ICCE-Asia 2023

The 8th International Conference on Consumer Electronics (ICCE) Asia

October 23Mon - October 25Wed, 2023
Paradise Hotel Busan, South Korea
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Welcome to IEEE/IEIE ICCE-Asia 2023

On behalf of the Institute of Electronics and Information Engineers (IEIE) and the IEEE Consumer Technology Society (IEEE CT-SoC), we are pleased and honored to welcome you to the IEEE/IEIE International Conference on Consumer Electronics Asia-2023. This year, ICCE-Asia 2023 is being held at the Paradise Hotel, Busan, Republic of Korea (South Korea) from October 23 to 25, 2023.

The world is again advancing towards prosperity based on digital consumer electronics, overcoming the long, dark tunnel of the pandemic. It is emerging into a new era of technological innovation and social progress. With the help of digital innovation, the next world will be a vastly prominent and prosperous place. The research community of ICCE-Asia is poised to make foundational contributions to the future world. In this year's ICCE-Asia Conference, the organizing committee has done its best to prepare research papers and presentations for the next generation of technological advancement.

We would like to express our deepest gratitude for the voluntary efforts of all the members and colleagues. We give sincere thanks to the members of the Technical Program Committee (TPC) as well as the reviewers for organizing the technical program and peer-evaluating the papers. We give special gratitude to all the authors who submitted their valuable research results to the conference, and to all those who attended the conference. Particularly, we would like to express special thanks to the plenary speakers. The organizers of the special sessions surely prepared those sessions to deliver state-of-the-art research trends throughout the industry. We also would like to express our thanks to the keynote speakers and tutorial presenters for giving great lectures of their prominent research experiences. All the keynote speeches, tutorials, special sessions, and regular papers will be presented in-person this year to enrich more in-depth discussion among researchers.

A successful meeting would not have been possible without the help and dedication of all of you. Sincerely, we hope that you all enjoy precious time and experiences at ICCE-Asia 2023. We hope that you will have unforgettable presentations, lectures, discussions, and experiences, and that you will cherish the memories you make here in Busan, Republic of Korea.

Thank you!

General Chair
Youngsu Kwon
ETRI (Electronics and Telecommunications Research Institute)

General Co-Chair
Jong-Ok Kim
Korea University

Wen-Chung Kao
IEEE CT-SoC
Technical Program Overview

It is great pleasure to welcome all of you to ICCE-Asia 2023 on behalf of all technical program committee members. First of all, I would like to express my sincere thanks to all program committee members and organizing members who dedicated to the wonderful technical program in ICCE-Asia 2023.

In this year, around 190 papers from 8 countries have been submitted to regular and special sessions. After rigorous review process, they are organized into 8 oral presentation sessions, 3 poster presentation sessions, and 8 special sessions. The topics of the technical program cover artificial intelligence, machine learning, semiconductor technology, image/video processing, IoT, security, robotics, and wireless technologies.

In ICCE-Asia 2023, we have invited one valuable plenary speaker: Insung Park (Senior VP of Software Center at LG Electronics). In addition, one keynote and three tutorials are planned to provide both fundamental theories and practical techniques on AI model compression, intelligent mobile platforms, healthcare sensors, and hardware acceleration for LLMs. All of them contributed to our excellent technical program.

I believe and promise that ICCE-Asia 2023 will be the best opportunity to broaden your perspectives and build real relationships for better collaboration in this field.

Thank you very much.

Technical Program Chair
Jaeha Kung
Korea University

TPC Co-Chair
Taehui Na
Incheon National University

Chul Lee
Dongguk University
Committee

Organizing Committee

General Chair
Youngsu Kwon (ETRI)

General Co-Chair
Jong-Ok Kim (Korea University)
Wen-Chung Kao (IEEE CT-Soc.)

Organizing Chair
Yong Sin Kim (Korea University)

Organizing Co-Chair
Sang Min Yoon (Kookmin University)

TPC Chair
Jaeha Kung (Korea University)

TPC Co-Chairs
Taehui Na (Incheon National University)
Chul Lee (Dongguk University)

Special Session Chair
William J. Song (Yonsei University)
Yutaka Ishibashi (Nagoya Institute of Technology)
Seung Joo Lee (KETI)

Financial Chair
Jin Tae Kwak (Korea University)

Publication Chairs
Seung-Won Jung (Korea University)

Local Chairs
Youngsun Han (Pukyong National University)
Technical Program Committee

TPC Chair
Jaeha Kung (Korea University)

TPC Co-Chairs
Taehui Na (Incheon National University)
Chul Lee (Dongguk University)

TPC Member
Kyu Bong Yeon (KATECH)
Sukju Kang (Sogang University)
Seung-Wook Kim (Pukyong National University)
Yong Shim (Chung-Ang University)
Hyung-Min Lee (Korea University)
Chul Lee (Dongguk University)
Dong Min Kim (Soonchunhyang University)
Sungju Ryu (Sogang University)
Baekgyu Kim (DGIST)
Donkyu Baek (Chungbuk National University)
Youngjoo Lee (POSTECH)
Yongtae Kim (Kyungpook National University)
Kyong Hwan Jin (Korea University)
## Time Table

### October 23 (Mon), 2023

<table>
<thead>
<tr>
<th>Time</th>
<th>Room</th>
<th>Grand Ballroom</th>
<th>Capri Room</th>
<th>Venice Room</th>
<th>Miami Room</th>
<th>Sydney Room 1</th>
<th>Sydney Room 2, 3</th>
<th>Sicily Room 1 (1F)</th>
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</thead>
<tbody>
<tr>
<td>14:30-16:00</td>
<td>Registration (Lobby)</td>
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<td>15:00-15:45</td>
<td>Tutorial 1</td>
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<td>15:45-16:30</td>
<td>Tutorial 2</td>
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<td>16:30-17:15</td>
<td>Tutorial 3</td>
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<td>17:15-17:30</td>
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<td>17:30-19:00</td>
<td>Welcome Reception [Capri Room]</td>
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### October 24 (Tue), 2023

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<td>10:30-10:45</td>
<td>Opening Ceremony [Grand Ballroom]</td>
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<td>10:45-11:30</td>
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<td>12:10-13:30</td>
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<td>Time</td>
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<td>Sicily Room (1F)</td>
<td>Panorama Room (16F)</td>
<td>Sicily Room (1F)</td>
<td>Panorama Room (16F)</td>
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<td>09:00-10:20</td>
<td>SS: QoE/QoS for Cyber-</td>
<td><strong>SS05</strong></td>
<td>SS: Deep Learning-</td>
<td><strong>SS04</strong></td>
<td>SS: Deep Learning-</td>
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<td>Physical Systems</td>
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<td>10:30-12:00</td>
<td>SS: Circuit and System</td>
<td><strong>SS07</strong></td>
<td>SS: Network,</td>
<td><strong>SS08</strong></td>
<td>SS: Network,</td>
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<td>Design for Intelligent</td>
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<td>Image and Signal Processing Technologies</td>
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</tbody>
</table>
Floor Map

1F
- Registration : Lobby (2F)
- Opening Ceremony : Grand Ballroom
- Banquet : Grand Ballroom
- Lunch : Capri Room

2F

16F
Conference Information

**Author Registration**
All authors should register for the conference by **October 6, 2023**
- Authors with one accepted paper must pay at least one regular registration fee. (Regardless of the author’s title)
- Authors with more than two accepted papers are required to pay one regular registration fee for one paper and a student registration fee for each additional paper. (Please refer to the table below.)

※ Please note that the receipt and the participation certificate will be issued to authors who paid the conference registration fees. (Receiver’s name cannot be changed once issued.)

<table>
<thead>
<tr>
<th># of Accepted Papers</th>
<th>Required Registration</th>
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<tbody>
<tr>
<td>One Paper</td>
<td>One Regular Registration</td>
</tr>
<tr>
<td>Two Papers</td>
<td>One Regular Registration + One Student Registration</td>
</tr>
<tr>
<td>Three Papers and More</td>
<td>One Regular Registration + Two Student Registrations</td>
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**Registration Fee**
Due date for pre-registration is by **October 6, 2023**

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<th>Category</th>
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<td>IEEE/IEIE Member</td>
<td>Non-member of IEEE, IEIE</td>
<td>IEEE CE Society Member</td>
<td>IEEE Life Member</td>
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<tr>
<td>Regular</td>
<td>USD 608</td>
<td>USD 760</td>
<td>USD 570</td>
<td>USD 190</td>
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<tr>
<td>Student</td>
<td>USD 380</td>
<td>USD 532</td>
<td>USD 342</td>
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<td>IEEE/IEIE Member</td>
<td>Non-member of IEEE, IEIE</td>
<td>IEEE CE Society Member</td>
<td>IEEE Life Member</td>
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<tr>
<td>Regular</td>
<td>USD 760</td>
<td>USD 950</td>
<td>USD 712</td>
<td>USD 190</td>
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<tr>
<td>Student</td>
<td>USD 475</td>
<td>USD 665</td>
<td>USD 427</td>
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</tbody>
</table>
Registration Fee includes

**Regular Registration**
Admission to All Sessions, Conference Proceedings, Banquet

**Student Registration**
Admission to All Sessions, Conference Proceedings
* A Banquet ticket is not included

Payment Method

**Credit Card**
All transactions by credit card will appear on your statement as payment to Conference by ‘Allat’

**Bank Transfer**
- Name of Bank: SUHYUP BANK (ALSO KNOWN AS NATIONAL FEDERATION OF FISHERIES CO-OPERATIVES)
- Account Number: 1010-2185-8847
- Name of Account Holder: The Institute of Electronics and Information Engineers
- Swift Code (Overseas Transfer): NFFCKRSEXXX
* You should transfer registration fee within 7 days from registration.
* You should send a copy of transaction with your name on it to the secretariat by fax (+82 2 552 6093) or e-mail (inter@theieie.org) for confirmation.
* All bank remittance charges are to be paid by the registrants.

Cancellation and Refund Policy
To cancel your registration, please notify the secretariat by an email to inter@theieie.org. Refunds will be made if cancellation occurs before October 6, 2023, with the processing fee of USD 100 (KRW130,000). No refund will be made after October 6, 2023 or for no show. If you have any questions regarding the registration, please contact the secretariat.

All dates and time are indicated in KST (The local time in Korea)
Presentation Guideline

Oral Presentations

- Please go into the session room at least 15 minutes before the session starts and identify yourself to the session chair.
- Please submit the presentation slide. You need to bring your ppt file on USB memory, and load it on the computer in your session room. You also need to confirm whether it is working properly. This is very important to pay attention to this time frame. The visual equipment provided is a beam projector.
- Time assignment including discussion is as follow
  - Tutorial : 45 minutes
  - Plenary Talk : 50 minutes
  - Keynote Speech : 40 minutes (5 minutes of Q&A included)
  - Oral Presentation (SS + Oral) : 15 minutes presentation per presenter (3 minutes of Q&A included)

Poster Presentation

- The size of the poster board is 100cm (width) × 150cm (length).
- You need to prepare your poster within this size and attach it on the poster board in your session room at least 10 minutes before the session starts, and then remove your poster immediately after the session finishes.

Lunch

Lunch will be provided to all participants during the conference. Please bring your lunch coupon with your name tag.

<table>
<thead>
<tr>
<th>Location</th>
<th>Capri Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Time</td>
<td>Tuesday, October 24 12:10-13:30</td>
</tr>
</tbody>
</table>
Welcome Reception  
Date: Monday, October 23, 2023  
Time: 17:30-19:00  
Place: Capri Room  
An invitation to the welcome reception is extended to all participants including registered students.

Opening Ceremony  
Date: Tuesday, October 24, 2023  
Time: 10:30-10:45  
Place: Grand Ballroom  
All registered participants are cordially invited to join us and celebrate the official opening.

Banquet  
Date: Tuesday, October 24, 2023  
Time: 18:00  
Place: Grand Ballroom  
We hope this banquet will offer you a good opportunity to promote friendship with participants. Delicious food and special performance will be offered at the banquet. A banquet ticket is included in the Regular Registration. Student Registration does not include the banquet.
LG Smart Life Solutions: Upgradable home appliances with AI

Abstract

The latest trends in home appliance industry are hyper-personalization and lifestyle-matching home solutions. To make this possible, home appliances should provide convenient features and intuitive user interface that allow end users to install and utilize various apps & services.

However, current home appliances could only offer simple control functions based on low-cost MCUs (Microcontroller Units). High-end operating systems such as Android and iOS are not suitable for home appliances due to their high performance hardware and highly complex software requirements.

Thus, LG Electronics has been developing its own custom chip-set with its own RTOS-based operating system that will enable long-term upgradability, user-oriented feature customization, and furthermore, AI-based life care.

In order to move from HW-centric home appliances to SW-centric life solutions, LG Electronics had to not only improve its development systems, but also transform the entire organization with the software-oriented mindset at all times.

In this talk, we will introduce our vision of the future life solutions and the underlying technologies encompassing OS, chip-set, IoT and AI technologies that will enable that vision. Also, we'll describe some of the challenges that we have faced along the way.
Biography

• Education
  1996~2000 Ph.D. in Computer Engineering
  Purdue University
  1993~1995 MSEE (Master of Science in Electrical Engineering)
  Virginia Polytechnic Institute and State University (Virginia Tech)
  Seoul National University

• Career
  2023~ Senior Vice President, CTO Software Center,
  LG Electronics
  2016~2022 Vice President, Vehicle Component Solutions
  (VS) Company, LG Electronics
  2014~2015 Senior Research Fellow, CTO SW Platform
  Lab., LG Electronics
  2010~2014 Principal Dev Lead, Internet Explorer Group,
  Microsoft
  2000~2009 Principal Dev Manager, Windows Core OS
  Fundamentals Group, Microsoft
Unlocking the potential of Generative AI by model compression

Abstract

With the emergence of ChatGPT, there is a growing interest in large-scale generative AI models. Deep learning models have been steadily growing since 2012, and now models with over 1 billion parameters are commonly found.

The increase in the size of AI models implies the need for more hardware resources to run these models, leading to issues such as the cost of AI-based services and limitations in usage environments.

AI model compression is a technique to address these problems by compressing the size of models or making them run faster while maintaining their performance. This enables running AI services at a lower cost or achieving faster inference speeds. AI compression techniques include Quantization, Pruning, Knowledge distillation, and others. In this talk, several practical approaches to compress large-scale generative AI models such as Stable Diffusion and LLMs will be discussed.
Biography

Hyungjun Kim received his bachelor’s and PhD degrees from Pohang University of Science and Technology (POSTECH). He worked at the Holst Centre in Netherlands as a research intern for organic memory diode design from January to Sep, 2015 and also spent the summer of 2018 at IBM T.J. Watson Research Center for in-memory neural network hardware design. After receiving the PhD degree, he was employed as a researcher of POSTECH Future IT Innovation Laboratory from 2021 to 2022. His research for last 10 years includes hardware-algorithm co-design for efficient deep learning system. Especially, he focused on in-memory neural network accelerator and various model compression techniques such as quantization, pruning and knowledge distillation. Based on his research achievements, he founded SqueezeBits Inc., a startup building efficient AI models and systems, and currently serves as the CEO.
Tutorials

Tutorial 1

Room: Sydney Room 1,2,3

15:00~15:45 Monday, October 23, 2023

Chair: Yong Sin Kim (Korea University)

Prof. Seung-Wook Kim
Pukyong National University

Advancements in AI for Mobile Consumer Electronics: A Comprehensive Review

Abstract

In the era of mobile technology, the integration of AI into consumer electronics is driven by the need for personalized user experiences, efficient systems, and enhanced security. The speaker will present several state-of-the-art AI models and discuss how these models can be optimized for mobile platforms to improve performance despite hardware limitations. Designed for anyone from students to professionals interested in the intersection of AI and mobile technology, this tutorial provides a clear understanding of this rapidly evolving field.

Biography

Seung-Wook Kim received the B.S. and Ph.D. degrees in School of Electrical Engineering from Korea University, Seoul, in 2012 and 2019, respectively. In 2019, he was a Research Professor with the Semiconductor Research Center, Korea University. From 2020 to 2022, he was a Staff Researcher with the Samsung Advanced Institute of Technology, Suwon, South Korea. In 2022, he joined the Division of Electronic and Communication Engineering, Pukyong National University, Busan, South Korea, where he is currently an Assistant Professor. His research topics include computer vision, image processing, and machine learning.
Tutorial 2

➤ Room: Sydney Room 1,2,3
15:45~16:30 Monday, October 23, 2023

Chair: Yong Sin Kim (Korea University)

Dr. Jeongseok Chae
Principal research engineer of Dongwoon Anatech

Healthcare Sensors: Body Temperature and Blood Glucose Monitoring

Abstract

Recently, we can monitor biological vital signs with cheap cost compared with medical grade equipment of hospital by using mobile devices such as smart watches.

Moreover, in this year, ChatGPT is a hot issue which shows tremendous achievement of artificial intelligence (AI) area. Healthcare service can be improved and commercialized more by using AI technologies and continuously sampled biological data. Gathering personal biological signs requires many sensor ICs.

In this tutorial, two biological sensor systems, body temperature and noninvasive blood glucose monitoring systems, will be shown in detail.

Biography

Jeongseok Chae received the B.S. and M.S. degrees in electronics engineering from Kookmin University, Seoul, Korea, in 2000 and 2002, respectively. He received the Ph.D. degree in electrical and computer engineering at Oregon State University, Corvallis, USA, in 2011. He was a design engineer with Samsung Electronics, Kiheung, Korea, from 2002 to 2006 working on battery protection ICs and display (TFT-LCD and AMOLED) driver ICs for mobile solutions. He was a member of technical staff with MaxLinear, Carlsbad, USA, from 2010 to 2011 working on high speed ADC design for DOCSIS modem application. He designed and/or developed analog blocks such as touch sensor, ambient light sensor, audio amplifier and galvanic isolator. Currently, he is a principal research engineer with Dongwoon Anatech, Seoul, Korea, working on healthcare SoCs. His research interests include high-resolution and low-power analog circuit and system design.
Latency Processing Unit (LPUTM) for Acceleration of Large Language Model Inference

Abstract

In this talk, I will present a new processor breed named LPU for accelerating the inference of hyperscale AI models. Optimized for transformer-based large language models such as OpenAI’s GPT and Meta’s LLaMA, LPU manages to execute an end-to-end inference with low latency and high throughput. LPU uses model parallelism and optimized data-flow that is model-and-hardware-aware for fast simultaneous workload execution among multiple devices. Its compute cores operate on custom instructions and support entire GPT operations including multi-head attentions, layer normalization, token embedding, and LM head. We implement the proposed hardware architecture on multiple AMD Alveo U55C datacenter accelerator cards and utilize all of the channels of the high bandwidth memory (HBM) and the maximum number of compute resources for high hardware efficiency. Finally, the multi-LPU server appliance achieves 1.49x speedup and 2.35× cost efficiency over the GPU supercomputer DGX A100 with state-of-the-art library (Faster-Transformer), showing high performance scalability of 1.76x when doubling the number of devices. We are building LPU silicon IPs, compiler stack, and software development kit.

Biography

Joo-Young Kim received the B.S., M.S., and Ph. D degrees in electrical engineering from Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea, in 2005, 2007, and 2010, respectively. He is currently an Associate Professor with the School of Electrical Engineer-
ing, KAIST. He is also the Director of AI Semiconductor Systems Research Center. His research interests span various aspects of hardware design, including VLSI design, computer architecture, FPGA, domain-specific accelerators, hardware/software co-design, and agile hardware development. Before joining KAIST, he was a Hardware Engineering Leader at Microsoft Azure, Redmond, WA, USA, working on hardware acceleration for its hyper-scale big data analytics platform named Azure Data Lake. He was also one of the initial members of Catapult project at Microsoft Research, Redmond, where he deployed a fabric of FPGAs in datacenters to accelerate critical cloud services such as machine learning, data storage, and networking. He founded a AI silicon startup HyperAccel in Jan 2023 to build innovative AI processor/solutions for generative AI, making it sustainable for everyone.

Dr. Kim was a recipient of the 2016 IEEE Micro Top Picks Award, the 2014 IEEE Micro Top Picks Award, the 2010 DAC/ISSCC Student Design Contest Award, the 2008 DAC/ISSCC Student Design Contest Award, and the 2006 A-SSCC Student Design Contest Award. He also served as Associate Editor for the IEEE Transactions on Circuits and Systems I: Regular Papers (2020-2022), and is an IEEE SSCS Distinguished Lecturer for the term 2023-24.
Technical Program

Oral Session

OS01  Semiconductor/Sensors and Other CE Topics

Chair: Jaeha Kung (Korea University)

01  Comparison of Leak Detection Techniques Using Water Pipeline Vibration Sensor Data
Mi-seon Kang, Kwang-Ju Kim, Jung-won Yu, Hyan-su Bae, and In-Su Jang
Electronics and Telecommunications Research Institute (ETRI), Korea

02  A Modeling and Simulation of ReRAM with Nonidealities for System-Level PIM Validation in SystemVerilog
Ingu Jeong and Jun-Eun Park
Sungkyunkwan University, Korea

03  Radar Target Detection Method through Spatial Voxelization in Complex Indoor Environment
Jaewon Lee, Dalwon Jang, and JongSeol Lee
Korea Electronics Technology Institute (KETI), Korea

04  Accelerating Flush Operation of LSM Tree by Leveraging the Zone Append Command
Jongsung Lee\textsuperscript{1,2} and Jae W. Lee\textsuperscript{1}
\textsuperscript{1}Seoul National University, Korea, \textsuperscript{2}Samsung Electronics, Korea

OS02  Wireless and Network Technologies

Chair: Donkyu Baek (Chungbuk National University)

01  Enhanced DV–Hop Algorithm using Graph Theory
Shu Renyi\textsuperscript{1,2}, Jonathan M. Caballero\textsuperscript{1}, and Jasmin Niguidula\textsuperscript{1}
\textsuperscript{1}Technological University of the Philippines, Philippines, \textsuperscript{2}Huainan Normal University, China

02  Congestion Monitoring and Exposure of 5G Network for XR service
Jeounglak Ha, Changki Kim, and Namseok Ko
Electronics and Telecommunications Research Institute, Korea
03 A 43-fJ/Conv, 1-GS/s Energy-Efficient Charge-Steering Comparator with Floating-Inverter-Based Preamplifier in 40nm CMOS
Yongjun Lee and Jun-Eun Park
Sungkyunkwan University, Korea

04 Enhanced Efficiency of UDS-Based Large Data Diagnostics through CAN-FD to CAN Gateway
Se Jeong Lim, Young Soo Do, and Jae W Jeon
Sungkyunkwan University, Korea

05 Preprocessing at Application Nodes for Reduction of Data Transmission in Edge Computing
Donguk Kim, Chanhwi Roh, and Donkyu Baek
Chungbuk National University, Korea

➤ Tuesday, October 24 / 09:00~10:20  ➤ Room: Sydney Room 1

0503 IoT/VR/AR/Camera Systems
- Chair: Seung-Wook Kim (Pukyong National University)

01 Device identification in BLE packets from moving devices with randomized MAC addresses
Shuhei Akiyama and Yoshiaki Taniguchi
Kindai University, Japan

02 Device Location Recognition Using Channel State Information in Wireless LAN Environments
Yuya Izumoto, Taishin Mabuchi, and Yoshiaki Taniguchi
Kindai University, Japan

03 3D Articulated Human Pose Recognition via Learning Deep Gaussian Mixture Models for Virtual Exercise
Jong-Sung Kim
ETRI, Korea

04 Accelerating YOLO-based Real-time Object Detection via Foveated Rendering
Kimleang Kea\(^1\), Sanghyeon Lee\(^1\), Myeongjin Kwak\(^2\), and Youngsun Han\(^1\)
\(^1\)Pukyong National University, Korea, \(^2\)Kyungpook National University, Korea

05 Dual Encoding++ : Optimization of Text-Video Retrieval via Fine-tuning and Pruning
Dongyoun Lee, Dong-hun Lee, Vani Priyanka Gali, and Sang-hyo Park
Kyungpook National University, Korea
A Deep Multi-Object Tracking Technique in Swimming Video Scenes
Dong-Yeon Shin1, Timothy Woinoski2, Ivan V. Bajic2, and Seong-Won Lee1
1Kwangwoon University of Computer Engineering, Korea,
2Simon Fraser University of Engineering Science, Canada

Tuesday, October 24 / 09:00~10:20
Room: Sydney Room 2,3

Healthcare Systems and Mobile/HCI Technologies
Chair: Taehui Na (Incheon National University)

01 A Study on Acne Visualization and Prediction of Therapeutic Drug Effectiveness Using Wood's Lamp and Deep Learning
Kaito Okazaki, Sota Watanabe, and Makoto Hasegawa
Tokyo Denki University, Japan

02 Improvement of Tear Meniscus Measurement for Dry Eye Detection Using Smartphone and Ring Light
Maho Taniai, Kaito Okazaki, and Makoto Hasegawa
Tokyo Denki University, Japan

03 Dynamic Compressive Sensing Matrix for Electrocardiogram Signal Projection in Healthcare IoT Environment
M Fajrul Nugraha, Ida Wahidah, and Gelar Budiman
Telkom University, Indonesia

04 Facial Video-based Remote Photoplethysmography Signal Estimation with Vision Transformer
Chae-Min Kim and Young-Seok Choi
Kwangwoon University, Korea

05 Semi-supervised EEG emotion recognition with Discriminative Graph Transformer Model
Dae Hyeon Kim and Young-Seok Choi
Kwangwoon University Seoul, Korea

06 Exploring the effects of vibratile takeover request in autonomous driving across various locations
Toshihide Ubukata1, Qingxin Chen1, Jialong Li1, and Kenji Tei2
1Waseda University, Japan, 2Tokyo Institute of Technology, Japan
Tuesday, October 24 / 13:30~15:00
Room: Venice Room

0505 Artificial Intelligence for CE 1

01 Conformer-Based End-to-End Speech Recognition Using Grouped Convolution and Multi-Headed Linear Self-Attention with Headdrop
Seunghun Jeong and Hong Kook Kim
Gwangju Institute of Science and Technology, Korea

02 End-of-Sentence Token Modeling for Streaming Conformer-Based Korean Children’s Speech Recognition Applied to a Social Robot
Seunghun Jeong, Yejin Park, and Hong Kook Kim
Gwangju Institute of Science and Technology, Korea

03 Automatic Segmentation Labeling for Autonomous Driving Datasets
Jinsun Lee, Si Woo Lee, HyeongKeun Hong, and Jae Wook Jeon
Sungkyunkwan University, Korea

04 Context-aware Image-to-Image Translation for Autonomous Driving
Naré Yi¹, Minho Park², and Dong-oh Kang²
¹Duksgung Women’s University, Korea.
²Electronics and Telecommunications Research Institute, Korea

05 A Multimodal Transfer Learning Approach for Medical Image Classification
Hong N. Dao¹, Tuyen Nguyen², Cherubin Mugisha¹, and Incheon Paik¹
¹The University of Aizu, Japan, ²University of Technology Sydney, Australia

06 Copy-paste Augmentation for better saliency learning of underrepresented Object Classes
Zafar Aziz and HyungWon Kim
Chungbuk National University, Korea

Tuesday, October 24 / 13:30~15:00
Room: Miami Room

0507 Robotics & Automotive Technologies

01 Design and Research of Self–balancing Bicycle System
Miao Lei¹, Jasmin Niguidula², and Arelene³
¹Huainan Normal University, China, ²Technological University of the Philippines, Philippines, ³Lyceum of the Philippines University, Philippines
02 Walkable areas detection for quadruped robot
Min Cheol Park, Shin Dong In, and Hwang Jung Hoon
Korea Electronics Technology Institute, Korea

03 Exploring the Suitability of AVAS for Electric Scooters
Yen-Jui Lee, Ping-Chen Huang, Chun-Ching Chen, and Chi-Hao Lung
National Taipei University of Technology, Taiwan

04 Performance Analysis of Frame Merging Methods on Time-Sensitive Networking (TSN)
Young Soo Do, Sung Bhin Oh, Jong Hun Kim and Jae Wook Jeon
Sungkyunkwan University, Korea

➤ Tuesday, October 24 / 13:30~15:00
➤ Room: Sydney Room 1

SS01 AI Processing Devices and Chips
Chair: Youngsu Kwon (ETRI)

01 Hardware Accelerator for VSLAM using Fisheye Image in Embedded System
Wonseob Na, Jaecheol Jeong, SungYong Jo, Youngseok Oh, and Ewoo Chon
Nextchip Co. Ltd., Korea

02 Optimizing Edge AI Solutions through Hardware and Software Co-Design
Sinjin Jeong, Hyunjin Kim, and Lok-Won Kim
DEEPX, Korea

03 Mobilint’s ARIES: Chip for Edge AI
Youngrock Oh, Haeryong Jeon, Jisung Kim, Seunghak Han, Yunjeong Chung, Kanybek Asanbekov, Gyuyoun Song, Kibum Han, Junyeob Kim, Junseong Lee, Jeongseung Lee, Jongjun Park, and Dongjoo Shin
Mobilint, Inc., Korea

04 A study of interference systems using deep learning for automotive 4D imaging radar
KyuBong Yeon and DuHo Lee
Korea Automotive Technology Institute, Korea

05 Optimizing Deep Neural Network with Brain Floating Half-Precision Format
Shoaib Sajid, Sereswatha Ros, and Hyung-Won Kim
Chungbuk National University, Korea
SS02 [KETI] Sensor Technology for Autonomous Vehicles

Chair: Seung Joo Lee (KETI)

01 Pulse Amplitude Estimation Technique without ADC using Time Walk and Response Time of Read-out Circuit in ToF LiDAR
Sang-gyun Gi and Jihyuk Cho
Korea Electronics Technology Institute, Korea

02 Research on Interactive Dataset for Transparent Display-Based Interactive Content Development
EunJin Son¹, HaYoung Song², SeongHyeon Nam¹, and YoungWon Kim¹
¹Korea Electronics Technology Institute, Korea, ²Gwangju Institute of Science and Technology, Korea

03 Crop & Match: RoI Cropping and Feature Matching for Segmentation of Small Objects
Goo-Young Moon and Jong-Ok Kim
Korea University, Korea

04 Self-Diagnostics of Deterioration of LiDAR in Driving Condition
Yonghwi Kim
Korea Electronics Technology Institute, Korea

05 Multi-exposure Image Fusion Based on Recurrent Neural Network using Local Component Enhancement Module
Je-Ho Ryu, Jong-Hun Lee, Hyeong-Jun Yoo, and Seung-Joo Lee
Korea Electronics Technology Institute, Korea

06 Walk error compensation circuit based on CFD to improve the estimated distance accuracy of ToF LiDAR with TDC
Seongchan Kang and Jihyuk Cho
Korea Electronics Technology Institute, Korea

OS06 Artificial Intelligence for CE 2

Chair: Seung-Won Jung (Korea University)

01 A Comparative Evaluation on Melody Generation of Large Language Models
Kenta Suzuki¹, Takuto Yamauchi¹, Jinyu Cai¹, Jialong Li¹, and Kenji Tei²
¹Waseda University, Japan, ²Tokyo Institute of Technology, Japan
02 Low-Light Image Enhancement via Gradient Based Cross-Attention Transformer
Dong-Min Lee, Jeong-Hyeok Park, and Jong-Ok Kim
Korea University, Korea

03 The Implementation of Compressive Sensing Architecture for Endoscopy Image Acquisition and Reconstruction over Body-to-body Networks
Ida Wahidah, Agus Subekti, Arif Indra Irawan, Vinsensius Sigit Widhi Prabowo, Agatha Kalyana Vashty, Alfito Sri Pangestu, Riski Amelia Mulyadi, and Gita Yuniar Maharani
1Telkom University, Indonesia, 2National Research and Innovation Agency (BRIN), Indonesia

04 Radian Scaling: A Novel Approach to Preventing Concept Drift in Electricity Load Prediction
Mohd Hafizuddin Bin Kamilin, Shingo Yamaguchi, and Mohd Anuaruddin Bin Ahmadon
Yamaguchi University, Japan

05 Can Generative AI Eliminate Speech Harms? A Study on Detection of Abusive and Hate Speech during the COVID-19 Pandemic
Chen-Shu Wang, Heng-Li Yang, Bo-Yi Li, and Hong-Yan, Chen
1National Taipei University of Technology, Taiwan, 2National Chengchi University, Taiwan

06 Performance Analysis and Comparison of Knowledge Distillation Among Diverse Teacher and Student Models
Jaeung Lee, Trinh Thi Le Vuong, Jiamu Wang, Jiang Kan, Keunho Byeon, Ju Cheon Lee, Sumin Jung, Doanh Cao Bui, Anh Tien Nguyen, Hyun Yang, and Jin Tae Kwak
Korea University, Korea

07 A Low-Latency and Lightweight FPGA-Based Engine for Softmax and Layer Normalization Acceleration
Seongho Jeong, Minseok Seo, Xuan Truong Nguyen, and Hyuk-Jae Lee
Seoul National University, Korea

➤ Tuesday, October 24 / 15:30~17:30
➤ Room: Miami Room

08 SW & HW Systems for Consumer Electronics
Chair: Donkyu Baek (Chungbuk National University)

01 Estimating the Infection Spread Rate of Malicious Botnets Using Reconnaissance Worms in Botnet Defense System
Ryo Yamashita and Shingo Yamaguchi
Yamaguchi University, Japan
02 Relationship between AND extension and XOR extension of 3-valued input with 2-party card-based protocols
Yuji Suga
Internet Initiative Japan Inc., Japan

03 An Enhanced Load Regulation LDO with Ripple Cancellation for Clock Generator in 28nm CMOS
Taeho Kim, Bongsu Kim, Songi Cheon, Jinsoo Bae, Hyunsu Jang, Jongchan An, Gwangmyeong An, Seungmyeong Yu, and Junyoung Song
Incheon National University, Korea

Seongseop Kim, Minsu Kim, Seungwoo Lee, and Youngmin Kwon
Korea Electronics Technology Institute, Korea

➤ Tuesday, October 24 / 15:30~17:30
➤ Room: Sydney Room 1

SS03 X+AI Services
Chair: Jongwon Kim (GIST), Giltae Song (Pusan National University)

01 UWB NLOS/LOS Classification Using Hybrid Quantum Convolutional Neural Networks
Seon-Gun Jeong1, Quang-Vinh Do1, Hae-Ji Hwang1, Mikio Hasegawa2, Hiroo Sekiya3, and Won-Joo Hwang1
1Pusan National University, Korea, 2Tokyo University of Science, Japan, 3Chiba University, Japan

02 Mask CycleGAN for removing artifacts in dual-energy CT
Chunsu Park, DongEon lee, Seonho Kim, SiYeoul Lee, and MinWoo Kim
Pusan National University, Korea

03 Machine Learning Model for Predicting Mortality in Heart Failure Patients Using Electronic Health Records and Exome Sequencing Data
Gwanghoon Jung and Giltae Song
Pusan National University, Korea

04 Concept Design of Intelligent BoP Based on Slot-/Rack-type Fuel Cell for Integrated Management of Hydrogen Fuel Cells
Sun Park1, Byung-joo Chung2, and JongWon Kim1
1GIST, Korea, 2GSPIN, Korea
05 Design and Implementation of Data Concentrator Unit supported with Multiple Synchronized Cameras for Object-Detection
Yusupov Anvarjon, Sun Park, and JongWon Kim
GIST, Korea

➤ Tuesday, October 24 / 15:30~17:30
➤ Room: Sydney Room 2,3

SS04 System-level Computing Technology

01 A Cache Register Sharing Structure for Channel-level Near-memory Processing in NAND Flash Memory
Taigon Song
Kyungpook National University

02 Backdoor in Hardware: Hardware Trojan and Its Countermeasures
Junghee Lee
Korea University, Korea

03 Numerical Encodings and DNN Training in Post-Moore Era
Yunho Oh
Korea University, Korea

04 Simulation-Based SoC Dataflow Optimizations
Junsu Heo¹, Sungkyung Park², and Chester Sungchung Park¹
¹Konkuk University, Korea, ²Pusan National University, Korea

05 Research on GPU Memory Subsystem: from Core to Uncore
Gunjae Koo
Korea University, Korea

06 Bandwidth-Scalable SpMV Accelerator Architecture
Hyunji Kim, Eunkyoung Ham, Sunyoung Park, Hana Kim, and Ji-Hoon Kim
Ewha Womans University, Korea
SS05 QoE/QoS for Cyber–Physical Systems
Chair: Pingguo Huang (Gifu Shotoku Gakuen University)
Yutaka Ishibashi (Nagoya Institute of Technology)

01 The Effect of User Attributes on QoE of Transmission and Presentation Methods for Multi-View Video and Audio IP Transmission
Toshiro Nunome
Nagoya Institute of Technology, Japan

02 Enhancement of Dynamic Output Timing Control of Fragrance in Metaverse
Pingguo Huang\textsuperscript{1} and Yutaka Ishibashi\textsuperscript{2}
\textsuperscript{1}Gifu Shotoku Gakuen University, Japan, \textsuperscript{2}Nagoya Institute of Technology, Japan

03 Stability Analysis of Multiple Terminal Systems under Communication Delay by using Delayed Differential Equation
Hitoshi WATANABE\textsuperscript{1}, Pingguo HUANG\textsuperscript{2}, and Yutaka ISHIBASHI\textsuperscript{3}
\textsuperscript{1}Tokyo University of Science, Japan, \textsuperscript{2}Gifu Shotoku Gakuen University, Japan, \textsuperscript{3}Nagoya Institute of Technology, Japan

SS06 Deep Learning–based Image Restoration
Chair: Sukju Kang (Sogang University)

01 Discriminative Learning for Supervised Anomaly Detection
JungHoon Lee and Suk-Ju Kang
Sogang University, Korea

02 Efficient Framework for Blind High-Resolution Image Reconstruction
Songju Na, Yoonchan Nam, and Suk-Ju Kang
Sogang University, Korea

03 Text-to-Video Editing using Direction Information of Optical Flow
Seong-Hun Jeong\textsuperscript{1} and Kyeongbo Kong\textsuperscript{2}
\textsuperscript{1}Pukyong National University, Korea, \textsuperscript{2}Pusan National University, Korea

04 Survey on Deep learning based Low Light Enhancement Models
Sang Yeon Ahn and Sung In Cho
Dongguk University, Korea
SS07 Circuit and System Design for Intelligent Image and Signal Processing Technologies

Chair: Chih-Peng Fan (National Chung Hsing University)
Yu-Cheng Fan (National Taipei University of Technology)

01 Performance Comparison between OpenPose and TRT_Pose for Self–Practice Yoga on Embedded GPU Platform
Cheng-Liang Shih1, Wan-Chia Huang1, Irin Tri Anggraini2, Yanqi Xiao2, Nobuo Funabiki2, and Chih-Peng Fan1
1National Chung Hsing University, Taiwan, 2Okayama University, Japan

02 New Generation Encryption Chip Based on the GAN Chaos Model and the Geffe Architecture
Ming-Liang Shao, Lian-You Huang, Zhe-Wei Hu, Yao-Zhan Xu, Ping-Chun Chen, and Yu-Cheng Fan
National Taipei University of Technology, Taiwan

03 A Flexible and Efficient Hardware Accelerator Architecture Design for Multiple CNN
Jung-Ting Kuo, Chung-Bin Wu, and Wei-Xuan Luo
National Chung-Hsing University, Taiwan

04 Implementation of a Tile–Grained Pipeline Architecture for CNN Accelerator
Jung-Ting Kuo, Chung-Bin Wu, and Yi-Yuan Chen
National Chung-Hsing University, Taiwan

05 0.18um 1P6M CMOS Virtual View Generator Based on DIBR Technology for 3D Display
Yu-Cheng Fan1 and De-Wei Shen2
1National Taipei University of Technology, Taiwan,
2VIA Technologies, Inc., Taiwan

SS08 Network, Communication and Information Technologies

Chair: Kiyoshi Ueda (Nihon University)
Nobuo Funabiki (Okayama University)

01 Improvements of Blank Element Selection Algorithm for Element Fill-in–blank Problem in Web–client Programming
Huiyu Qi1, Nobuo Funabiki1, Khaing Hsu Wai1, Flasma Veronica Hendryanna1, and Wen-Chung Kao2
1Okayama University, Japan, 2National Taiwan Normal University, Taiwan
A Method for Constructing Collision Avoidance Route for Multiple UAVs Using AODV-Based Link Hierarchization
Shuto Ohkawa, Taku Yamazaki, Ryo Yamamoto, Takumi Miyoshi, and Kiyoshi Ueda
1Nihon University, Japan, 2Shibaura Institute of Technology, Japan, 3The University of Electro-Communications, Japan

A Study of Exergame System Using Hand Gestures for Tenosynovitis Prevention
Yanqi Xiao, Irin Tri Anggraini, Nobuo Funabiki, Shih-Wei Shen, and Chih-Peng Fan
1Okayama University, Japan, 2National Chung Hsing University, Taiwan

A Synthesized Voice Discrimination Method Using Characteristic Sounds Spoken by Humans
Yuya Nuruki and Yoshiaki Taniguchi
Kindai University, Japan

A Concept of Content Sharing System in Dynamic Equilibrium over a Large-Scale Network
Shinji Sugawara
Chiba Institute of Technology, Japan

Optimization of Indoor Comfort Distribution Using Sensor Network and Computational Fluid Dynamics
Kazuyuki Kojima
Shonan Institute of Technology, Japan
Poster Session

➤ Tuesday, October 24 / 09:00~10:20
➤ Room: Sicily Room

PS01 Poster Session 1

Chair: Sungju Ryu (Sogang University)

01 Time-of-Flight PET Sensor with 8×8 Digital SiPMs and Pile-Up Compensated Event-Driven TDCs
Soodong Woo and Jaehyuk Choi
Sungkyunkwan University, Korea

02 Watchdog timers and time accuracy at high temperatures
HyeonSoo Lee and SoonBaek Kwon
Hyundai-kefico, Korea

03 Single-Body-Integrated Complementary Tunneling Field-Effect Transistor (SBI CTFET) and Design Consideration of Processing Margin in Dual-Gate Formation
Soomin Kim¹, Seeun Oh¹, Md. Hasan Raza Ansari², Nazek El-Atab³, and Seongjae Cho¹
¹Ewha Womans University, Korea, ²King Abdullah University of Science and Technology (KAUST), Saudi Arabia

04 Implementation of Interface System through DMX512 Standard Expansion for Control of Multi-Channel Sensor and Effect Devices
Sunghun Chae and Young Bo Shim
Korea Electronics Technology Institute (KETI), Korea

05 Performance Implication of MSHRs on GPU TLB Designs
Jiwon Lee and Won Woo Ro
Yonsei University, Korea

06 Design of XR Interaction Data Management System Based on Edge Computing Architecture
Hyuntae Ju and Yong Mu Jeong
Korea Electronics Technology Institute, Korea

07 On Modified SEC codes with Improved Error Detection for Memory Applications
Hee Ju Na and Sang-Hyo Kim
Sungkyunkwan University, Korea

08 A Study on the Implementation of User Web/APP Based Reading Ability Assessment Service
Hongyeon Yu, Yunji Ban, Seunghun Oh, Donghoon Son, Gihyeon Min, and Jeongeun Kim
Electronics and Telecommunications Research Institute, Korea
Design of Ensemble Predictive Agent with Voting in Edge Computing
Keonhee Lee, Hyuntae Ju, and Yong Mu Jeong
Korea Electronics Technology Institute, Korea

28 GHz 6-bit Active Phase Shifter with Phase-Correction Technique
Hyuk-jin Choi, Soo-Chang Chae, Kwang-Ho Ahn, and Ki-Jin Kim
Korea Electronics Technology Institute, Korea

Design of a Wide Band Tx-to-Rx Leakage Canceller
Soo-Chang Chae, Hyeon-Bhin Jo, Ki-Jin Kim, and Kwang-Ho Ahn
Korea Electronics Technology Institute (KETI), Korea

CMOS SPDT switch with low insertion loss and high linearity in Ka-band
Seung-Ho Han, Kwang-Ho Ahn, and Ki-Jin Kim
Korea Electronics Technology Institute, Korea

Design switch with high isolation between Tx and Rx using Lange coupler
Dae-Ho Shin, Kwang-Ho Ahn, and Ki-Jin Kim
Korea Electronics Technology Institute, Korea

A 28 GHz CMOS Variable Gain Phase Shifter for 5G Applications
Ho Kim, Jinman Myung, and Ilku Nam
Pusan National University, Korea

Design of a 77–81GHz RF Transceiver for FMCW Level Sensing System
Soo-Chang Chae, Soo-Jeong Kim, Hyeon-Bhin Jo, Ki-Jin Kim, and Kwang-Ho Ahn
Korea Electronics Technology Institute (KETI), Korea

Design and Analysis of Four-Layer MOD Coil Array with Printed Spiral Detection Coils for Wireless Power Transfer
Sunhee Kim¹, Junhee Kim², Youngjun Ju³, and Yongseok Lim⁴
¹Sangmyung University, Korea, ²Bioneer, Korea, ³Erette Inc., Korea, ⁴Korea Electronics Technology Institute, Korea

A Design of Kickback Noise Suppression Comparator for High-Speed Wireless Communication
Ho-Jin Kwark, Yeong-Hun Kim, Dong-Ha Kim, and Kang-Yoon Lee
Sungkyunkwan University, Korea

Unit-Cell Characterization for D-band Amplifier Design Using CMOS 40-nm technology
Sunwoo Kong, Seunghyun Jang, Seunghun Wang, Hui-Dong Lee, Bong-Hyuk Park, Seok-Bong Hyun, and Junghwan Hawang
Electronics and Telecommunications Research Institute (ETRI), Korea
19 A Signal Integrity Analysis for the Design of a Computer Mainboard
Kyong Hee Lee, Hyuk Je Kwon, Young Woo Kim, Seon Young Kim, and Yoo Mi Park
Electronics and Telecommunications Research Institute (ETRI), Korea

20 77GHz mm-wave 2 Stage CMOS Cascode Power Amplifier
Se-ho Kim
Yonsei University, Korea

21 SIW (Substrate Integrated Waveguide) Band Pass Filter using LTCC for sub-THz 6G Application
GeunYoung Bae, BumSu Lee, JiYeon Choo, and Chan-Sei Yoo
Korea Electronics Technology Institute, Korea

22 Efficient Load Balancing Method using Multi-Hop Network in Edge Computing Environment
Yongsso Park, Yeon-sang Oh, and Donkyu Baek
Chungbuk National University, Korea

23 T-coil design for bandwidth expansion of high-speed interface
Shin Sunggon, Ju Haram, and Lee Kwangho
Korea Electronics Research Institute (KETI), Korea

24 An Implementation of Hybrid Hardware Architecture for QHD in Interprediction of Video Encoder
Kyeongmook Oh and Byungsoo Kim
Korea Electronics Technology Institute, Korea

25 Exploring and Creating a Physical Mechanic Rigging System – Based on SimBiCon
Chi-Hao Lung and Yen-Jui Lee
National Taipei University of Technology, Taiwan

26 XR Standards and Improvements for Future Multimedia based Digital Reality Technologies (MBDRT) and Applications
Wonsik Yang, Jeongyoon Shin, Stefan Mozar, and Jong-Moon Chung
1Yonsei University, Korea, 2IEEE MBDRT Ac HoC Committee Chair and VP of CTSoc & PSES

27 Virtual Hand Model Generation Through Size Modifications Of Hand Joint Feature Points for XR Interaction
Gahyeon Kim, Juyeong Kim, and Sung-Uk Jung
Electronics and Telecommunications Research Institute, Korea

28 RF–DC Converter with Threshold Voltage Compensation for Energy Harvesting Systems
Seung-Wan Yoo, Chang-Hyun Kim, and Kang-Yoon Lee
Sungkyunkwan University, Korea
29 Improved Design of Stand-by Circuit for Electric Vehicle Fast-charging Power Modules
Woo-Young Choi
Jeonbuk National University, South-Korea

30 Scalable Service Oriented V2X Data Format over 5G-NR-V2X
Byoungman An, Seonghyun Jang, Sanghun Yoon, and Kitaeg Lim
Korea Electronics Technology Institute, Korea

➤ Tuesday, October 24 / 13:30~15:00
➤ Room: Sicily Room

PS02 Poster Session 2
Chair: Sukju Kang (Sogang University)

01 Enhancing Image Clarity through a Comparative Analysis of Polarizing Filters and Homomorphic Filtering Algorithms
Sung Keun Cha, Si Woo Lee, and Jae Wook Jeon
Sungkyunkwan University, Korea

02 Comparison of Free-Viewpoint-Based Heterogeneous Sensor Fusion for 3D Data Generation
Hyunjoo Kim, Joongyong Choi, Ahreum Oh, and Hyungkeun Jee
Electronics and Telecommunications Research Institute (ETRI), Korea

03 Cross-Modal Transformer-Based RGB-T Image Fusion and Aligned Module with Guided for Crowd Counting
Gahyeon Kim, An Gia Vien, Duong Hai Nguyen, and Chul Lee
Dongguk University, Korea

04 Camera Position Comparison System of Free-viewpoint Data Acquisition Equipment Using Dissimilar Sensors for 3D Data Generation
Ah Reum Oh, Joong Yong Choi, Hyun Joo Kim, and Hyung-Keun Jee
Electronics and Telecommunications Research Institute, Korea

05 A Study of Skin Visualization with Smartphones Using Deep Learning from Medical Cameras
Aika Kuramoto1, Kensuke Yotsumoto2, Hiroko Kawanobe2, Megumi Nakashima2, and Makoto Hasegawa1
1Tokyo Denki University, Japan, 2ALBION Co., Ltd. Japan

06 Development of smart glasses using an infrared distance measurement sensor
Jaeyoung Kang1, Da ran Kim2, Kyung-sun Na2, and Dae Yu Kim1
1Inha University, Korea, 2The Catholic University of Korea, Korea
Historical Asset Viewer for Efficient Management of Cultural Heritage
Chan-Woo Park, Hee-Kwon Kim, and Jae-Ho Lee
Electronics and Telecommunications Research Institute, Korea

Developing an Integrated Dashboard to Analyze Multimodal Data for User Experience Evaluation
Hyejeong Jo, Junhyeok Lee, Hye Won Park, Minjae Kim, Yeonwoo Kim, and Won Hee Lee
Kyung Hee University, Korea

PyEye: An Integrated Approach for Signal Integrity Assessment and Eye Diagram Generation
Muhammad Usama and Dong Eui Chang
KAIST, Korea

Denoising Capacitive Touch Sensor Noise Network with U-Net Convolutional Neural Network
Jaeheon Lee and Jun-Eun Park
Sungkyunkwan University, Korea

Tiny Machine Learning Hardware Implementation of Handwritten Digit Inference using Arduino and Ternary Output Binary Neural Network
Seongmin Ahn, Jaehyek Lee, and Taehui Na
Incheon National University, Korea

An Energy-Efficient GAN Processor for Mobile Image Translation
Jinhoon Jo, Sangho Lee, Ghangmin Yun, and Kyuho Lee
Ulsan National Institute of Science and Technology (UNIST), Korea

Attention-Enhanced CycleGAN for Improving Electrical Impedance Tomography (EIT) Reconstruction from Piezoresistive Fabric Images
Felipe Alberto Solano Sanchez, Anil Kumar Khambampati, Minho Jeon, and Kyung Youn Kim
Jeju National University, Korea

Stereo Confidence Estimation with Pyramid Pooling Transformer
Jini Yang, Minjung Yoo, and Sunok Kim
Korea Aerospace University, Korea

Enhancing Plant Disease Identification through Innovative Image Synthesis: A Study of InstaGAN and Data Augmentation in Agriculture
Kiseong Lee, Abdullah Muhammad, Chaejin Lim, Junhee Hyeon, and Dongil Han
Sejong University, Korea
16 A Comparative Study on Implicit Neural Representation-based Arbitrary-Scale Image Super-Resolution
Sangmin Lee, Jinbum Park, and Seung-Won Jung
Korea University, Korea

17 Smart Factory Mold Injection Anomaly Detection Using Deep Autoencoder Neuronal network
Pichdara Po and Hyungwon Kim
Chungbuk National University, Korea

18 Adaptive Object Detection: Balancing Accuracy and Inference Time
JiHyeon Ryu and HyungWon Kim
Chungbuk National University, Korea

19 Real-time Steering Control algorithm based on Lane Segmentation image using Monocular view for Map-less Driving
Si Woo Lee, Jinsun Lee, HyeongKeun Hong, and Jae Wook Jeon
Sungkyunkwan University, Korea

20 Contour-aware anomaly detection system for autoencoder neural network
Phong Phu Ninh and HyungWon Kim
Chungbuk National University, Korea

21 Filter Pruning via Representative Election
Mincheol Park\textsuperscript{1}, Won Woo Ro\textsuperscript{1}, and Suhyun Kim\textsuperscript{2}
\textsuperscript{1Yonsei University, Korea,} \textsuperscript{2Korea Institute of Science and Technology, Korea}

22 A Novel Independent Monitoring Model for Efficient Out-of-Distribution Detection in CNNs: Utilizing The Forward-Forward Algorithm
Junhee Hyeon, Chaejin Lim, Seonu Park, Abdullah Muhammad, Kiseong Lee, and Dongil Han
Sejong University, Korea

23 Hardware-aware Pruning for Large Winograd Convolution
Cheonjun Park and Won Woo Ro
Yonsei University, Korea

24 Prediction of Increase in COVID-19 Confirmed Cases Through Multilingual Keyword Extraction
Gi-Hu Kim and Gil-Jin Jang
Kyungpook National University, Korea
25 **Time-Enhanced Recommendations: Capturing Dynamic User Preferences through Time-aware Reviews**
Yeonghwa Kim, Jooweon Choi, Jungmin Yun, Kyohoon Jin, and Youngbin Kim
*Chung-Ang University, Korea*

26 **Fault Type Classification of Rotating Machinery based on Machine Learning with Fourier Transform Feature Extraction**
Minseok Lee¹, Dohun Kim², and Wonjong Kim²
¹Hongik University, Korea, ²Electronics and Telecommunications Research Institute, Korea

27 **Hypergraph Partitioning with Graph Neural Network**
Sunghoon Kim, Joon-Sung Yang
*Yonsei University, Korea*

28 **Violent Behavior Detection Using CNN-LSTM Model**
Junyeon Woo, Hyunsik Ahn
*Tongmyong University, Korea*

29 **Model Comparison Study for Microscopic Symptom Classification of Plant Diseases**
Chaejin Lim, Junhee Hyeon, Muhammad Abdullah, Kiseong Lee, Seonu Park, and Dongil Han
*Sejong University, Korea*

➤ Tuesday, October 24 / 15:30~17:30
➤ Room: Sicily Room

**PS03 Poster Session 3**
*Chair: Jaeha Kung (Korea University)*

01 **Population Density Detection by Human Head Recognition Using Deep Learning**
Changgeon Lee and Hyunsik Ahn
*Tongmyong University, Korea*

02 **Brain Floating Point Precision for Object Detector**
Ali Haroon Turk and Hyungwon Kim
*Chungbuk National University, Korea*

03 **Advanced Color Pseudo Anomaly to Enhance Learning of Convolutional Neural Network Models**
Rizwan Ali Shah and HyungWon Kim
*Chungbuk National University, Korea*
04 Combined Pruning with Structured Sparsity and Unstructured Sparsity for Efficient CNN
Cheonjun Park and Won Woo Ro
Yonsei University, Korea

05 Enhancing Plant and Disease Segmentation through Semi-Supervised Learning with Feature Distillation
So-Yeon Jang, Goo-Young Moon, and Jong-Ok Kim
Korea University, Korea

06 Advancing Temporal Spike Encoding for Efficient Speech Recognition
Sung Soo Park and Young-Seok Choi
Kwangwoon University, Korea

07 Attention-Temporal Convolutional Networks for EEG-based Emotion Recognition
Danho Kim, Haneul Kim, ChangGyun Jin, and Seong-Eun Kim
Seoul National University of Science and Technology, Korea

08 Application of a CNN-based Acoustic Classification Model to Detecting a Target Signal with Interference
Jungyu Choi¹, Seyeon Jeong¹, Eojin Kim¹, Sungbin Im¹, and Jong Hoon Lee²
¹Soongsil University, Korea, ²MoAdata, Korea

09 Versatile-VTON: A Versatile Virtual Try-on Network
Jin, Hyun-woo¹² and Kang, Dong-oh²
¹Dongseo University, Korea, ²Electronics and Telecommunications Research Institute, Korea

10 Real-time motion classification with efficient event stream data processing
Seokhun Jeon, Sihyeong Park, Kyungmo Kim, Byung-Soo Kim, and Youngjong Jang
Korea Electronics Technology Institute, Korea

11 Implementation of Activation functions using inverse delta coding LUT
Yunpyo Hong, Heetak Kim, and Byungssoo Kim
Korea Electronics Technology Institute (KETI), Korea

12 Data storage for efficient knowledge distillation in object detectors
Suho Son and Byung Cheol Song
Inha University, Korea
13 A Novel Approach to Reduce A Visual Gap Using Inpainting GAN
Thanh Hien Truong1, Tae-Ho Lee1, Viduranga Munasinghe1, Tae-Sung Kim2, Jin-Sung Kim2, and Hyuk-Jae Lee1
1Seoul National University, Korea, 2Sun Moon University, Korea

14 Self-driving Map Creation Robot with Lidar Sensors for Smart Hospitals
Taehyeon Eun, Jinsoo Park, Hanwoong Kim, Ilhak Ban, and Se-Jin Kim
Chosun University, Korea

15 Automatic Reverse Parking Algorithm for Inter-Vehicle Spaces Using Rear 2D Lidar
Hyeong-Keun Hong, Woon-Ho Ko, Dong-Heok Park, and Jae-Wook Jeon
Sungkyunkwan University, Korea

16 Grounded SAM-based Smoke Datasets labeling and cognitive
Min Cheol Park, Shin Dong In, and Hwang Jung Hoon
Korea Electronics Technology Institute, Korea

17 SLAM for mobile robots in smoke environment
Min Cheol Park, Shin Dong In, and Hwang Jung Hoon
Korea Electronics Technology Institute, Korea

18 Real-time smoke recognition for quadruped robot
Min Cheol Park, Shin Dong In, and Hwang Jung Hoon
Korea Electronics Technology Institute, Korea

19 Design of Electrochemical Impedance Spectroscopy System using Frequency Response Analysis Method for Lithium-Ion Battery Cell Monitoring Unit
Hoonmin Jang, Jiseong Lee, Seung Soo Kwak, Kyeong Keun Lee, and Yong Sin Kim
Korea University, Korea

20 Analyzing the Impact of ECU Synchronization on the SOME/IP Service Discovery
Jong Hun Kim, Young Soo Do, Sung Bhin Oh, and Jae Wook Jeon
Sungkyunkwan University, Korea

21 Implementation of GUI-based SOME/IP and SOME/IP-SD communication
Sung Bhin Oh, Jong Hun Kim, Si Woo Lee, Jae Bum Park, and Jae Wook Jeon
Sungkyunkwan University Suwon, Korea
22 **Analysis of Wireless Localization Using Chirp-based Ranging Algorithms**
Ki-Tae Kim¹, Kwang-Yul Kim², and Yoan Shin¹
¹Soongsil University Seoul, Korea, ²SOLiD WiNTECH R&D Center Yongin, Korea

23 **Efficient and Trustable Deep Learning Weight Management System based on Hashgraph**
YoungJoo Choi and Younghoon Park
Sookmyung Women’s University, Korea

24 **Analysis Scheme for Energy Saving Effect Based on Gas AMI Data**
Minsu Kim, Seongseop Kim, Seungwoo Lee, and Youngmin Kwon
Korea Electronics Technology Institute (KETI), Korea

25 **Low-Latency LeNet-5 Architecture for Handwritten Digit Recognition**
Chu Yu, Yu-Heng Li, Yi-Hsiang Tseng, and Yi-Ming Chen
National Ilan University, Taiwan

26 **Improved Uniformity in Si CMOS-Compatible Ta2O5 Based ReRAM by Nitrogen Doping**
Youna Kwon, Gapseop Sim, Huijae Cho, Youngjoo Kim, Dongeun Yoo, Minho Kang, Yeeun Na, Woo-Suk Sul, and Jongwon Lee
National Nanofab Center (NNFC), Korea

27 **Comparative Analysis of Data Transmission Latency in Scalable service-Oriented Middleware over IP: TCP and SOME/IP-TP**
Jae Bum Park, Sung Bhin Oh, Jae Wook Jeon
Sungkyunkwan University, Korea
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About Busan City

1. Haeundae Beach
Going beyond Busan, Haeundae is beloved throughout the country as a vacation spot. It teems with so many attractive places such as 5-star hotels, restaurants, and an aquarium. In addition, it boasts outstanding popularity and receives more than million tourists annually, particularly in the summer season. Haeundae is a must-visit site when you visit Busan.

- Haeundae Tourism Facility Management Office
- +82-51-749-7611~7
- www.haeundae.go.kr

2. Haedong Yonggungsa Temple
The Portrait of Putai marking the start of the 108-step stairway leading into the main temple site is stained with handprints because of the rumor that touching the belly of the beloved Buddhist deity in this portrait can make women bear and give birth to sons.
There are three famous food and drinks to try near Busan Haedong Yonggungsa Temple. They are seafood black bean noodles (haemul jjajang myeon), Korean full course meal (hanjeongsik), and coffee. The old cafes and restaurants around Yonggungsa Temple and their famous dishes are worth experiencing.

▸ Songjeong Tourist Information Center : +82-51-749-5800
▸ http://www.yongkungs.or.kr

3. Dongbaekseom Island
Located at the southern end of Haeundae Beach, Dongbaekseom Island creates a picturesque scene in harmony with a thick forest of camellias and pine trees. Tourist attractions in Dongbaekseom Island include a walking path and the Nurimaru APEC House built for the 2005 APEC summit.

Lifestyle store located inside the dining pub on the second floor of The Bay 101. The kitchen concept store suggests a tastier way of living by introducing a wide variety of Korean and International food and beverage, cookware, and brands.
4. Marine City

Cafes began cropping up throughout Marine City, and locals have taken to calling the area “Marine City Cafe Street.” The cafe-lined street also features dozens of restaurants, bars, and other eateries that continue to draw gourmet lovers in search of good meals and desserts. With the Movie Street right in front, the Cafe Street is a beloved feature of the famed Haeundae nightscape.

Haeundae Cine Road extends from Dongbaekseom Island to the Yacht Center. It features trick art on the ground as well as a 10 Million-viewers Movies Zone, Animated zones, Haeundae Background Movie Zone, and more. You can also appreciate the sculptures and hand prints in Santorini Square.
5. Gwangalli Beach

Gwangalli Beach is known for its breathtaking night view with Gwangandaegyo Bridge stretching across the ocean in the background. You can find differently themed streets around Gwangalli Beach featuring a variety of concerts and things to enjoy in all seasons, including the annually held Busan Fireworks Festival.

Equipped with the world’s largest LED lighting and sound facilities for bridges, Gwangandaegyo Bridge has a multi-dimensional outdoor landscape lighting system. You will be able to enjoy the breathtaking view of the bridge with fantastic lighting from sunset to 12:00(midnight) on weekdays (from Sunday to Thursday) and from sunset to 2:00 a.m. on weekends (from Friday to Saturday) as well as an amazing laser show three times a day (8:30, 9:30, 10:30 p.m.) for about 10 minutes over the beautiful night sea of Gwangalli.

» Suyeong District Office : +82-51-610-4000
» U-Tourist Information Center : +82-51-610-4848
» www.gwanganbridge.bisco.or.kr
6. BIFF Square

It is the best-known place where you can feel the atmosphere of Busan, a city of film. Do not miss an exciting chance to take a look at the handprints of filmmakers and enjoy the delicious local food.

One of the specialties available near BIFF Square is Ssiat hotteok, a sweet Korean pancake stuffed with seeds. The Ssiat hotteok snack cart that was visited by singer Lee Seung-gi has a particularly long line of customers

▶ www.bsjunggu.go.kr
7. Gukje Market

It is an enormous market located in Nampo-dong, which can be roughly divided into several subsections, such as Food Street, Youth Street, Everything Street, Arirang Street, and Vintage Street. It is also known as “Dottegi Market.” “Dottegi Market” refers to a disorderly, bustling, and unusual flea market where people used to sell off second-hand goods and junk at wholesale, retail, or under the table prices. The name originated from the fact that when Japanese people rushed back home following the independence of Korea, their leftover belongings went up for bidding. It has been said that there were lucky people who received a financial windfall at that time. One more thing to keep in mind is that this place is known as the heaven of snacks because each cranny is full of street snacks, including spicy glass noodles, sweet red bean porridge, and spicy rice cakes.

▸ Gukje Market Cooperative : +82-51-245-7389
▸ gukjemarket.co.kr
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