The 34th International Technical Conference on Circuits / Systems, Computers and Communications

ITC-CSCC 2019

June 23 (Sun) – June 26 (Wed), 2019
Jeju Shinhwa World, Republic of Korea

IEEE
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Welcome!! On behalf of the committee members, I truly welcome you to the ITC-CSCC 2019, the 34th International Technical Conference on Circuits, Systems, Computers, and Communications. This year’s ITC-CS**CC** will be held at the Jeju Island, one of the most beautiful places in Korea. I welcome all participants and appreciate all the voluntary efforts from the committee members. Especially, I would like to express big thanks to the committee members from Japan and Thailand. As you enjoy the conference, if you meet any of the committee members, please take a moment to thank them for their hearty efforts.

Over the past years, ITC-CSCC has established meaningful milestones and become one of the premier forums to develop and discuss research advances in the fields of Circuits, Systems, Computers, and Communications. This year, the technical program covers three days of presentations, including two plenary talks and three technical tutorials. In addition, there will be 36 technical sessions including two special sessions.

In addition to the technical programs, a series of social events has been prepared for both academic and informal interactions among the participants. The social events begin with the welcome reception on Sunday, and continue on with the opening ceremony on the morning of June 24th. The main social event is the banquet on Tuesday (June 25th), which will provide an evening of celebration and award. I recommend you participate in these activities and make your days at ITC-CSCC 2019 more enjoyable.

Lastly but not least, I would like to appreciate the committee members of ITC-CSCC 2019. I also like to express my truthful appreciations to the Technical Program Committee (TPC) and the anonymous reviewers for their hard work in reviewing the papers and for arranging the great technical
program. I especially thank the authors who submitted the precious research work to ITC-CSCC 2019. Finally, I thank you all for attending ITC-CSCC2019 at Jeju. I sincerely thank all people joining the conference and truly hope you find big inspiration from the technical discussion and interactions with your colleagues. I also hope you have an unforgettable memory here in Jeju as well.

Sincerely,

Chungyong Lee  
Yonsei University, Korea  
General Chair of ITC-CSCC 2019  
Vice President of IEIE

Satoshi Yamane  
Kanazawa University, Japan  
General Co-Chair

Pornchai Supnithi  
King Mongkut’s Institute of Technology Ladkrabang, Thailand  
General Co-Chair
Welcome from the TPC Chair

On behalf of the Technical Program Committee (TPC), I sincerely thank all the authors for submitting their precious research and development papers to the 34th International Technical Conference on Circuits, Systems, Computers, and Communications of 2019 (ITC-CSCC 2019) and I am glad to introduce the technical program covering a wide range of topics on electronics research area. During ITC-CSCC 2019, 267 outstanding papers will be presented, where the conference has papers from the Korea, Japan, Thailand, Taiwan, U.S.A., Vietnam, Indonesia, China, Saudi Arabia, Egypt, Mongolia, Nepal and Pakistan. All submitted papers have been carefully reviewed in 4 technical tracks, “Circuits & Systems”, “Communications”, “Computers”, and “Special Sessions”. TPC selected 186 and 81 papers for oral and poster presentations, respectively. Because of the limited time and sessions available, it was impossible to select all excellent papers for inclusion in the technical program.

In addition to the contributed papers, 2 keynote speeches, 2 special sessions, and 3 tutorials are also presented in ITC-CSCC 2019.

I would like to express our sincere gratitude to all those who have contributed to the technical program, including authors, reviewers, special session organizers, organizing committee members, and technical program committee members. Without their devotion and efforts, it would be impossible to hold the successful ITC-CSCC 2019.

I hope that the technical programs as well as the social events are energizing and fun. Thank you very much and I wish you a most fruitful and pleasant time in Jeju Island and in the Republic of Korea.

Kwang-Hyun Baek
Chung-Ang University, Korea
TPC Chair of ITC-CSCC 2019

Toshiyuki Miyamoto
Osaka University, Japan
TPC Co-Chair

Piya Kovintavewat
Nakhon Pathom Rajabhat University, Thailand
TPC Co-Chair
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Datchakorn Tancharoen (Panyapiwat Institute of Management, Thailand)
Lunchakorn Wuttiwittikul (Chulalongkorn University, Thailand)
Chang Dong Yoo (KAIST, Korea)
### Sunday, June 23, 2019

<table>
<thead>
<tr>
<th>Time</th>
<th>Room</th>
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<tr>
<td>15:00-17:00</td>
<td>Registration</td>
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<tr>
<td>18:00-19:30</td>
<td>Welcome Reception (LANDING BALLROOM - C)</td>
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### Monday, June 24, 2019

<table>
<thead>
<tr>
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<tr>
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<td>Registration</td>
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<tr>
<td>09:00-10:15</td>
<td>SS-01</td>
<td>Standardization of Technologies for Semiconductor Devices</td>
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<tr>
<td>09:00-10:15</td>
<td>OS-01</td>
<td>Artificial Intelligence I</td>
</tr>
<tr>
<td>09:00-10:15</td>
<td>OS-02</td>
<td>Circuits &amp; Components for Communications / Optical Communications &amp; Components</td>
</tr>
<tr>
<td>09:00-10:15</td>
<td>OS-03</td>
<td>Computer Systems &amp; Applications I</td>
</tr>
<tr>
<td>09:00-10:15</td>
<td>OS-04</td>
<td>Security I</td>
</tr>
<tr>
<td>10:15-10:30</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>10:30-10:50</td>
<td>Opening Ceremony (LANDING BALLROOM A+B)</td>
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</tr>
<tr>
<td>10:35-11:35</td>
<td>Plenary Talk 1 (LANDING BALLROOM A+B)</td>
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<tr>
<td>11:35-12:20</td>
<td>Plenary Talk 2 (LANDING BALLROOM A+B)</td>
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<tr>
<td>12:20-14:00</td>
<td>Lunch (LANDING BALLROOM - C)</td>
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<tr>
<td>14:00-16:00</td>
<td>Tutorial 1</td>
<td>OS-05 Artificial Intelligence II</td>
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<tr>
<td>14:00-16:00</td>
<td>OS-06</td>
<td>Analog Circuits I</td>
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<tr>
<td>14:00-16:00</td>
<td>OS-07</td>
<td>Computer Systems &amp; Applications II</td>
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<tr>
<td>14:00-16:00</td>
<td>OS-08</td>
<td>Security II</td>
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<tr>
<td>15:30-15:50</td>
<td>Coffee Break</td>
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</tr>
<tr>
<td>15:50-17:20</td>
<td>Tutorial 2</td>
<td>OS-09 Image Processing / Image Coding &amp; Analysis I</td>
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<tr>
<td>15:50-17:20</td>
<td>OS-10</td>
<td>Analog Circuits II</td>
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<tr>
<td>15:50-17:20</td>
<td>OS-11</td>
<td>Computer Systems &amp; Applications III</td>
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<tr>
<td>15:50-17:20</td>
<td>SS-02</td>
<td>Emerging Technologies to IoT</td>
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### Tuesday, June 25, 2019

<table>
<thead>
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<th>Time</th>
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<tr>
<td>09:00-16:00</td>
<td>Registration</td>
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</tr>
<tr>
<td>10:00-12:00</td>
<td>OS-12</td>
<td>Artificial Intelligence III</td>
</tr>
<tr>
<td>10:00-12:00</td>
<td>OS-13</td>
<td>Intelligent Transportation Systems &amp; Technologies / Linear, Nonlinear Systems</td>
</tr>
<tr>
<td>10:00-12:00</td>
<td>OS-14</td>
<td>Modern Control / Neural Networks</td>
</tr>
<tr>
<td>10:00-12:00</td>
<td>OS-15</td>
<td>Recent Researches in IoT, Ad-hoc, Sensor Networks</td>
</tr>
<tr>
<td>10:00-12:00</td>
<td>OS-16</td>
<td>Power Electronics &amp; Circuits / Semiconductor Devices &amp; Technology I</td>
</tr>
<tr>
<td>12:00-13:30</td>
<td>Lunch (LANDING BALLROOM - C)</td>
<td></td>
</tr>
<tr>
<td>13:30-15:00</td>
<td>Tutorial 3</td>
<td>OS-17 Audio and Speech Signal Processing</td>
</tr>
<tr>
<td>13:30-15:00</td>
<td>OS-18</td>
<td>Communication Signal Processing I</td>
</tr>
<tr>
<td>13:30-15:00</td>
<td>OS-19</td>
<td>Computer Vision I</td>
</tr>
<tr>
<td>13:30-15:00</td>
<td>OS-20</td>
<td>Power Electronics &amp; Circuits / Semiconductor Devices &amp; Technology II</td>
</tr>
<tr>
<td>15:00-15:20</td>
<td>Coffee Break</td>
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<tr>
<td>15:20-17:00</td>
<td>OS-21</td>
<td>Artificial Intelligence IV</td>
</tr>
<tr>
<td>15:20-17:00</td>
<td>OS-22</td>
<td>Advanced System Analysis &amp; Evaluation</td>
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<tr>
<td>15:20-17:00</td>
<td>OS-23</td>
<td>Communication Signal Processing I</td>
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<tr>
<td>15:20-17:00</td>
<td>OS-24</td>
<td>Communication Signal Processing II</td>
</tr>
<tr>
<td>15:20-17:00</td>
<td>OS-25</td>
<td>Emerging Issues on Circuits &amp; Devices</td>
</tr>
<tr>
<td>18:00-</td>
<td>Banquet (LANDING BALLROOM)</td>
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### Wednesday, June 26, 2019

<table>
<thead>
<tr>
<th>Time</th>
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<th>Session Details</th>
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<tr>
<td>09:00-11:00</td>
<td>Registration</td>
<td></td>
</tr>
<tr>
<td>09:00-10:30</td>
<td>OS-26</td>
<td>Verification &amp; Testing</td>
</tr>
<tr>
<td>09:00-10:30</td>
<td>OS-27</td>
<td>Communication Signal Processing III</td>
</tr>
<tr>
<td>09:00-10:30</td>
<td>OS-28</td>
<td>Image Processing / Image Coding &amp; Analysis II</td>
</tr>
<tr>
<td>09:00-10:30</td>
<td>OS-29</td>
<td>Communication &amp; Network Systems I</td>
</tr>
<tr>
<td>09:00-10:30</td>
<td>OS-30</td>
<td>Medical Electronics &amp; Circuits / Sensors &amp; Related Circuits</td>
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<tr>
<td>10:30-10:50</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>10:50-12:20</td>
<td>OS-31</td>
<td>VLSI Design / Computer Aided Design</td>
</tr>
<tr>
<td>10:50-12:20</td>
<td>OS-32</td>
<td>RF Circuits</td>
</tr>
<tr>
<td>10:50-12:20</td>
<td>OS-33</td>
<td>Image Processing / Image Coding &amp; Analysis III</td>
</tr>
<tr>
<td>10:50-12:20</td>
<td>OS-34</td>
<td>Communication &amp; Network Systems II</td>
</tr>
</tbody>
</table>
Conference Information

Registration

Author Registration
At least one author of every accepted paper should register no later than May 31, 2019 to be presented at the conference and included in the proceedings. Basically, one regular registration will cover the publication of only one accepted paper. Each additional accepted paper by the same "corresponding" author will follow the policy described below. In case of four or more papers, only three registrations are required, which will cover the attendance of three people at the conference. Beyond these three registered participants, additional registrations by coauthors and students are needed to participate in the conference.

<table>
<thead>
<tr>
<th>Accepted Papers (by the Same Author)</th>
<th>First Paper</th>
<th>Second Paper</th>
<th>Third Paper</th>
<th>Rest of the Paper</th>
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<tbody>
<tr>
<td>One Paper</td>
<td>Regular registration</td>
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<tr>
<td>Two Papers</td>
<td>Regular registration</td>
<td>Student Registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three Papers</td>
<td>Regular registration</td>
<td>Student Registration</td>
<td>Student Registration</td>
<td></td>
</tr>
<tr>
<td>Four Papers or More</td>
<td>Regular registration</td>
<td>Student Registration</td>
<td>Student Registration</td>
<td>Free</td>
</tr>
</tbody>
</table>

Registration Fee
Due date for Early Registration is by May 31, 2019

| Category                     | Oversea | | | |
|------------------------------|---------|---------|---------|
|                              | Early Registration By May 31, 2019 | Late Registration After May 31, 2019 |
| Regular Registration         | USD 550 | USD 650 |
| Student Registration         | USD 340 | USD 390 |
| Additional Proceeding        | | USD 60 |
| Additional Banquet Ticket    | | USD 70 |
Registration Fee Includes

Regular Registration
Admission to All Sessions, Proceedings Download, Banquet, Coffee Breaks

Student Registration
Admission to All Sessions, Proceedings Download, Coffee Breaks
* A banquet ticket is not included.
Presentation

Oral Presentation
Please meet the session chair at your session at least 15 minutes before the session starts. You should identify yourself to the session chair and check in with the AV staff to go over your equipment needs. 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 : 90 minutes
Plenary : 45 minutes
Regular : 15 minutes

Poster Presentation
The size of the poster board is 100cm (width) × 180cm (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.

Coffee Break and Lunch

Coffee Breaks

<table>
<thead>
<tr>
<th>Location</th>
<th>Lobby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Time</td>
<td></td>
</tr>
<tr>
<td>June 24(Mon)</td>
<td>10:15-10:30</td>
</tr>
<tr>
<td>June 24(Mon)</td>
<td>15:30-15:50</td>
</tr>
<tr>
<td>June 25(Tue)</td>
<td>15:00-15:20</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Location</th>
<th>LANDING BALLROOM - C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Time</td>
<td></td>
</tr>
<tr>
<td>June 24(Mon)</td>
<td>12:20-14:00</td>
</tr>
<tr>
<td>June 25(Tue)</td>
<td>12:00-13:30</td>
</tr>
</tbody>
</table>
Social Program

Welcome Reception
Date: Sunday, June 23, 2019
Time: 18:00 ~
Place: LANDING BALLROOM - C
An invitation to the welcome reception is extended to all participants including registered students.

Opening Ceremony
Date: Monday, June 24, 2019
Time: 10:30 ~ 10:50
Place: LANDING BALLROOM A+B
All registered participants are cordially invited to join us and celebrate the official opening.

Banquet
Date: Tuesday, June 25, 2019
Time: 18:00 ~
Place: LANDING 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 for all types of registration.
Petri Net-Based Approach to Business Process Management

Abstract

Today’s business system supports not only individual tasks but also needs to support business processes within and between organizations. This talk deals with Petri net-based approach to business process management. Petri net has become one of the standard ways to design and analyze business processes. In the beginning, the outline of business process management will be presented together with its history, system architecture, and benefits. Next, the Petri net-based approach to business process management will be expounded. Business process management is classified into three phases: Design, Enactment, and Kaizen. In each phase, the state-of-the-art will be illustrated with application examples. In particular, the Kaizen phase (also known as the improvement phase) will be focused, and the related topics such as soundization, refactoring, supervisory control, and dynamic change will be discussed in detail. Finally, future perspectives in business process management will be discussed.

Biography

Shingo Yamaguchi received B.E., M.E. and D.E. degrees from Yamaguchi University, Japan, in 1992, 1994 and 2002. He was a Visiting Scholar in University of Illinois at Chicago, United States, in 2007. He is currently a Professor in Graduate School of Sciences and Technology for Innovation, Yamaguchi University, Japan. His research interests are in the area of net theory and its applications in-
cluding service science, IoT, big data analysis, and cyber security. He is a recipient of the 21st IEEE International Symposium on Consumer Electronics Best Paper Award, the 30th International Technical Conference on Circuits/Systems, Computers and Communications Best Paper Award, and so on. He is a Senior Member of IEEE and IEICE. He is also an elected member of Board of Governors of IEEE Consumer Electronics Society.
Plenary Talk 2

11:35~12:20 Monday, June 24, 2019

Room: LANDING BALLROOM A+B

Prof. Apinunt Thanachayanont
Professor at the Department of Electronic Engineering, Faculty of Engineering / King Mongkut’s Institute of Technology Ladkrabang

Shaping the future of medicine and health care with semiconductor-based diagnostic technologies

Abstract

During the past decade, there have been tremendous advances and breakthroughs in biomolecular sciences and technologies that empower precise diagnostic of human diseases and medical conditions down to the molecular level. The advent of high-speed genome sequencing and biomolecular diagnostic equipment have empowered physicians to pinpoint and understand exactly the root causes of many diseases and conditions; this increases the efficacy of medical therapies. Medicine is being transformed towards “precision medicine”, in which treatment and prevention of diseases are proactive and take into account of individual variability in genes, environment, and lifestyle. Nevertheless, some of the present barriers to widespread success include the limited accessibility to biomolecular diagnostic equipment and the high cost of such a test. The aforementioned barriers can be overcome by the application of semiconductor technologies towards biomolecular diagnostic. The fabrication and integration of biomolecular sensors and actuators with electronic circuits in CMOS technologies, such as biochip, lab-on-chip, and microfluidics, have shown huge potential for the future of low-cost miniaturised point-of-care biomolecular diagnostic tools. The convergence of biomolecular sciences and semiconductor technologies will play a vital role for the future of precision medicine and health care. This plenary talk will give an overview of recent research, development, trends and challenges of semiconductor technologies for biomolecular diagnostic towards the future of precision medicine and personalised health care.
Biography

Apinunt Thanachayanont currently holds the position of Professor at the Department of Electronic Engineering, Faculty of Engineering, King Mongkut’s Institute of Technology Ladkrabang. He was the recipient of the royal Thai government scholarship to study in the UK during 1990-1999. He graduated with a 1st-class Honours M.Eng. Degree in 1995 and Ph.D. degree in 1999 both in Electrical and Electronic Engineering from Imperial College London, England. Since 1999, he has been with the Department of Electronic Engineering, Faculty of Engineering, King Mongkut’s Institute of Technology Ladkrabang.

He is currently the leader of the Pervasive Integrated Circuits and Systems on Chip (PiCASSO©) research group that researches and develops low-voltage low-power analog, mixed-signal and RF integrated circuits and systems for wireless telemetry, biomedical and biosensor applications. He is also a co-founder of Silicon Craft Technology Co. Ltd.; a fabless IC design company that excels in low-power analog and mixed-signal IC products.
Tutorial 1

14:00~15:30 Monday, June 24, 2019
Room: HALLA Room A

Assoc. Prof. Charturong Tuntibundhit
Thammasat University, Thailand

Artificial Intelligence for Medical Screening and Diagnosis: Research and Innovation

Abstract

Artificial Intelligence (AI) has been applied to a lot of medical applications especially for disease screening and diagnosis. One objective is to support medical staffs especially in developing countries, where medical experts and resources are very limited. As a result, patients can have medical screening and can receive medical treatment on time reducing disability and loss of life. Our research group, emphasized in AI in medicine, have collaborated on interdisciplinary research and development of medical innovations using resources available in Thailand. Our ultimate goal is to facilitate physicians, public health officers, and people in medical screening and diagnosis, focusing on the major diseases, e.g., stroke, Alzheimer’s, learning disability, diabetic retinopathy, aged-macular degeneration, glaucoma, cytomegalovirus retinitis, cervical cancer, skin cancer, lung cancer, and tuberculosis that are affecting majority people around the world. Based on our continuous dedication for more than 10 years, we have developed a lot of innovative medical products with world class quality. These innovations have high impacts resulting in the better quality of life of Thai people. Our research work and innovations have been perceived as one of the best research groups in Thailand as shown by awards received nationally and internationally. Moreover, our research group is only one that won the Grand Prize in International Exhibition of Inventions of Geneva, Switzerland recognized as the world’s largest exhibition of inventions. Finally, our research work and innovations have been published in the
world leading international journals.

**Biography**

CHARTURONG TANTIBUNDHIT received the B.E. degree in electrical engineering from Kasetsart University, Bangkok, Thailand, in 1996, and the M.S. degree in information science and Ph.D. degree in electrical engineering from the University of Pittsburgh, Pittsburgh, PA, USA, in 2001 and 2006, respectively. Since 2006, he has been with Thammasat University, Thailand, where he is currently an Associate Professor with the Department of Electrical and Computer Engineering and the Head of the Speech and Language Technology Cluster, Center of Excellence in Intelligence Informatics, Speech and Language Technology, and Service Innovation. From 2007 to 2008, he was a Post-Doctoral Researcher with the Signal Processing and Speech Communication Laboratory, Graz University of Technology, Graz, Austria. He was an IEEE ICASSP Student Paper Contest Winner in 2006. He led a team to win the Grand Prix of the 45th International Exhibition of Inventions of Geneva in 2017. His research interests include handcrafted machine learning and deep learning in medicine, biomedical signal processing, and speech processing.
Neural network and its variants

Abstract

Recent developments of machine learning bring innovations to various scientific areas. Especially, the developments of the computer vision area brought by the convolutional neural networks is remarkable and neural networks are becoming one of the basic techniques for computer vision. Neural network itself is a classic machine learning model and it is not difficult to understand the its basic property. In this talk, I will explain the foundation of the neural network with its approximation property. Then I will survey variants of the neural network including convolutional neural network and recurrent neural network.

Biography

Shun Kataoka is an associate professor at Otaru University of Commerce (OUC). He received the doctorial degree (information science) from Tohoku University in 2014. He worked at Tohoku University as an assistant professor for 4 years before moving to OUC in 2018. His research interests are statistical machine learning, computer vision, complex networks, and statistical mechanics.
Lightweight Benchmark Suite for Neural Networks

Abstract

This tutorial presents a lightweight benchmark suite for neural networks. The advance of computing systems and explosive growth of data production have sparked the unprecedentedly rapid evolution of machine learning. Neural networks and deep learning provide state-of-the-art algorithms designed to recognize patterns. Neural network structures resemble human brains by organizing data into neurons and synapses. The computation of neural networks under the hood is represented as repeated matrix or vector arithmetic on conventional Von Neumann architectures. Recent neural networks tend to form deep networks by increasing the volume of layers and dataset to enhance accuracy. However, such a trend imposes modeling and validation challenges on the analysis and development of accelerator hardware, since it requires increasingly longer execution time to process the sizable data and operation count of a neural network. In this tutorial, we present and demonstrate a novel lightweight benchmark suite for neural networks to tackle the aforementioned engineering challenges.

Biography

William J. Song is currently an Assistant Professor with the School of Electrical and Electronic Engineering, Yonsei University in Seoul, South Korea. He earned his Ph.D. degree in Electrical and Computer Engineering from Georgia Tech, Atlanta, GA, and B.S. degree in Electrical and Electronic Engineering from Yonsei University, Seoul, South Korea. His research focus lies in the challenges of heterogeneous architectures and processing near data for neural networks and big data problems. His interests also include solutions to power, thermal, and reliability issues in
many-core microarchitectures and 3D-integrated packages. Prior to joining the faculty of Yonsei University, he was a senior engineer at Intel in Santa Clara, CA. He was a graduate research intern at Qualcomm, San Diego, CA (2015 summer), IBM T.J. Watson Research Center, Yorktown Heights, NY (2014 summer and fall), AMD Research, Bellevue, WA (2013 summer), and Sandia National Labs, Albuquerque, NM (2012, 2011, and 2010 summers). He received Distinguished Faculty Award for Teaching Excellence from Yonsei University in 2018. He was a recipient of IBM/SRC graduate fellowship from 2012 to 2015. He received the Best Student Paper Award at IEEE International Reliability Physics Symposium (IRPS) in 2015 and Best in Session Award at SRC TECHCON in 2014.
Technical Program

Oral Session

SS-01 Standardization of Technologies for Semiconductor Devices

09:00~10:15 Monday, June 24, 2019

Room: HALLA Room A
Chair: Wonjong Kim (ETRI, Korea)

01 Modified Diode Equations for Light-Emitting Diodes Considering Radiative and Nonradiative Currents
Dong-Soo Shin¹, Jong-In Shim¹, Sang-Geun Lee², and Hyundon Jung³
¹Hanyang University, Korea, ²Sungkyunkwan University, Korea, ³EtaMax Co., Korea

02 Measurement Methods of the Internal Quantum Efficiency of Light-Emitting Diodes
Jong-In Shim¹, Dong-Soo Shin¹, Sang-Geun Lee², and Hyundon Jung³
¹Hanyang University, Korea, ²Sungkyunkwan University, Korea, ³EtaMax Co., Korea

03 Fully flexible and transparent piezoelectric touch sensors based on ZnO nanowires and BaTiO₃ capping layer
Churl Seung Lee¹ and JoonHo Bae²
¹Korea Electronics Technology Institute, Korea, ²Gachon University, Korea

04 Novel thermal measurement of wafer warpage
Habin Yoo, Sangwon Lee, and Sungdong Kim
Seoul National University of Science and Technology, Korea

05 Market and Industry Trends of Fan-Out Packaging
Seung-Kwang Hong and Kee-Won Kwon
Sungkyunkwan University, Korea

OS-01 Artificial Intelligence I

09:00~10:15 Monday, June 24, 2019

Room: HALLA Room B
Chair: Atsushi Ohta (Aichi Prefectural University, Japan)

01 Rescue System using Smoke Blocking Robots for Building Fires
Nagaoka Hiroki and Harashima Katsumi
Osaka Institute of Technology, Japan
02 Elimination of turbulence in platooning of self-driving vehicles by a non-self driving vehicle
Kosugi Takahiro, Tanii Ryosuke, and Harashima Katsumi
Osaka Institute of Technology, Japan

03 Detecting Human Movement during Vital Sign Measurement using Heterogeneous Sensors
Young-Jin Park and Hui-Sup Cho
DGIST, Korea

04 Two-Step Filtering for Rules without Overlapping Conditions
Kwangsoo Kim, Bong Wan Kim, Sunwhan Lim, and Dong-Hwan Park
ETRI, Korea

05 Characteristic Similarity Using Classical CNN Model
Mery Diana, Juntaro Chikama, Motoki Amagasaki, Masahiro Iida, and Morihiro Kuga
Kumamoto University, Japan

01 Phase-Circuit Design Using a Single Equality-Constrained Linear-Fractional Programming
Tian-Bo Deng
Toho University, Japan

02 Bandpass Filter with Wide Harmonics Suppression using Different Resonator Structure and Open Stubs
C. Teekha1, R. Lerdwanittip1, A. Namsang1, P. Jitjing2, and P. Jantree3
1Civil Aviation Training Center, Thailand, 2RMUT Thanyaburi, Thailand, 3RMUT Suvarnabhumi, Thailand

03 A UHF Broadband Low-Noise Amplifier for Active Digital TV Antenna
Ittaboon Watcharasatienpan and Panuwat Janpugdee
Chulalongkorn University, Thailand

04 Crosstalk Mitigation in Titanium-Diffused Lithium Niobate Parallel Optical Waveguides
Jiraphat Chunlen and Tuptim Angkaew
Chulalongkorn University Bangkok, Thailand
05 Data Transmission of Zigbee over Fiber
Vitawat Sittakul¹, Sarinya Pasakawee², and Piya Kovintavewat³
¹King Mongkut's University of Technology North Bangkok, Thailand,
²National Institute of Metrology, Thailand, ³Faculty Nakhon Pathom Rajabhat University, Thailand

OS-03 Computer Systems & Applications I
09:00–10:15 Monday, June 24, 2019
Room: Yeongsil Room
Chair: Takahiro Sasaki (Aichi Prefectural University, Japan)

01 Adaptive Cell Allocation Cache using Phase Detection Technique
Takahiro SASAKI¹ and Masato KITO²
¹Aichi Prefectural University, Japan, ²Mie-University, Japan

02 Development of Fisheries and Marine skills Mobile learning system and Evaluation based on ARCS motivation model
Tsukasa Kato¹,², Itaru Nagayama¹, and Shiro Tamaki¹
¹University of the Ryukyus, Japan, ²Okinawa Fisheries High School, Japan

03 Efficient Implementation of Strassen’s Algorithm for Memory Allocation using AVX Intrinsic on Multi-core Architecture
Nwe Zin Oo and Panyayot Chaikan
Prince of Songkla University, Thailand

04 A Simple example of Refactoring codes with modifying Class Diagram using an Eclipse plug-in
Hiroshi Ishikawa
Niigata University of International and Information Studies, Japan

05 Multi-node Power/Performance Modeling for HPC System
Sangwoo Han, Tae Yang Jeong, and Eui-Young Chung
Yonsei University, Korea

OS-04 Security I
09:00–10:15 Monday, June 24, 2019
Room: Eorimok Room
Chair: Won Woo Ro (Yonsei University, Korea)

01 High-Fidelity Reversible Data Hiding Using Block Extension Strategy
Rajeev Kumar¹,², Dae-So Kim¹, Se-Hyeon Lim², and Ki-Hyun Jung²
¹Wookyung Information Technology, Korea, ²Kyungil University, Korea
Analysis of Entropy Estimator of True Random Number Generation Using Beta Source
Seongmo Park¹, B.G. Choi¹, T.W. Kang¹, K.W. Park¹, J.J. Lee¹, S.W. Kang¹, and J.B. Kim²
¹ETRI, Korea, ²KAERI, Korea

Hash-chain based key management system suitable for re-distribution situation on contents delivery services
Yuji Suga
Internet Initiative Japan Inc., Japan

Measuring the Information Security Awareness Level of Government Employees Through Phishing Assessment
Mukhammad Gufron Ikhsan and Kalamullah Ramli
University of Indonesia, Indonesia

Anisa Dewi Prajanti and Kalamullah Ramli
University of Indonesia, Indonesia

Artificial Intelligence II
14:00~15:30 Monday, June 24, 2019
Room: HALLA Room B
Chair: Atsushi Ohta (Aichi Prefectural University, Japan)

A Wearable Walking Support System to provide safe direction for the Blind
Kataoka Hiroto and Harashima Katsumi
Osaka Institute of Technology, Japan

Comparative Study of Prediction Models on High School Student Performance in Mathematics
Phauk Sokkhey and Takeo Okazaki
University of the Ryukyu, Japan

Incremental Feature Extraction Based on Gaussian Maximum Likelihood
Seongyoun Woo and Chulhee Lee
Yonsei University, Korea

A Study of a Parallel Architecture for Accelerating Batch-Learning Self-Organizing Map by using Dedicated Hardware
Ryota Miyauchi, Akira Kojima, Hideyuki Kawabata, and Tetsuo Hironaka
Hiroshima City University, Japan
### 05 Human-skeleton Based Fall-Detection Method using LSTM for Manufacturing Industries
Sungil Jeong¹, Sungjoo Kang², and Ingeol Chun¹²
¹University of Science and Technology, Korea, ²ETRI, Korea

### 06 Improving Thai Herb Image Classification using Convolutional Neural Networks with Boost up Features
Arnon Visavakitcharoen, San Ratanasanya and Jumpol Polvichai
King Mongkut’s University of Technology Thonburi, Thailand

### OS-06 Analog Circuits I

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<th>Time</th>
<th>Session</th>
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<td>14:00~15:30</td>
<td>Very Low Frequency Lowpass Filter with Finite Transmission Zeros Realized by Using Extended Symmetrical Impedance Scaling Circuit</td>
</tr>
<tr>
<td></td>
<td>Tatsuya FUJII¹, Fujihiko MATSUMOTO², and Kazuhiro SHOUNO¹²</td>
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<tr>
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<td>¹University of Tsukuba, Japan, ²National Defense Academy of Japan, Japan</td>
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<tr>
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<td>A First-order Complex Filter Realized by Using a Voltage Follower</td>
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<tr>
<td></td>
<td>Tatsuya FUJII, Kohsei ARAKI, and Kazuhiro SHOUNO</td>
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<td></td>
<td>University of Tsukuba, Japan</td>
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<tr>
<td></td>
<td>A novel biquadratic circuit employing only plus current output DVCCs</td>
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<td></td>
<td>Takao Tsukutani¹, Noboru Yabuki², and Yasutomo Kinugasa¹²</td>
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<td>¹Matsue College, Japan, ²Tsuyama College, Japan</td>
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<td>A New Electronically Tunable Analog Comb Filter using the Current-Feedback Operational-Amplifier</td>
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<td>Muhammad Taher Abuelma’atti and Abdullah Yousef Alnafisah</td>
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<td>King Fahd University of Petroleum and Minerals, Saudi Arabia</td>
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<tr>
<td></td>
<td>A Digital Background Calibration Technique Using Ultrasonic Echo Signal for Pipelined SAR ADC</td>
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<td>Nam-Kyu Kim, Hyun-Tae Park, and Ji-Yong Um</td>
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<td>Hannam University, Korea</td>
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<tr>
<td></td>
<td>Filter Tuning Circuit for Band Path Filter with Temperature and Process Independent Characteristics</td>
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<tr>
<td></td>
<td>Ho-Jin Jeon, Dong-Gyu Kim, Sung-Jin Kim, and Kang-Yoon Lee</td>
</tr>
<tr>
<td></td>
<td>Sungkyunkwan University, Korea</td>
</tr>
</tbody>
</table>
01 Low Complexity Design of Slim-HED Video Codec
Kyeongmook Oh and Jaeseok Kim
Yonsei University, Korea

02 Study on properties of geomagnetic field for indoor positioning system
Yoshiki Takanawa and Makio Ishihara
Fukuoka Institute of Technology, Japan

03 Performance Scalability Limit of PARSEC Benchmark on a Many-Core Processor
Won Seob Jeong and Won Woo Ro
Yonsei University, Korea

04 Analysis of SSD Internal DRAM Sensitivity for a Key-Value Store
Yongseok Won, Yoonjin Lee, Won Seob Jeong, and Won Woo Ro
Yonsei University, Korea

05 The Simulation of Queuing Model for Bangkok Rapid Transit Train Ticket System Using Python
Suvit Poomrittigul\textsuperscript{1}, Amorn Koomsubsiri\textsuperscript{1}, Pruk Sasithong\textsuperscript{2,3}, Danunai Deenuch\textsuperscript{2,3}, and Lunchakorn Wuttisittikulki\textsuperscript{2,3}
\textsuperscript{1}Pathumwan Institute of Technology, Thailand, \textsuperscript{2}Smart Wireless Communication Ecosystem Research Group, Thailand, \textsuperscript{3}Chulalongkorn University, Thailand

01 A Comparison of Relic-toolkit and ELiPS Libraries for a Pairing-based Homomorphic Encryption
Tadaki KANENARI\textsuperscript{1}, Yuto TAKAHASHI\textsuperscript{1}, Yuta HASHIMOTO\textsuperscript{1}, Yuta KODERA\textsuperscript{2}, Takuya KUSAKA\textsuperscript{1}, Yasuyuki NOGAMI\textsuperscript{1}, and Toru NAKANISHI\textsuperscript{3}
\textsuperscript{1}Okayama University, Japan, \textsuperscript{2}JSPS Research Fellow and Graduate School of Natural Science and Technology, Japan, \textsuperscript{3}Hiroshima University, Japan
02 Analysis of the fruitless cycle of Pollard’s rho method based attack for solving ECDLP over Barreto-Naehrig curves
Hiromasa Miura, Ken Ikuta, Sho Joichi, Takuya Kusaka, and Yasuyuki Nogami
Okayama University, Japan

03 Updating A Secret Key for MAC Implemented on CAN Using Broadcast Encryption Scheme
Tomoya TATARA, Hiroto OGURA, Yuta KODERA, Takuya KUSAKA, and Yasuyuki NOGAMI
Okayama University, Japan

04 An Implementation and Evaluation of Pairing Library ELiPS for BLS Curve with Several Techniques
Yuto TAKAHASHI, Yuki NANJO, Takuya KUSAKA, Yasuyuki NOGAMI, Tadaki KANENARI, and Tomoya TATARA
Okayama University, Japan

05-09 Image Processing / Image Coding & Analysis I
15:50~17:20 Monday, June 24, 2019
Room: HALLA Room B
Chair: Takafumi Katayama (Tokushima University, Japan)

01 Multi-Input-Multi-Output Interface Video Retrieval Method
Shun Mitsui and Shigeo Wada
Tokyo Denki University, Japan

02 State and Transition Estimation of Traffic Light Motion Picture
Arika Watanabe and Shigeo Wada
Tokyo Denki University, Japan

03 High-Accuracy Distance and Gaze Estimation Method Using Facial Images
Yuta Akimoto and Shigeo Wada
Tokyo Denki University, Japan

04 Improvement of Cross Component Prediction by Multiple Linear Prediction for HEVC
Fumiya Kitawaki1, Tian Song1, Takafumi Katayama1, Xiantao Jiang2, and Takashi Shimamoto1
1The University of Tokushima, Japan, 2Shanghai Maritime University, China

05 Ultra-High Resolution Video Distributed Transcoding System Using Memory-based High-speed Data Distribution Method
Jingang Huh, Yong-Hwan Kim, and Jinwoo Jeong
Korea Electronics Technology Institute (KETI), Korea
06 Bacteria Classification using Image Processing and Deep Learning
Treesukon Treebupachatsakul¹ and Suvit Poomrittigul²
¹King Mongkut’s Institute of Technology Ladkrabang, Thailand,
²Pathumwan Institute of Technology, Thailand

OS-10 Analog Circuits II
15:50~17:20 Monday, June 24, 2019
Room: HALLA Room C
Chair: Kwang-Hyun Baek (Chung-Ang University, Korea)

01 A Design of Small Area Vernier Based TDC with 10 ps resolution for Phase Difference Detection in ADPLL Application
Muhammad Basim, Khuram Shehzad, Arash Hejazi, Deeksha Verma, Muhammad Asif, Qurat ul Ain, Imran Ali, and Kang-Yoon Lee
Sungkyunkwan University, Korea

02 A 2nd Order Discrete-Time Sigma-Delta ADC with Configurable Decimation for Sensor Applications
Khuram Shehzad, Deeksha Verma, Muhammad Riaz Ur Rehman, Muhammad Basim, Sung-Jin Kim, and Kang-Yoon Lee
Sungkyunkwan University, Korea

03 A Modified Current Differencing Buffered Amplifier and Its Application
Surasak Inchan¹ and Ittipong Chaisayun²
¹Muban Chombueng Rajabhat University, Thailand, ²Southeast Asia University, Thailand

04 A 1-V CMOS Low-Power Resistor-Based Temperature Sensor for Human Body Temperature Monitoring
Nutcha Rajit and Apinunt Thanachayanont
King Mongkut’s Institute of Technology Ladkrabang, Thailand

OS-11 Computer Systems & Applications III
15:50~17:20 Monday, June 24, 2019
Room: Yeongsil Room
Chair: Tae Wook Kim (Yonsei University, Korea)

01 Stockham FFT acceleration with Processing-in-Memory
Byoung Jin Kim, Tae Yang Jeong, and Eui-Young Chung
Yonsei University, Korea
02 Exploiting GPU hierarchical TLB in Multi-Application Execution
Hyun Jae Oh, Won Jeon, and Won Woo Ro
Yonsei University, Korea

03 Hierarchical, Compressed STT-MRAM Register File for GPU
Jun Hyun Park and Won Woo Ro
Yonsei University, Korea

04 An Improvement in Fall Detection System by Voting Strategy
Chattriya Jariyavajee, Athicom Faphatanchai, Wiroat Saeheng, Chutichai Tuntithawatchaikul, Booncharoen Sirinaovakul, and Jumpol Polvichai
King Mongkut’s University of Technology Thonburi, Thailand

05 On Reconstructibility of Event Structures for Choreography Realization Problem
Marika Izawa and Toshiyuki Miyamoto
Osaka University, Japan

SS-02 Emerging Technologies in IoT
15:50–17:20 Monday, June 24, 2019
Room: Eorimok Room
Chair: Haejoon Jung (Incheon National University, Korea)

01 Electronic Ink Formulation for Drop-on-Demand (DoD) Inkjet Printing Fabrication Process
Sangkil Kim
Pusan National University, Korea

02 Toward A Power Security in Wireless Power Transmission Systems
Byunghun Lee and Haejoon Jung
Incheon National University, Korea

03 Power Allocation Scheme to Achieve Fair User Data Rates in NOMA Systems
In-Ho Lee
Hankyong National University, Korea

04 Secrecy Enhancement via Randomized Radiation using Uniform Planar Arrays
Byungha You and Haejoon Jung
Incheon National University, Korea
05 Multi-Point Vehicular Positioning via Millimeter-Wave Transmissions
Zezhong Zhang¹, Seung-Woo Ko², Rui Wang³, and Kaibin Huang¹
¹The University of Hong Kong, Hong Kong, ²Korea Maritime and Ocean University, Korea, ³Southern University of Science and Technology, Hong Kong

06 RESTful Web of Things based Interactive Energy Management in Smart Homes
Bhagya Nathali Silva¹, Murad Khan², Kyuchang Lee¹, Yongtak Yoon¹, Diyan Muhammad¹, Jihun Han¹, and Kijun Han¹
¹Kyungpook National University, Korea, ²Sarhad University of Science and Information Technology, Pakistan

05-12 Artificial Intelligence III
10:00~12:00 Tuesday, June 25, 2019
Room: HALLA Room A
Chair: Seokhyun Yoon (Dankook University, Korea)

01 A Study on CNN-Based Berg Balance Scale Analysis for Elderly Persons
Yeonsu Lee¹, Sungjae Yoon², and Wonjong Kim²
¹Hanyang University, Korea, ²ETRI, Korea

02 Thai Comments Sentiment Analysis on Social Networks with Deep Learning Approach
Chayapol Piyaphakdeesakun, Nuttanart Facundes, and Jumpol Polvichai
King Mongkut’s University of Technology Thonburi, Thailand

03 A Machine Learning Approach to Indoor Positioning for Mobile Targets using BLE Signals
Arata Sashida¹, Diop Papa Moussa¹, Morikazu Nakamura¹, and Hideki Kinjo²
¹University of the Ryukus, Japan, ²Okinawa University, Japan

04 A Comparison of feature selection approaches for Breast Cancer Subtype Classification Using Gene Expression Data
KeXin Qiu, DongMug Kang, Minsu Kim, and Seokhyun Yoon
Dankook University, Korea
01 Comparison of spanning mobility patterns on mWSN with grid structure
Yoshihiro Kaneko
Gifu University, Japan

02 Polynomial Time Solvability of Response Property for Sound Acyclic Free Choice Workflow Nets
Atsushi Ohta, Ryosuke Fujii, and Kohkichi Tsuji
Aichi Prefectural University, Japan

03 Contactless Magnetic Braking Control Unit for Small-Scaled Wind Turbines for DC Green House
Koswatta Anupa¹, Alsharif Faramarz², Shiroma Yasushi¹, Kuwae Ken¹, Tamaki Shiro³, and Tamura Junji²
¹University of the Ryukyus, Japan, ²Kitami Institute of Technology, Japan

04 Utilizing Data Mining Techniques to Predicting IT Occupation of Persons with Disabilities in Thailand
Julaluk Watthananon¹ and Pollawat Chintanaporn²
¹Rajamangala University of Technology Thanyaburi, Thailand, ²Portalpolis Co. Ltd., Thailand

05 Deadlock-free Routing of Autonomous Distributed AGV Systems using CSP
Yuichi Namiki and Toshiyuki Miyamoto
Osaka University, Japan

01 Effectiveness and Limitation of Blockchain in Distributed Optimization
Daiki Ogawa, Koichi Kobayashi, and Yuh Yamashita
Hokkaido University, Japan

02 Attack Detection in Control Systems Based on Unknown Input Observers and Control Performance
Kei Isono, Koichi Kobayashi, Ryosuke Adachi, and Yuh Yamashita
Hokkaido University, Japan
03 Performance Analysis of Short-term Electricity Demand Forecasting for Thailand
Kamal Chapagain¹, Somsak Kittipiyakul¹, and Pisut Kultthanavit²
¹Thammasat University, Thailand, ²Pokhara University, Nepal

04 Comparative Analysis of Digital STDP Learning Circuits Designed Using Counter and Shift Register
Jeongyong Sim, Sunghwan Joo, and Seong-Ook Jung
Yonsei University, Korea

05 Integrator-Based Dynamic Subsidy Allocation Ratio for Power Consumption Reduction Problems Modeled by Replicator Dynamics
Takafumi Kanazawa and Yuta Hasegawa
Osaka University, Japan

01 Path Aggregation Method Based on Inter-Vehicular Distance in Hierarchical VANET
Mitsuhiro Nakamura¹, Taku Yamazaki¹,², Ryo Yamamoto¹,³, Takumi Miyoshi¹,², and Yoshiaki Tanaka¹
¹Waseda University, Japan, ²Shibaura Institute of Technology, Japan, ³The University of Electro-Communication, Japan

02 Evaluation of Wireless Ad Hoc Network Protocol for Inter-Vehicle Communication and Consideration of Automatic Terminal Movement Generator
Kiiichi ISHIJIMA, Omuwa OYAKHIRE, and Koichi GYODA
Shibaura Institute of Technology, Japan

03 Performance Study of Repetition-Based Grant-Free Schemes in the mMTC Scenario
Seokjae Moon and Jang-Won Lee
Yonsei University, Korea

04 Location-based Resource Selection in Distributed Mode of C-V2V Systems
Incheol Hwang, Hyejin Kim, Taehyung Kim, and Daesik Hong
Yonsei University, Korea

05–15 Recent Researches in IoT, Ad-hoc, Sensor Networks
10:00~12:00 Tuesday, June 25, 2019
Room: Yeongsil Room
Chair: Haejoon Jung (Incheon National University, Korea)
Implementation of Multi Sensor Network as Air Monitoring Using IoT Applications
Ade Silvia Handayani\textsuperscript{1}, Nyayu Latifah Husni\textsuperscript{1}, Rosmalinda Permatasari\textsuperscript{2}, and Carlos R Sitompul\textsuperscript{1}
\textsuperscript{1}Politeknik Negeri Sriwijaya, Indonesia, \textsuperscript{2}Universitas Tridinanti Palembang, Indonesia

Throughput-aware and Timeliness-aware MAC Scheme for Wireless Passive Sensor Networks
Heewon Seo, Jun Ha, Jin Kyung Park, and Cheon Won Choi
\textit{Dankook University, Korea}

\textbf{OS-16} Power Electronics & Circuits / Semiconductor Devices & Technology I

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10:00\textendash 12:00 & Tuesday, June 25, 2019 \\
\hline
\textbf{Room: Eorimok Room} & \\
Chair: Tae Wook Kim (Yonsei University, Korea) & \\
\end{tabular}

Optimal Sizing of Multiple DGs Based on Reduced Multivariate Polynomial Model
Soo Hyoung Lee
\textit{Mokpo National University, Korea}

An Improved STATCOM based on Hybrid Modular Multilevel Converter
HyunWoo Lee and Jung-Wook Park
\textit{Yonsei University, Korea}

A Design of Adaptive Input Voltage Control Low Power LDO for Battery Charger Application
Jong Wan Jo, Byeong Gi Jang, and Kang-Yoon Lee
\textit{Sungkyunkwan University, Korea}

A Design of Adaptive PWM / PSM Mode DC-DC Boost Converter using Current Sensing
Young-Woo Park, Byeong Gi Jang, and Kang-Yoon Lee
\textit{Sungkyunkwan University, Korea}

Effect of tunneling barrier layer insertion on HfO$_2$-based RRAM
Dong Keun lee\textsuperscript{1}, Min-Hwi Kim\textsuperscript{1}, Suhyun Bang\textsuperscript{1}, Tae-Hyeon Kim\textsuperscript{1}, Yeon-Joon Choi\textsuperscript{1}, Sungjun Kim\textsuperscript{2} Seongjae Cho\textsuperscript{3}, and Byung-Gook Park\textsuperscript{1}
\textsuperscript{1}Seoul National University, Korea, \textsuperscript{2}Chungbuk National University, Korea, \textsuperscript{3}Gachon University, Korea
01 Emotional Speech Synthesis Based on Style Embedded Tacotron2 Framework
Ohsung Kwon¹, Inseon Jang², ChungHyun Ahn², and Hong-Goo Kang¹
¹Yonsei University, Korea, ²ETRI, Korea

02 A Method for Performance Improvement of Noisy Speech Authentication
Jun-ichi Kimura and Shigeo Wada
Tokyo Denki University, Japan

03 Analysis of Speaker Model in Noisy Mixed Speech Environment
Takuya Kuriyama and Shigeo Wada
Tokyo Denki University, Japan

04 Excitation-by-SampleRNN Model for Text-to-Speech
Kyungguen Byun¹, Eunwoo Song², Jinseob Kim², Jae-Min Kim², and Hong-Goo Kang¹
¹Yonsei University, Korea, ²NAVER Corp. Korea

05 Model Order Selection for Wind Noise Reduction in Non-negative Matrix Factorization
Keulbit Kim¹, Jinkyu Lee¹, Jan Skoglund², and Hong-Goo Kang¹
¹Yonsei University, Korea, ²Google Inc., USA

06 Noise Reduction after RIR removal for Speech De-reverberation and De-noising
Sunghoon Jung, Chaehun Im, Chahyeon Eom, and Chungyong Lee
Yonsei University, Korea
02 Effect of Block ACK on Application-Level QoS in IEEE 802.15.6 CSMA/CA Wireless BANs
Takahiro Suzuki
Nihon Fukushi University, Japan

03 Discrete Cuckoo Search Algorithm for MIMO Detection
Donghyeok Jung, Chahyeon Eom, and Chungyong Lee
Yonsei University, Korea

04 Efficient Cross-layer Joint Iterative Decoding Algorithm
Qiang Hu, Zhi Zhang, and Meixiang Zhang
Yangzhou University, China

05 Signal Reconstruction using Second Order Tetration Polynomial
Suphongsa Khetkeeree and Chakit Chansamorn
Mahanakorn University of Technology, Thailand

06 UAV Trajectory Design Based on Reinforcement Learning for Wireless Power Transfer
Sungmo Ku, Sangwon Jung, and Chungyoung Lee
Yonsei University, Korea

OS-19 Computer Vision I
13:30~15:00 Tuesday, June 25, 2019
Room: Yeongsil Room
Chair: Wonjong Kim (ETRI, Korea)

01 Online Adaptation for Siamese-based Visual Object Tracking
Heansung Lee, MyeongAh Cho, Tae-young Chung, and Sangyoun Lee
Yonsei University, Korea

02 Neural Architecture Search using Crow Search Algorithm
Muhammad Abdullah, Mobeen Ahmad, and Dongil Han
Sejong University, Korea

03 Facial Landmark Detection using Gaussian Guided Regression Network
Yongju Lee, Taeoh Kim, Taejae Jeon, Hanbyeol Bae, and Sangyoun Lee
Yonsei University, Korea

04 License Plate Detection and Integral Intensity Projection for Automatic Finding the Vacant of Car Parking Space
P. Choorat, C. Sirikornkarn, and T. Pramoun
Srinakharinwirot University, Thailand
A Study for Selecting the Best One-Stage Detector for Autonomous Driving

Dayoung Chun\textsuperscript{1}, Jiwong Choi\textsuperscript{1}, Hyun Kim\textsuperscript{2}, and Hyuk-Jae Lee\textsuperscript{1}

\textsuperscript{1}Seoul National University, Korea, \textsuperscript{2}Seoul National University of Science and Technology, Korea

\textbf{05-20} Power Electronics & Circuits / Semiconductor Devices & Technology II

13:30~15:00 Tuesday, June 25, 2019

\textbf{Room: Eorimok Room}  
Chair: Tae Wook Kim (Yonsei University, Korea)

01 Circulating Current Suppression of Hybrid Modular Multilevel Converter with Improved Nearest Level Modulation

Yu-Nam Jang and Jung-Wook Park

Yonsei University, Korea

02 A Design of 91.7\% of High Efficiency Charge Pump Using PMOS Body Bias

Kyung-Duk Choi, Sol-Hee In, Seong-Jin Oh, and Kang-Yoon Lee

Sungkyunkwan University, Korea

03 A Design of Ultra-Low Power Low-Dropout Regulator for DSRC system

Su-Jin Oh, Yong-Deok Ahn, Sung-Jin Kim, and Kang-Yoon Lee

Sungkyunkwan University, Korea

04 Design of 96\% High Efficiency Active Rectifier with Gate Charge Recycling Technique

Hyun-Sung Lee, Sang-Woo Lee, Seong-Jin Oh, and Kang-Yoon Lee

Sungkyunkwan University, Korea

05 A Zero Cross-Regulation and Low-Ripple Single-Inductor Multiple-Output Buck Converter with Assist Regulator

Seong-won Joo\textsuperscript{1,2}, Jung-Duk Suh\textsuperscript{1}, and Bai-Sun Kong\textsuperscript{1}

\textsuperscript{1}Sungkyunkwan University, Korea, \textsuperscript{2}Samsung Electronics Co. Ltd., Korea
01 An Approach to Policy Gradient Reinforcement Learning with Multiple Evaluation Metrics
Yoshihiro Yasutake, Chihiro Tagawa, and Sunao Sawada
Kyushu Sangyo University, Japan

02 Enhanced-Gray Level Co-occurrence Matrix Feature Extraction Approaches for Fatty Liver Classification using Ultrasound Images
Moo Jung Seo and Jae Chern Yoo
Sungkyunkwan University, Korea

03 Speeded-Up Robust Feature Descriptor for Endochromoscopy Images
Viet Dung Nguyen and Thanh Hien Truong
Hanoi University of Science and Technology, Vietnam

04 Speech Recognition using Deep Learning
Phoemporn Lakkhanawannakun and Chaluemwut Noyunsan
Rajamangala University of Technology Isan, Khon Kaen campus, Thailand

05 A preliminary study on topical model for multi-domain speech recognition via word embedding vector
Jihye Moon¹, Seung Yun², Damheo Lee¹, and Sanghun Kim¹,²
¹University of Science and Technology, Korea, ²ETRI, Korea

01 Label propagation method based on constraint about triangles for community detection in complex networks
Junhai Luo, Yang Yang, and Lei Ye
School of Information and Communication Engineering University of Electronic Science and Technology, China

02 A Study on Finding a System of Tie-sets with the Minimum Total Number of Elements
Fumitaka IMON and Norihiko SHINOMIYA
Soka University, Japan
03 A Novel Web Questionnaire Based Method for Video Quality Experiment
Shota Eirai¹, Kyoko Yamori¹², Cheng Zhang¹, and Yoshiaki Tanaka¹
¹Waseda University, Japan, ²Asahi University, Japan

04 Visualization and analysis of soil moisture by multipoint measurement for automatic irrigation
Yasushi Shiroma, Hitoshi Afuso, Ken Kuwae, Itaru Nagayama, and Shiro Tamaki
University of the Ryukus, Japan

05 Stock Analysis System for the Stock Exchange of Thailand
Krittiyaporn Mueadkhunthod, Natchaya Khunmood, Sirawit Khittiwichayakul, Watid Phakphisut, and Pornchai Supnithi
King Mongkut’s Institute of Technology Ladkrabang, Thailand

06 A Constraint Optimization Approach for Unit Commitment in Distributed Energy Management Systems
Yuta Inoue and Toshiyuki Miyamoto
Osaka University, Japan

05–23 Communication Signal Processing II
15:20–17:00 Tuesday, June 25, 2019
Room: HALLA Room C
Chair: Jangwon Lee (Yonsei University, Korea)

01 Soft ITI Mitigation Method for Coded 2H2T BPMR Systems
Santi Koonkarnkhai¹, Chanon Warisarn², Nitthita Chirdchoo¹, and Piya Kovintavewat¹
¹Nakhon Pathom Rajabhat University, Thailand, ²King Mongkut’s Institute of Technology Ladkrabang, Thailand

02 Noise Predictive Multi-Track Joint Viterbi Detector Using Infinite Impulse Response Filter in BPMR’s Multi-Track Read Channel
Lin M. M. Myint and Prinya Tantaswadi
Shinawatra University, Thailand

03 Sparsity-Adaptive Compressed Sensing Algorithm for OFDM Sparse Channel Estimation
Sergelren Kwon¹, Hyukyeon Lee², Kyungmook Oh², Minjung Cho², and Jaeseok Kim²
¹Huree University, Mongolia, ²Yonsei University, Korea

04 Beamforming for UAV Communications Under Battery Life Constraint
Jian Zhao¹, Honggu Kang², and Jingon Joung³
¹Nanjing University, China, ²KAIST, Korea, ³Chung-Ang University, Korea
05 Block Averaging Based Leak Detection for Water Pipes Based On Vibration Sensors
Kibeom Kim, Heeseok Oh, and Jihoon Choi
*Korea Aerospace University, Korea*

**OS-24 Computer Vision II**

15:20–17:00 Tuesday, June 25, 2019

Room: Yeongsil Room
Chair: Wonjong Kim (ETRI, Korea)

01 **Apple image classification using Convolutional Neureal Network**
pichate Kunakornvong\(^1\) and Dhiya Mahdi Asriny\(^2\)
\(^1\)Rajamangala University of Technology Thanyaburi, Thailand,
\(^2\)Universitas Islam Indonesia, Indonesia

02 **A Novel Encoding Scheme for Complex Neural Architecture Search**
Mobeen Ahmad, Muhammad Abdullah, and Dongil Han
*Sejong University, Korea*

03 **The Impact of Content and Adversarial Losses on Super-Resolution**
Tung M. Luu and Chang D. Yoo
*KAIST, Korea*

04 **A Study on a Lane Keeping System using CNN for Online Learning of Steering Control from Real Time Images**
Yohei Nose, Akira Kojima, Hideyuki Kawabata, and Tetsuo Hironaka
*Hiroshima City University, Japan*

**OS-25 Emerging Issues on Circuits & Devices**

15:20–17:00 Tuesday, June 25, 2019

Room: Eorimok Room
Chair: Kwang-Hyun Baek (Chung-Ang University, Korea)

01 **Online Task Placement Algorithm for 2D Reconfigurable Device Based on Sophisticated MER Data Structure**
Yansa Li, Tingyu Zhou, Michael C Meyer, and Takahiro Watanabe
*Waseda University, Japan*

02 **Design and Fabrication of Microfluidic Chip for Spectroscopic Measurement**
R. Phatthanakun, Ch. Phiphattanaphiphop, and W. Pummara
*University Avenue Muang District, Thailand*
Optimal Reactive Power Dispatch Issue with STATCOM Considering Meta-heuristic Technique
Tahir Khurshid, Abdul Wadood, Saeid Gholami Farkoush, Chang-Hwan Kim, Muhammad Irfan, and Sang-Bong Rhee
Yeungnam University, Korea

Reliable Latency Extraction with NVSim Revision in Emerging NVM
Wonsuk Seo, Byungkyu Song, and Seong-Ook Jung
Yonsei University, Korea

A Fully Decentralized Approach of Unit Commitment using ADMM and Weighted Gradient Method
Annie Bedrossian and Toshiyuki Miyamoto
Osaka University, Japan

Application of Convolutional Neural Networks to Regenerate Deterministic Test Patterns for BIST
Tsutomu Inamoto and Yoshinobu Higami
Ehime University, Japan

Compact Dictionaries for Reducing Compute Time in Adaptive Diagnosis
Yoshinobu Higami¹, Tomokazu Nakamura¹, Tsutomu Inamoto¹, and Kewal K. Saluja²
¹Ehime University, Japan, ²University of Wisconsin – Madison, USA

Feasibility of Machine Learning Algorithm for Test Partitioning
Senling Wang, Hanan T. Al-Awadhi, Masatoshi Aohagi, Yoshinobu Higami, and Hiroshi Takahashi
Ehime University, Japan

Study of Activity Collecting System for Grazing Cattle
Takahiro NATORI, Natuko ARiyAMA, Satoki TSUICHIHARA, Hiroshi TAKEMURA, and Naoyuki AIKAWA
Tokyo University of Science, Japan

Measurement of the Delivery Environment Using Demo Parcel with Tri-axial Accelerometer
Ohyeon Kwon and Jong-Un Won
Korea Railroad Research Institute, Korea
KINS Simulator performance tests for the first half of the fourth year
DaeSeung Park, Joo-Youl Lee, and Jong-Beom Lee
Korea Hydro & Nuclear Power Co. Ltd., Central Research Institute, Korea

09:00–10:30 Wednesday, June 26, 2019
Room: HALLA Room B
Chair: Suyong Choi (Yonsei University, Korea)

01 Adaptive Step-size Normalised Least Mean Square Algorithm for Spline Adaptive Filtering
Suchada Sitjongsataporn and Worawut Chimpat
Mahanakorn University of Technology, Thailand

02 EXIT Chart Analysis of Serial Window Decoding of SC-LDPC codes
Sirawit Khittiwitchayakul, Watid Phakphisut, and Pornchai Supnithi
King Mongkut’s Institute of Technology Ladkrabang, Thailand

03 The Performance of Neuro-Fuzzy Detection on Nonlinear Magnetic Recording Channels
Rati Wongsathan and Pornchai Supnithi
King Mongkut’s Institute Technology of Ladkrabang, Thailand

04 Performance Evaluation of Cluster Factor Graph-Based Detection on 2-D Interference Channel
Thanomsak Sopon¹, Wannaree Wongtrairat¹, and Pornchai Supnithi²
¹Rajamangala University of Technology Isan, Thailand, ²King Mongkut’s Institute of Technology Ladkrabang, Thailand

05 Joint Antenna Selection and User Scheduling with Antenna Merge for Wideband in Massive MIMO Systems
Gyuyeol Kong, Seonbgae Han, Dongheon Lee, and Sooyong Choi
Yonsei University, Korea

06 CNN-based user selection in MIMO broadcasting channel
Seonbgae Han, Gyuyeol Kong, Dongwook Kim, and Sooyong Choi
Yonsei University, Korea
OS-28 Image Processing / Image Coding & Analysis II

01 Classification of Rice Leaf Diseases Using Deep Convolutional Neural Network
Sayan Tepdang and Kosin Chamnongthai
King Mongkut’s University of Technology Thonburi, Thailand

02 Emergency Exit Sign and Braille Block Detection using Mask R-CNN for Emergency Evacuation System
Seongha Ahn and Yongseok Chi
Dongseo University, Korea

03 Automatic prediction of brix and acidity in stages of ripeness of strawberries using image processing techniques
Wanhun Cho¹, Myunghwan Na¹, Sangkoon Kim², and Wonbae Jeon³
¹Chonnam National University, Korea, ²Mokpo National University, Korea, ³DGIST, Korea

04 An Improved YOLOv3-based Neural Network for De-identification Technology
Ji-hun Won, Dong-hyun Lee, Kyung-min Lee, and Chi-ho Lin
Semyung University, Korea

05 Medical Imaging using Automatic Region of Interest Segmentation for Psoriasis Diagnosis
Datchakorn Tancharoen¹, Patinya Tantawiwat¹, and Piya Kovintavewat²
¹Panyapiwat Institute of Management, Thailand, ²Nakhon Pathom Rajabhat University, Thailand

OS-29 Communication & Network Systems I

01 A Study on Low Level Quantizers for Block Turbo Decoding for Product Codes of Binary Linear Code
Shinichi KAGEYAMA, Ken IKUTA, Takuya KUSAKA, and Yasuyuki NOGAMI
Okayama University, Japan
02 Performance evaluation of Disaster Information Communication System using Message Ferry
Ryoma SATO, Omuwa OYAKHIRE, and Koichi GYODA
Shibaura Institute of Technology, Japan

03 Mitigation of GPS Chirp Jammer Using a Transversal FIR Filter and LMS Algorithm
Sanghyun Kim, Kwansik Park, and Jiwon Seo
Yonsei University, Korea

04 Smartphone Application to Estimate Distances from LTE Base Stations Based on Received Signal Strength Measurements
Seungjae Han, Taewon Kang, and Jiwon Seo
Yonsei University, Korea

05 Franklin Array MIMO Antenna for 5G Applications
Janam Maharjan, Sun-Woong Kim, and Dong-You Choi
Chosun University, Korea

Medical Electronics & Circuits / Sensors & Related Circuits
09:00~12:20 Wednesday, June 26, 2019
Room: Eorimok Room
Chair: Norihiko Shinomiya (Soka University, Japan)

01 Improving the shutter NUC algorithm by changing the shutter position to achieve a small and lightweight system
Won-Seok KANG and Hyun-Bae Kong
LIGNEX1, Korea

02 Development of circatidal rhythm measuring system of Mictyris brevidactylus
Shota Iwamasa, Hotaru Arakaki, Kumi Yasunaga, and Hiroshi Matsuno
Yamaguchi University, Japan

03 Dielectrophoretic corral trap device for single bioparticle immobilization
Tae Joon Kwak, Mohammad Rizwen Ur Rahman, Jörg C. Woehl, and Woo-Jin Chang
University of Wisconsin-Milwaukee, USA

04 An Anodic Current Pulse Modulation Active Charge Balancer for Implantable Electrical Stimulator
Jin-Young Son and Hyouk-Kyu Cha
Seoul National University of Science and Technology, Korea
A Power-Efficient Low-Noise Neural Recording Analog Front-End IC for Implantable Medical Devices
Luat Tran and Hyouk-Kyu Cha
Seoul National University of Science and Technology, Korea

A Charge Balanced Neural Stimulator Using Chopped Anodic Pulse Control
Jin-Young Son and Hyouk-Kyu Cha
Seoul National University of Science and Technology, Korea

Determination of Coffee Rust Infection among Arabica Tree using Image Processing Technology
Joy N. Carpio, Maila R. Angeles, Armil S. Monsura, Maria Joanna M. Cosculla, Nimer Bonjo P. Mendez, Joshua Louise T. Nollora, Miland Pecdasen, Paul Carlo Romie B. Rodrigo, and Riego Jeremy J. Terte
National University (NU), Philippines

Technology Trends in Using ToF-Based Depth Camera
Sang-Gyu Jeon, Jong-Wan Jo, and Kang-Yoon Lee
Sungkyunkwan University, Korea

Enrely: A reliable MLC PCM Architecture based on Data Encoding
Muhammad Imran, Taehyun Kwon, and Joon-Sung Yang
Sungkyunkwan University, Korea

Synthesis of Distributed Control Circuits for Dynamic Scheduling across Multiple Dataflow Graphs
Sayuri Ota Nagisa Ishiura
Kwansei Gakuin University, Japan

Novel Hysteresis Thresholding FPGA Architecture for Accurate Canny Edge Map
Yunseok Jang, Junwon Mun, Yoojun Nam, and Jaeseok Kim
Yonsei University, Korea

High-Pumping Gain Fibonacci Charge Pump Using Charge Transfer Switch
Harim Kim, Choongkeun Lee, and Hongil Yoon
Yonsei University, Korea
05 Single Supply Level Shifter Circuit using body-bias
Yuki TAKEYOSHI and Kimiyoshi USAMI
Shibaura Institute of Technology, Japan

06 Approximate Computing Technique Using Memoization and Simplified Multiplication
Yoshinori ONO and Kimiyoshi USAMI
Shibaura Institute of Technology, Japan

OS-32 RF Circuits
10:50~12:20 Wednesday, June 26, 2019
Room: HALLA Room B
Chair: Suchada Sitjongsataporn (Mahanakorn University of Technology, Thailand)

01 A programmable electronic impedance tuner to improve power capability by using 0.18-um SOI switches for mobile handset application
Taewan Kim, Younghwan Bae, Hyosung Nam, and Junghyun Kim
Hanyang University, Korea

02 0.191 uW Ultra Low Power RC Oscillator for Wake-up receiver of 5.8 GHz Dedicated Short Range Communication Transceiver
Won-Seok Choi, Sung-Jin Kim, and Kang-Yoon Lee
Sungkyunkwan University, Korea

03 A 5.8 GHz Ramping Controlled Class-E Type Power Amplifier for DSRC Application
Jae-Jin Lee, Yasser Mohammadi Qaragoez, Sung Jin Kim, Seong-Jin Oh, and Kang-Yoon Lee
Sungkyunkwan University, Korea

04 Analysis of Wake-Up Receivers of Direct RF Detection and tuned-RF Architecture
Changhwan Kim, Sungyoung Lee, and Tae Wook Kim
Yonsei University, Korea

OS-33 Image Processing / Image Coding & Analysis III
10:50~12:20 Wednesday, June 26, 2019
Room: HALLA Room C
Chair: Ji Hoon Kim (Ewha Womans University, Korea)

01 Defect Detection of Photovoltaic Panel Using Thermal and Color Cameras
Jaeguk Kim¹, Kyudong Sim¹, Sang Hwa Lee², and Jong-II Park¹
¹Hanyang University, ²Seoul National University
02 Zero-Tree Coding for Random Phase Hologram Compression
Jin-Kyum Kim, Young-Ho Seo, and Dong-Wook Kim
Kwangwoon University, Korea

03 Perceptual Image Fusion Technique of RGB and NIR Images
Jaelin Lee, Gyohak Oh, and Byeungwoo Jeon
Sungkyunkwan University, Korea

04 Texture-Enhanced Multi-Exposure Fusion using Texture Decomposition and Cascaded Convolutional Autoencoder
Je-Ho Ryu, Jae-Woo Kim, and Jong-Ok Kim
Korea University, Korea

05-34 Communication & Network Systems II
10:50~12:20 Wednesday, June 26, 2019
Room: Yeongsil Room
Chair: Chungyong Lee (Yonsei University, Korea)

01 Packet Traffic Measurement of IEEE1888 WRITE Procedure between ZigBee Gateway and Storage for Building Energy Management System
Kritsana Sureeya1 and Tanakorn Inthasuth2
Rajamangala University of Technology Sivijaya, Thailand

02 The comparison of position estimation by using Kalman filter and Unscented Kalman filter with linear model system
Natthanarong Nilchan1, Pornchai Supnithi2, and Watid Phakphisut3
King Mongkut’s Institute of Technology Ladkrabang, Thailand

03 Planar 5G Millimeter-wave Polarization Switchable Antenna
Yu-Jen Chi
Tamkang University, Taiwan
01 The comparison of Klobuchar model with GPS TEC model at the low geomagnetic latitude station, Thailand
Napat Tongkasem\textsuperscript{1}, Pornchai Supnithi\textsuperscript{1}, and Watid Phakphisut\textsuperscript{1},
Kornyanat Hozumi\textsuperscript{2}, and Takuya Tsugawa\textsuperscript{3}
\textsuperscript{1}King Mongkut’s Institute of Technology Ladkrabang, Thailand,
\textsuperscript{2}National Institute of Information and Communication Technology, Japan

02 The Improvement of Time-step method for Ionospheric Delay gradient Estimation
Jirapoom Budtho\textsuperscript{1}, Pornchai Supnithi\textsuperscript{1}, and Susumu Saito\textsuperscript{2}
\textsuperscript{1}King Mongkut’s Institute of Technology Ladkrabang, Thailand,
\textsuperscript{2}Electronic Navigation Research Institute, Japan

03 Preliminary results of EPB impact on GBAS performance
Acharaporn Bumrungkit, Watid Phakphisut, and Pornchai Supnithi
King Mongkut’s Institute of Technology Ladkrabang, Thailand

04 Validation of the spread-F probability of IRI-2016 model during high solar activity over the equatorial Chumphon station in Thailand
Phimmasone Thammavongsy\textsuperscript{1}, Pornchai Supnithi\textsuperscript{1}, Watid Phakphisut\textsuperscript{3},
Takuya Tsugawa\textsuperscript{2}, and Kornyanat Hozumi\textsuperscript{2}
\textsuperscript{1}King Mongkut’s Institute of Technology Ladkrabang, Thailand,
\textsuperscript{2}National Institute of Information and Communication Technology, Japan

05 Assessment of GPS-TEC with the IRI-2016 model, the IRI-Plas model and GIM-TEC during low solar activity at KMITL, Thailand
Jumpon Udomchaibanjerd\textsuperscript{1}, Pornchai Supnithi\textsuperscript{1}, Watid Phakphisut\textsuperscript{1},
Kornyanat Hozumi\textsuperscript{2}, and Takuya Tsugawa\textsuperscript{2}
\textsuperscript{1}King Mongkut’s Institute of Technology Ladkrabang, Thailand,
\textsuperscript{2}National Institute of Information and Communications Technology, Japan

06 Customer Recognition and Counting by Cloud Computing
Anand Dersingh, Sunchanan Charanyananda, Apusara Chaiyaprom,
Nuchchada Domsrifah, and Santi Liwsakphaiboont
Assumption University, Thailand
07 A Wireless Personal Safety Monitoring System for Firefighters
Akihisa Yamada1, Wataru Kayano1, Ryosuke Kinoshita1, Shoji Fujiyama1, Yoichiro Tsutsui1, Shuji Seki1, Naohisa Sakamoto1, Shinsuke Harā2, and Isao Shirakawa3
1Morita Holdings Corporation, Japan, 2Osaka City University, Japan, 3University of Hyogo, Japan

08 Automatic Modulation Classification-Based Communication-Like Jamming Strategy
Kwang-Yul Kim and Yoan Shin
Soongsil University, Korea

09 Data Hiding in Documents
Se-Hyeon Lim1, Sang-Ho Shin2, Rajeev Kumar1,3, and Ki-Hyun Jung1
1Kyungil University, Korea, 2Gyeongju Smart Media Center, Korea, 3Wookyung Information Technology, Korea

10 Capacity Enhancement of Asymmetric Multi-Level Cell (MLC) NAND Flash Memory using Write Voltage Optimization
Chatuporn Duangthong, Watid Phakphisut, and Pornchai Supnithi
King Mongkut’s Institute of Technology Ladkrabang, Thailand

11 Development of Integrated System of Divided Prediction Results for Disease Classification
Hyunjun Woo and Dongil Han
Sejong University, Korea

12 Wideband Low Noise Amplifier for TVWS Application
Zeqing Bai, SungJin Kim, and Kang-Yoon Lee
Sungkyunkwan University, Korea

13 Low Power 10-BIT 1MS/s Asynchronous SAR ADC for RSSI Applications
Deeksha Verma, Khuram Shehzad, Qurat ul Ain, Muhammad Basim, Sung-Jin Kim, and Kang-Yoon Lee
Sungkyunkwan University, Korea

14 Simple Coding Method with Single-Reader Two-Track Reading (SRTR) in Bit-Patterned Media Recording (BPMR) Systems
Siranya Pomsanam1, Chanon Warisarn1, Wiparat Busyatras2, Lin. M. M. Myint3, Santi Koonkarnkhai4, and Piya Kovintawewat4
1KMITL, Thailand, 2RMUTT, Thailand, 3SIU, Thailand, 4NPRU, Thailand
15 Learning Polar Codes using Python Program with Graphical User Interface
Htain Lynn Aung1,2, Tay Zar Bhone Maung1,2, Pruk Sasithong1,2, Teesid Sreprasurt1,2, Sanika Wijayasekara1,2, Manus Pengnoo1,2, Lunchakorn Wuttisittikulkij1,2, Watid Phakphisut3, Chairat Phongphhanphance1, Ambar Bajpai4, Muhammad Saadi5, and Pisit Vanichchanunt6
1Smart Wireless Communication Ecosystem Research Group, Thailand, 2Chulalongkorn University, Thailand, 3King Mongkut’s Institute of Technology Ladkrabang, Thailand, 4Indore Institute of Science and Technology, India, 5University of Central Punjab Lahore, Pakistan, 6King Mongkut’s University of Technology North, Thailand

16 Design of Virtual Antenna Array for Direction of Arrival Estimation Using Real Antenna Array System
A. A. Yahia and H. M. Elkeamchouchi
Alexandria University, Egypt

17 Transition Shift in Heat-Assisted Magnetic Recording
Warunee Tipcharoen1, Chanon Warisarn1, Lin. M. M. Myint2, Santi Koonkarnkhai3, and piya Kovintavewat3
1KMITL, Thailand, 2SIU, Thailand, 3NPRU, Thailand

18 Scalar quantization of hologram for signal processing
Kyung-Jin Kim, Jin-Kyum Kim, Young-Ho Seo, and Dong-Wook Kim
Kwangwoon University, Korea

**PS-02 Poster Session 2**

15:50~17:20 Monday, June 24, 2019
Room: Lobby
Chair: Won Woo Ro (Yonsei University, Korea)

01 Circuit Transformations Suitable for Three-phase Gm-C Complex Filter
Tatsuya FUJII and Kazuhiro SHOUNO
University of Tsukuba, Japan

02 Assessment of Photovoltaic Generator Capacity based on Allocation of Diesel Power Generation in Stand-alone Microgrid
Kwang Woo Joung1, Jung-Wook Park1, Seung-Mook Baek2, and Hee-Jin Lee3
1Yonsei University, Korea, 2Kongju National University, Korea, 3Kumoh National Institute of Technology, Korea
03 Analysis of Influence of a Dummy Layer in a LTCC based Power Inductor
H. G. Jang¹, D. Y. Jung¹, M. Kim¹, J. Park¹, J.M. Park¹, and Y. H. Lee²
¹ETRI, Korea, ²Y.TECH., Korea

04 Study on fair cost allocation for network wholesale charge among content providers
JinSil Jo¹ and HyunMoon Shin²
¹University of Science and Technology(ETRI campus), Korea, ²ETRI, Korea

05 Estimation of Dielectric Properties of Concrete Using Backward Tracing
Hyunki KIM, Moon-Gi Min, and Kwang-Hyun Lee
KHNP (Korea Hydro & Nuclear Power CO. Ltd.) Central Research Institute, Korea

06 Development of Sleep Monitoring System for Health Management of Disaster Evacuees and Sleep Quality Estimation
Masato ABE, Omuwa OYAKHIRE, and Koichi GYODA
Shibaura Institute of Technology, Japan

07 Reliable cooperative spectrum sensing through multi-bit quantization with presence of multiple primary users in cognitive radio networks
Hurmat Ali Shah¹, Kyung Sup Kwak¹, Masakazu Sengoku², and Shoji Shinoda³
¹Inha University, Korea, ²Niigata University, Japan, ³Chuo University, Japan

08 Efficient Storage Caching for In-Memory MapReduce Frameworks
Hakbeom Jang¹, Jonghyun Bae², Tae Jun Ham², and Jae W. Lee²
¹Sungkyunkwan University, Korea, ²Seoul National University, Korea

09 A Design of High-Efficiency RF-DC Converter for 2.4 GHz Energy Harvesting system
Sol-Hee In, Seong-Jin Oh, and Kang-Yoon Lee
Sungkyunkwan University, Korea

10 Study on Real Time Transmission Technique of Multiple Sensor Data
Hojong Chang¹, Yongho Kim², Byunghun Han¹, Taeyoon Lim³, Hyoung Ho Nam², Youngyi Kim², Woosook Jeon¹, and Gyuseong Cho¹
¹KAIST, Korea, ²CNFrontier, Korea, ³Doohaine co., ltd., Korea, ⁴Sun Healthcare International, Korea
11 Bandwidth-aware Allocations for Big-data Applications
Jaeyoung Jang¹, Sangjin Ha², and Jae W. Lee²
¹Sungkyunkwan University, Korea, ²Seoul National University, Korea

12 Partial-Band Chirp Jamming Scheme for Chirp Spread Spectrum Systems
Kwang-Yul Kim and Yoan Shin
Soongsil University, Korea

13 Methods for Measurement of Shielding Effectiveness in Industrial Facilities
Hyunki Kim, Moon-Gi Min, and Kwang-Hyun Lee
KHNP (Korea Hydro & Nuclear Power CO, Ltd.) Central Research Institute, Korea

14 Optimization of Deep Neural Network for Neuromorphic System
Jae Eun Lee, Chul Jun Lee, Dae Seok Lee, Dong Wook Kim, and Young Ho Seo
Kwangwoon University, Korea

15 Soft-Decision Output Encoding/Decoding Algorithms of a Rate-5/6 CITI Code in Bit-Patterned Magnetic Recording (BPMR) Systems
Chavisa Kanjanakunchorn and Chanon Warisarn
King Mongkut’s Institute of Technology Ladkrabang, Thailand

PS-03 Poster Session 3
10:00~12:00 Tuesday, June 25, 2019
Room: Lobby  
Chair: Jingon Joung (Chung-Ang University, Korea)

01 An Equivalent Circuit of a Complex Prototype Filter Suitable for Its Active Realization Using CFOAs
Tatsuya FUJI and Kazuhiro SHOUNO
University of Tsukuba, Japan

02 Real-Time Monitoring Device for Car Battery with Remote Switching Capability Via Mobile Application
National University (NU), Philippines

03 Exploiting Unified Memory for Training Deep Neural Networks
Hakbeom Jang¹, Jonghyun Bae², and Jae W. Lee²
¹Sungkyunkwan University, Korea, ²Seoul National University, Korea
An Improved OLSR protocol to reduce topology control traffic considering terminal density for audio remote broadcasting
Omuwa Oyakhire and Koichi Gyoda
Shibaura Institute of Technology, Japan

Object movement highlighting technique using a deep-learning based object detector for effective UAV control
Jaewan Choi and Woo-Chan Park
Sejong University, Korea

Optimizing Large-Heap Java Applications on Emerging Near-Far Memory Systems
Jaeyoung Jang¹, Sangjin Ha², and Jae W. Lee³
¹Sungkyunkwan University, Korea, ²Seoul National University, Korea

Comparison of training methods for the binarized neural object detection network
Sungjei Kim, Seong-heum Kim, Youngbae Hwang, and Jinwoo Jeong
KETI, Korea

Detection of Bird’s Nest in Real Time Based on Relation with Electric Pole Using Deep Neural Network
Minjeong Ju and Chang D. Yoo
KAIST, Korea

Performance Analysis of Phase Noise for Universal-Filtered Multicarrier Communication Systems: At 60 GHz Expectation
K. Puntsri¹, E. Khansalee¹, T. Bubpawan¹, R. Chuenchom², and W. Wongtrairat¹
¹Rajamangala University of Technology Isan, Thailand, ²National Institute of Metrology Thailand, Thailand

Development of a CNN-based Expert System using Domain Knowledge
WonJong Kim¹, DongMug Kang¹, SungJae Yoon¹, Hanjin Cho¹, ChulHoo Kim², and Jaemin Byun²
¹ETRI, Korea, ²Hyundai Heavy Industry, Korea

A Study on Probabilistic Line-of-Sight Air-to-Ground Channel Models
Honggu Kang¹, Jingon Joung², and Joonhyuk Kang¹
¹KAIST, Korea, ²Chung-Ang University, Korea

Experimental Performance of Signal Source Localization Based on Distributed DoA Measurements
Hyoungsoo Lim, Kwangjae Lim, Inone Joo, Jung-Bin Kim, and Sang-Uk Lee
ETRI, Korea
13 An IntelligentCMOS Image Sensor with a Deep Learning Algorithm for Smart Internet of Things
Minhyun Jin, Keunyeol Park, and Minkyu Song
Dongguk University, Korea

14 Garbage Box (G-Box) Designing and Monitoring
Nyayu Latifah Husni1, Ade Silvia Handayani1, Firdaus2, Selamet Muslimin1, Niksen Alfarizal1, and Uwais1
1State Polytechnic of Sriwijaya, Indonesia, 2Universitas Sriwijaya, Indonesia

15 Multipurpose IoT Gateway on Edge Framework to Support Big Data Processing
Muhammad Diyan1, Murad Khan2, Bhagya Nathali Silva1, Jihun Han1, Yongtak Yoon1, Kyuchang Lee1, Cao Zhenbo1, and Kijun Han1
1Kyungpook National University, Korea, 2Sarhad University of Science and Information Technology, Pakistan

PS-04 Poster Session 4
13:30~15:00 Tuesday, June 25, 2019
Room: Lobby
Chair: Chungyong Lee (Yonsei University, Korea)

01 Realization of Impedance-scaled Complex Filters Using Reciprocal Elements
Tatsuya FUJII and Kazuhiro SHOUNO
University of Tsukuba, Japan

02 Survey for the Applications in Distributed IoT
Muhammad Shahzad Asif
Paradise Computers, Pakistan

03 Adjustable Template Matching for Pose Mismatches in 2D Orientation and Size without Depth Information
Youngmo Han
Hanyang Cyber University, Korea

04 Image Recognition based on Auto-tuning Template Matching with Depths
Youngmo Han
Hanyang Cyber University, Korea

05 Crack Detection Method on Surface of Tunnel Lining
Jeong Hoon Han, Yong Chae Cho, Ho Gyeng Lee, Hyeon Seok Yang, Woo Jin Jeong, and Young Shik Moon
Hanyang University, Korea
06 Evaluation of MANET Protocol FORP-SOS for Disaster Relief Communication Considering Received Signal Strength
Satoru Inazu, Omuwa OYAKHIIRE, and Koichi Gyoda
Shibaura Institute of Technology, Japan

07 The Document Similarity Index based on the Jaccard Distance for Mail Filtering
Seiya TEMMA, Manabu SUGII, and Hiroshi MATSUNO
Yamaguchi University, Japan

08 Analog Baseband with dual mode for 5.8GHz DSRC Transceiver in ETCS
Sung Jun Cho, Sung-Jin Kim, Kang-Yoon Lee
Sungkyunkwan University, Korea

09 Reducing memory pressure for In-Memory MapReduce Frameworks
Hakbeom Jang1, Jonghyun Bae2, Tae Jun Ham2, and Jae W. Lee2
1Sungkyunkwan University, Korea, 2Seoul National University, Korea

10 Performance Analysis of Convolutional Neural Networks on Manycore Platforms
Jaeyoung Jang1, Yejin Lee2, and Jae W. Lee2
1Sungkyunkwan University, Korea, 2Seoul National University, Korea

11 DStream: Dynamic Memory Resizing for Multi-Streamed SSDs
Sangwoo Lim1,2 and Dongkun Shin1
1Sungkyunkwan University, Korea, 2Samsung Electronics Co., Korea

12 A High Sensitive Low Input Voltage Level Voltage Booster for Energy Harvesting Applications
Sungkyunkwan University, Korea

13 A Fast Intra Mode Decision Based on Accuracy of Rate Distortion Model for AV1 Intra Encoding
Jinwoo Jeong, Ganzorig Gankhuyag, and Yong-Hwan Kim
KETI, Korea

14 An Experimental Instrument for Distance Sensing of a Moving Vehicle with Frequency Control of 2.4GHz Doppler Radar
Min-Hwan Ok, Suyong Choi, and Kwan-Sup Lee
NTIRC KRRI, Korea
15 **Beam-Steering Antenna with Variable Beamwidth Using Rotman Lens**
Soon-Soo Oh¹, Gi-Tae Hwang¹, Dong-Woo Kim¹, Hyun-Chel Roh¹, Jae-Beom Jin¹, In-Ryeol Kim¹, and Sang-Jin Oh⁲
¹Chosun University, Korea, ²CtoCTech, Inc., Korea

16 **MUSIC-Based Estimation of Beamforming Weights for Distributed Beamforming in a Wireless Power Transfer System**
Tae-Rae Roh, Gil-Mo Kang, and Oh-Soon Shin
Soongsil University, Korea

**PS-05 Poster Session 5**

15:20~17:00 Tuesday, June 25, 2019
Room: Lobby
Chair: William Jinho Song (Yonsei University, Korea)

01 **High efficient 35 W, 12-to-5 V DC/DC converter using ceramic based multi-layer circuit technologies**
Dong Yun Jung¹, Hyun Gyu Jang¹, Minki Kim¹, Jong Moon Park¹, and Yong Ha Lee²
¹Electronics Telecommunications Research Institute, Korea, ²Y.TECH Inc., Korea

02 **Implementation of a LoRaWAN protocol processing module on an embedded device using Secure Element**
YongSung Jeon and Yousung Kang
ETRI, Korea

03 **Analysis and Compensation of a Complex Filter Realized by Using CCII’s with Voltage Gain Error and Current Gain Error**
Tatsuya FUJII and Kazuhiro SHOUNO
University of Tsukuba, Japan

04 **Design of a Switched-Capacitor DC-DC Converter with a Multiple Up/Down Ratio**
Youngju Park, Jonghyun Kim, Kihyun Kim, Kilsoo Seo, Minseob Shim, and Kyoungho Lee
KERI, Korea

05 **77~97 GHz LNA MMIC with 1 dB-Gain Flatness Using Short-Circuited Capacitor**
Woojin Chang, Seong-il Kim, Jong-Min Lee, Sang-Heung Lee, and Jong-Won Lim
ETRI, Korea
06 Experimental characterization process of DC-offset performance for Multiple CW Doppler Radar
You Jin Kim and Dong Kyoo Kim
ETRI, Korea

07 Short Convolutional Neural Network and MFCCs for Accurate Speaker Recognition Systems
Pham Xuan Trung and Chang D. Yoo
KAIST, Korea

08 Proposal for improvement MANET protocol AODV-SOS for emergency communication
Koya KASAMA, Omuwa OYAKHIRE, and Koichi GYODA
Shibaura Institute of Technology, Japan

09 Emotion Recognition Using Physiological Signals: A Review
Muhammad Zubair\textsuperscript{1} and Yoon Changwoo\textsuperscript{2}
\textsuperscript{1}University of Science and Technology, Korea, \textsuperscript{2}Electronics and Telecommunication Research Institute, Korea

10 VR Image Watermarking by Using Deep Learning
Won-Jun Moon, Young-Ho Seo, and Dong-Wook Kim
Kwangwoon University, Korea

11 A Lightweight YOLOv2 Object Detector Using a Dilated Convolution
Tuan Nghia Nguyen\textsuperscript{1}, Xuan Truong Nguyen\textsuperscript{1}, Hyun Kim\textsuperscript{2}, and Hyuk-Jae Lee\textsuperscript{1}
\textsuperscript{1}Seoul National University, Korea, \textsuperscript{2}Seoul National University of Science and Technology, Korea

12 Photoplethysmography-based biometric authentication using singular value decomposition and deep learning
Sun woo Lee\textsuperscript{1}, Duk Kyun Woo\textsuperscript{2}, and Pyeong Soo Mah\textsuperscript{1,2}
\textsuperscript{1}UST, Korea, \textsuperscript{2}ETRI, Korea

13 Interference Pattern Generation by using Deep Learning based on GAN
Ji-Won Kang, Jae-Eun Lee, Yoon-Hyuk Lee, Dong-Wook Kim, and Young-Ho Seo
Kwangwoon University, Korea

14 An Analysis on the Interference Effect by Panel Orientation of Beamforming Antenna
Choi Sung Woog and Chong Young Jun
ETRI, Korea
15 Industry Trends Analysis of Drone
Sang-Geun Lee¹, Se-Hwan Park², Jong-Yun Kim³, and Seong-Tae Hong¹
¹Sangmyung University, Korea, ²ENF Co. Ltd., Korea, ³Kyungdong University, Korea

16 Wi-Fi system in shopping street utilizing attributes of customers for providing information of their interest
Shohei Nagasawa, Daiki Kawaguchi, and Hiroshi Matsuno
Yamaguchi University, Japan

17 100 MHz Low-Power Modulator/Demodulator for Signal Isolation of SiC Gate Driver IC
Minseob Shim, Kyoungho Lee, Jonghyun Kim, Kilsoo Seo, Youngju Park, and Kihyun Kim
Korea Electrotechnology Research Institute, Korea
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About Jeju

Udo Maritime Park

At the far east of Jejudo Island, located 3.8km northeast from Seongsanpo Port, is Udo Island, which got its name because it looks like a cow lying down or a cow with its head up. If you see it from Jongdal-ri, Gujwa-eup, Bukjeju-gun, you can see an island which looks like a cow’s body, from head to tail. With its unique shape, you can tell that it is Udo Island at a glance. Udo Island is a blessed tourist site with natural environments such as plain rich soil, diverse fishing grounds, and the 8 Scenic Sights of Udo Island. Above all, you can experience Jejudo Island’s unique and traditional culture such as female divers, Stonewall Walkway, and stone tombs, making you feel like you’re in a smaller version of Jejudo Island.

Saryeoni Forest Path

Saryeoni Forest Path is a forest walking trail that starts from Bijarim-ro and goes through Mulchat Oreum Volcanic Cone and Saryeoni Oreum Volcanic Cone. Its starting point is located at National Road No. 1112, which is thick with Japanese cedars. A variety of species of trees grow in the forest, such as Konara Oak, Red-Leaved Hornbeam, Japanese Snowbell, Hinoki Cypress, and Japanese cedar and average altitude is 550m. It is one of the hidden 31 views of Jeju-si. It is popular among tourists who love hiking, because the nature of the forest hasn’t been tampered with.
**Woljeong-ri Beach**

Well known for its beautiful scenery, the white sands and emerald waters, Jeju Woljeongri Beach has a road filled with tea houses and coffee shops. A great stopover during your cruise through Jejudo Island, and one of few places to enjoy an exotic view.

**Jeju Dongmun Traditional Market**

This is Jeju Island’s largest and oldest permanent market. A street market, night market, traditional market, and seafood market are all combined in one place, and there are many places where you can eat and shop, so it is popular with tourists.
Jeju Horse Riding Park

Jeju Horse Riding Park is the new premium in horseback riding, sports, and leisure. This membership-based equestrian center is the largest of its kind in Korea, and offers independent horseback riding, trekking, and International Endurance Competitions with Halla horses that have inherited the natural grasslands of Jeju and the essence of Hallasan Mountain. It has the only outdoors nighttime horseback riding course in Korea, and dedicated expert instructors that are willing to treat all who enjoy horseback riding or have a desire to learn with utmost respect. “Enjoy racing along Halla horses, the treasures of Jeju that run with you.”
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