao Nishira, Hiroki Nishikawa, Xiangbo Kong and Hiroyuki Tomiyama.
2. [13:20] A Case Study on Forehand Footwork Mistake Detection in Table Tennis, Hiroki Matsumiya, Xiangbo Kong, Ami Tanaka, Hiroki Nishikawa and Hiroyuki Tomiyama.
3. [13:40] Monocular Thermal Camera Depth Estimation with Optical Flow for Autonomous Drones, Tomoyasu Shimada, Hiroki Nishikawa, Xiangbo Kong and Hiroyuki Tomiyama.

14:10-16:00 Poster Session & Paper Awards (Event Hall, Future Plaza)

All speakers of session1-session4 should also make a poster presentation at this session.

Overseas online participants may not attend the poster session.

Friday, August 26

10:00-18:00 Academic Tour

Cancelled according to Covid-19

Author Guidelines

1. Speakers should bring their presentation data (Microsoft PowerPoint) by a USB memory stick and Windows format is required.
2. Authors of accepted papers need to prepare slide presentation and poster presentation. The slide presentation consists of a 15-minute presentation and a 5-minute Q&A. In order to reduce the burden on the author, the author does not need to prepare or print the poster separately. Before participating in the conference, select 8 pages from your own slides (Authors can also prepare other slides, but total 8 pages) and send the **Microsoft PowerPoint (.pptx) file** to Dr. Kong (kong@fc.ritsumei.ac.jp) before August 18. The organizing committee which will be responsible for printing.
3. Authors of overseas online presentations do not need to participate in the poster session. For authors of online presentations, if necessary, the organizing committee can assist in posting posters and leave the author's email, and participants can ask questions to the authors through email. Please contact Dr. Kong (kong@fc.ritsumei.ac.jp) if necessary.
4. Authors who participate offline must participate in both slide presentation and poster presentation, and authors who participate online must participate in slide presentation, otherwise the author's paper will be regarded as non-presented paper. Non-presented paper will not be included in the proceedings.

Venue

Conference Hall and Event Hall, Building B Future Plaza,
Ritsumeikan University Osaka Ibaraki Campus, 2 Iwakura-cho, Ibaraki-shi, Osaka, Japan 567-0871

ZOOM

Contact by email