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On behalf of the Organizing Committee, we would like to take this opportunity to express our excitement at hosting ICUFN 2021 online and in Jeju Island, Korea on August 2021. ICUFN 2021 is organized by KICS and technically co-sponsored by IEEE Communications Society (ComSoC) and IEICE Communications Society. With 12 years of history, the ICUFN conference has served as a premier international forum to provide a great opportunity for exchanging the state-of-the-art research advances in ubiquitous and future communications & network technologies and expanding the research community.

We would like to welcome you to Jeju Island that is famous for its mild oceanic climate throughout the year with the smallest annual temperature range in the country. Jeju Island is the largest island in Korea, located in the Jeju Province, Jeju Special Self-Governing Province, and was formed by the eruption of an underwater volcano approximately 2 million years ago. It contains a natural world heritage site, the Jeju Volcanic Island and Lava Tubes. The island belongs to the temperate climate, it has a moderate climate, and even in winter, the temperature rarely falls below 0°C. The island is a popular holiday destination and a sizable portion of the economy relies on tourism and economic activity from its civil/naval base.

We have prepared an exciting program for you in ICUFN 2021. Distinguished keynote speeches and tutorials on hot topics will also be delivered by highly prominent experts. We would like to express our sincere gratitude to all committee members and referees who made tremendous contributions to this event. In particular, our special thanks go to Technical Program Committee Chairs, Professors Dongkyun Kim, Xin WANG, Sang-Chul Kim, Suguru Kameda, Kun Yang, Lingyang Song, Periklis Chatzimisios, and all TPC members for their great efforts in preparing the technical program. Special thanks are extended to all workshop organizers for preparing excellent workshops. We do hope that you will take this unique opportunity to attend the technical and workshop sessions, meet the authors, and foster greater collaboration with other researchers. The Organizing Committee put a lot of effort to make this conference greatly successful and enjoyable. In addition, if you have extra time, please do not miss the chance to take a look around Jeju Island.

We look forward to seeing you at ICUFN 2021 in Jeju Island or online! We also wish your active participation and support in the future event!

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Message from Technical Program Committee Chairs

We are pleased to welcome you all to Jeju Island, Korea, from August 17 (Tue.) to 20 (Fri.), 2021, at the 12th International Conference on Ubiquitous and Future Networks (ICUFN). Since 2009, ICUFN has addressed all aspects of computing, networking, communications, and their convergence. Similar to the previous successful history of ICUFN, this year, we have also a successful conference covering various topics such as the integration of Artificial Intelligence, Machine Learning, and Deep Learning, with the ubiquitous and future network technologies. Furthermore, the ubiquitous and future networks offer multi-services, multimedia services convergence, mobility, service ubiquity, context awareness, fixed-mobile convergence, enhanced quality of service & experience, variable connectivity, spontaneous and heterogeneous networking, autonomic networking, edge and cloud computing, and other relevant services.

In ICUFN 2021, we have received many submissions electronically from 10 countries worldwide. A rigorous review process has followed in which all papers received three or more independent reviews. The accepted technical papers were organized into oral, workshops, tutorial sessions. Each oral session will lead by session chairs from around the globe. Similarly, the workshops focus on the latest trends and new results in wireless and wired networking technologies. The program is intended to provide a broad range of wireless and wired communications network technologies, including cognitive radios, wireless sensor networks, Internet of Things (IoT), broadband wireless communications, future networks, mobile multimedia networking and applications, machine and deep learning, artificial and computational intelligence, and other vital technologies.

Alongside with the contributions of leading and renowned authors from worldwide, we believe that the technical and workshop papers' review process, management of sessions, and other relevant programs were made possible by the dedication of technical program committee members. We are indebted to all the TPC members for their active participation and processing of the review process in a timely manner. We would also like to thank our sponsors, KICS, IEEE Communications Society, IEICE Communications Society, Springer, ETRI, Samsung, KT, and SK Telecom, for their kind and valuable support in this successful event. Finally, we extend our sincere thanks to the Organizing Committee Chairs, Prof. Seong-Ho Jeong, Prof. Takeo Fujii, Prof. Mislav Grgic, Prof. Zary Segall, and Prof. Zdenek Becvar, for their continued support and guidance. We hope that all of you will enjoy the splendid program of ICUFN 2021, as well as the beautiful scenery and charm of Jeju Island.

We look forward to seeing you at ICUFN 2021 in Jeju Island! We also wish your active participation and support in future events.

Dongkyun Kim
Kyungpook National Univ., Korea

Xin WANG
Fudan Univ., China

Sang-Chul Kim
Kookmin Univ., Korea

Suguru Kameda
Tohoku Univ., Japan

Kun Yang
Univ. of Essex, UK

Lingyang Song
Peking Univ. China

Periklis Chatzimisios
ATEITHE, Greece

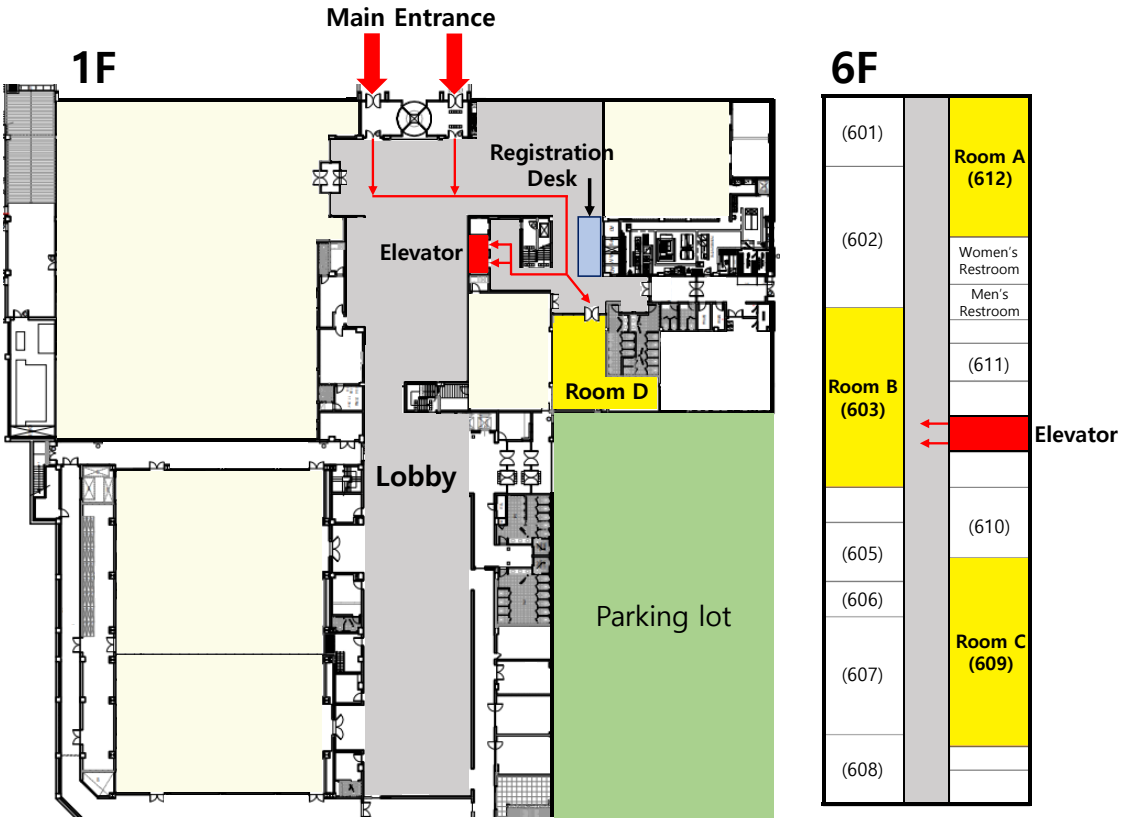
ICUFN 2021 Program at a Glance

August 16, 2021 (Monday)			
17:00 ~ 19:00	ICUFN Committee Meeting (IAC/SC/OC)		
Room	**Room A**	**Room B**	**Room C**
August 17, 2021 (Tuesday)			
13:00 ~ 14:30	Registration		
14:30 ~ 16:00	Workshop 1A SRIoT 2021	Workshop 1B IV 2021	Workshop 1C Energy Data and DDI 2021
16:00 ~ 16:30	Workshop Break		
16:30 ~ 17:30	Tutorial 1: Recent GAN and its Applications (Room D) Prof. Junhee Seok, Korea University, Korea		
August 18, 2021 (Wednesday)			
09:00 ~ 10:30	Session 1A Vehicular Ad-hoc Networks	Session 1B Embedded Systems	Session 1C E-Health & IoT
10:30 ~ 10:40	Session Break		
10:40 ~ 12:10	Session 2A Machine Learning and its Applications	Session 2B AI enabled IoT Networks	Session 2C Edge Computing & Ad-hoc Networks
12:10 ~ 14:00	Lunch Break		
14:00 ~ 15:30	Session 3A Underwater & Optical Communication	Session 3B SDN & Network Virtualization	Session 3C PHY Layer Aspects & Future Network Technologies
15:30 ~ 15:40	Session Break		
15:40 ~ 16:40	Tutorial 2: Advanced AI for Self-driving Robots (Room D) Prof. Jun-Won Choi, Hanyang University, Korea		
16:40 ~ 16:50	Session Break		
16:50 ~ 17:40	Opening Address: Prof. Seong-Ho Jeong (OC Co-Chair) Welcome Address: Prof. Younghan Kim (President of KICS) Keynote Speech 1: Towards Connecting the Remaining 3+ Billion (Room D) Prof. Mohamed-Slim Alouini, IEEE Fellow, KAUST, Saudi Arabia		

August 19, 2021 (Thursday)			
09:00 ~ 10:40	Session 4A Machine Learning & Computational Intelligence	Session 4B Network Security & Intelligent Networks	Session 4C Power Electronics
10:40 ~ 10:50	Session Break		
10:50 ~ 12:30	Session 5A 5G and Beyond Wireless Networks	Session 5B Wireless Sensor Networks	Session 5C QoS, QoE, and Optimization
12:30 ~ 14:50	Lunch Break		
14:50 ~ 15:20	Keynote Speech 2: AI-based Smart Healthcare (Room D) Prof. Tomoaki Ohtsuki, Keio University, Japan		
15:20 ~ 15:30	Session Break		
15:30 ~ 16:30	Tutorial 3: Distributed and Split Deep Learning: Theory and Applications (Room D) Prof. Joongheon Kim, Korea University, Korea		
16:30 ~ 17:00	Session Break		
17:00 ~ 17:30	Keynote Speech 3: Voyages towards 5G Advanced and 6G (Room D) Dr. Jin-Kyu Han, Corporate Vice President, Samsung Electronics, Korea		
17:30 ~ 18:00	Keynote Speech 4: Aeronautical Ad-hoc Networking for the Internet Above the Clouds Just UTOPIA OR A Next-Generation Challenge? (Room D) Prof. Lajos Hanzo, University of Southampton, UK		
August 20, 2021 (Friday)			
09:30 ~ 11:00	Workshop 2A AIEA 2021	Workshop 2B Future Networks and Machine Learning	Workshop 2C Future Networks and Applications
Closing			

CHEJU HALLA UNIVERSITY

Halla Convention Center
(GEUMHO WORLD EDUCATION)



16:50 ~ 17:40, Aug 18, 2021 (Wednesday)

Room: Room D

Keynote Speech 1: Towards Connecting the Remaining 3+ Billion

Speaker: Prof. Mohamed-Slim Alouini, IEEE Fellow, KAUST, Kingdom of Saudi Arabia

Abstract:
It goes without saying that we suffer from severe gaps in global internet connectivity. We tend indeed to forget that we still have about half of the world population (or about 4 billion people) without boroadband connectivity. And it is expected that 5G (in it current initial deployment stages) will further accentuate this connectivity divide. Actually, the Covid 19 pandemic also showed that the connectivity divide is in a way becoming one of the modern faces of inequality, deepening the economic and social unbalances between the 'Haves' and 'Have Nots' in a digital context. To achieve digital inclusiveness, we need to develop and deploy new technological solutions that help connecting the unconnected/under-connected in an affordable fashion. In this context, this talk aims to (i) provide an envisioned picture of 6G, (ii) serve as a research guideline in the beyond 5G era, and (iii) go over the recently proposed solutions to provide high-speed connectivity in under-covered areas in order to serve and contribute to the development of far-flung regions.

Biography
Mohamed-Slim Alouini was born in Tunis, Tunisia. He received the Ph.D. degree in Electrical Engineering from the California Institute of Technology (Caltech) in 1998. He served as a faculty member at the University of Minnesota then in the Texas A&M University at Qatar before joining in 2009 the King Abdullah University of Science and Technology (KAUST) where he is now a Distinguished Professor of Electrical and Computer Engineering. Prof. Alouini is a Fellow of the IEEE and of the OSA. He is currently particularly interested in addressing the technical challenges associated with the uneven distribution, access to, and use of information and communication technologies in far-flung, rural, low-density populations, low-income, and/or hard-to-reach areas.

14:50 ~ 15:20, Aug 19, 2021 (Thursday)

Room: Room D

Keynote Speech 2: AI-based Smart Healthcare

Speaker: Prof. Tomoaki Ohtsuki, Keio University, Japan

Abstract:
With the rapid aging society in developed countries particularly Japan, social costs for nursing care and medical expenses are also rising. Meanwhile, the size of the average family has continued to shrink, which results in the increase of elderly people living alone. Smart healthcare is expected to support the aging society where people can live healthily and peacefully while reducing the costs for support dramatically. To realize such a society, smart technologies are necessary. Now AI is becoming more and more important in smart healthcare as well. In this talk, we will introduce AI-based smart healthcare. We will also introduce some techniques to detect mental diseases.

Biography
Tomoaki Ohtsuki (Otsuki) is currently a Professor at Keio university, Japan. He received the B.E., M.E., and Ph. D. degrees in Electrical Engineering from Keio University, Yokohama, Japan in 1990, 1992, and 1994, respectively. From 1995 to 2005 he was with Science University of Tokyo.
In 2005 he joined Keio University. He is engaged in research on wireless communications, optical communications, signal processing, and information theory. Dr. Ohtsuki is a recipient of the 1997 Inoue Research Award for Young Scientist, the 1997 Hiroshi Ando Memorial Young Engineering Award, Ericsson Young Scientist Award 2000, 2002 Funai Information and Science Award for Young Scientist, IEEE the 1st Asia-Pacific Young

Researcher Award 2001, the 5th International Communication Foundation (ICF) Research Award, 2011 IEEE SPCE Outstanding Service Award, the 27th TELECOM System Technology Award, ETRI Journal's 2012 Best Reviewer Award, and 9th International Conference on Communications and Networking in China 2014 (CHINACOM '14) Best Paper Award. He has published more than 215 journal papers and 420 international conference papers.
He served as Chair of IEEE Communications Society, Signal Processing for Communications and Electronics Technical Committee. He served as a technical editor of the IEEE Wireless Communications Magazine and an editor of Elsevier Physical Communications. He is now serving as an Area Editor of the IEEE Transactions on Vehicular Technology and an editor of the IEEE Communications Surveys and Tutorials. He has served general-co chair and symposium co-chair of many conferences, including IEEE GLOBECOM 2008, SPC, IEEE ICC2011, CTS, IEEE GCOM2012, SPC, IEEE ICC2020, SPC, IEEE SPAWC, and IEEE APWCS. He gave tutorials and keynote speeches at many international conferences including IEEE VTC, IEEE PIMRC, and so on. He was a President of the Communications Society of the IEICE, Japan. He is a fellow of the IEICE, a senior member of the IEEE, and a Distinguished Lecturer of the IEEE Vehicular Technology society.

17:00 ~ 17:30, Aug 19, 2021 (Thursday)

Room: Room D

Keynote Speech 3: Voyages towards 5G Advanced and 6G

Speaker: Dr. Jin-Kyu Han, Corporate Vice President at Samsung Electronics & Heads Standards Research Team at Samsung Research, Korea

Abstract:
5G has been designed considering the extended requirements such as eMBB, URLLC, and mMTC to support various verticals. After completion of the first version of 5G, Rel-15, 3GPP has continued to improve 5G with Rel-16 and Rel-17. Recently, 3GPP RAN hosted a workshop for 5G-advanced, a new marker for 5G evolution. Carriers, vendors, and various industries presented their views on the scope of 5G-advanced in the workshop. 3GPP SA also plans to host another workshop to address the system aspect of 5G-advanced. Moreover, ITU-R started to discuss 6G vision from this year. This talk will introduce what 5G-advanced and 6G will look like and how they will be standardized.

Biography
Jin-Kyu Han is a Corporate Vice President at Samsung Electronics and heads Standards Research Team at Samsung Research. Dr. Han as a standardization expert has actively contributed to shaping the cellular communications standards such as cdma2000, LTE, and 5G since his career began at Samsung in 2003. He has also participated in research activities for next generation communications systems such as 5G mmWave PoC and 6G Vision. He represented Korea at IEC as a member of its SMB (Standardization Management Committee) from 2018 to 2020.

17:30 ~ 18:00, Aug 19, 2021 (Thursday)

Room: Room D

Keynote Speech 4: Aeronautical Ad-hoc Networking for the Internet Above the Clouds Just UTOPIA OR A Next-Generation Challenge?

Speaker: Prof. Lajos Hanzo, University of Southampton, UK

Abstract:
Thanks to the spectacular advances in signal processing and nano-technology, five wireless generations have been conceived over tha past five decades. Indeed, near-capacity operation at an infinitesimally low error-rate has become feasible and flawless multimedia communications is supported in areas of high traffic-density, but how do we fill the huge coverage holes existing across the globe? As a promising system-architecture, an integrated terrestrial, UAV-aided, airplane-assisted as well as satellite-based global coverage-solution will be highlighted to pave the way for seamless next-generation service provision. However, these links exhibit strongly heterogeneous properties, hence requiring different enabling techniques. The joint optimization of the associated conflicting performance metrics of throughput, transmit power, latency, error probability, hand-over probability and link-lifetime poses an extremely challenging problem. Explicitly, sophisticated multi-component system optimization is required for finding the Pareto-front of all optimal solutions, where none of the above-mentioned metric can be improved without degrading at least one of the others..

Biography
Lajos Hanzo is a Fellow of the Royal Academy of Engineering (FREng), FIEEE, FIET and a EURASIP Fellow, Foreign Member of the Hungarian Academy of Science. He holds honorary Doctorates from the University of Edinburgh and the Technical University of Budapest. He co-authored 19 IEEE Press - JohnWiley books and 1900+ research contributions at IEEE Xplore. For further information on his research in progress and associated publications please refer to IEEE Xplore.

16:30 ~ 17:30, Aug 17, 2021 (Tuesday)

Room: Room D

Tutorial 1: Recent GAN and its Applications

Speaker: Prof. Junhee Seok, Korea University, Korea

Abstract:
In this tutorial, I will introduce the recent development of Generative Adversarial Networks (GAN) and its applications over various domains. The GAN is a generative deep learning model based on the competing training mechanism of the generator and discriminator. Since first introduced, the GAN has been applied for generating fake images and style transfer. Now, its application is being extended to non-image data such as time-course data. The first part of this tutorial will introduce the general concept of the GAN. Next, it will focus on conditional generative models that can produce fake data with desired and controllable properties. Here, I will introduce a recent advance of controllable GAN models that independently implements a classification module. Then, the tutorial will cover how the GAN can be applied to time-course data, including the generation model, regularization methods, performance metrics, and comparison analysis. Finally, the application example for financial data will be introduced with data augmentation techniques.

Biography
2014 ~ Now, Assistant/Associate Professor, School of Electrical Engineering, Korea University, Seoul, South Korea
2013 ~ 2014, Assistant Professor, Health and Biomedical Informatics, Northwestern University, IL, USA
2011 ~ 2013, Postdoctoral Fellow, Department of Statistics, Stanford University, CA, USA
2011, PhD Electrical Engineering, Stanford University, CA, USA

15:40 ~ 16:40, Aug 18, 2021 (Wednesday)

Room: Room D

Tutorial 2: Advanced AI for Self-driving Robots

Speaker: Prof. Jun-Won Choi, Hanyang University, Korea

Abstract:
Recent advances in AI have significantly improved the intelligence of autonomous robots. Autonomous robots include autonomous vehicles, service robots, and delivery robots. They need to perceive the world and be able to navigate socially and safely in crowded and complex environments like humans. This tutorial explores the latest AI technologies in the context of perception and prediction for autonomous robots. We then list the various challenges that need to be addressed to implement human-level intelligence for social navigation and discuss future research directions. Insights and lessons learned from past research experiences will be shared as well.

Biography
Jun-Won Choi received B.S and M.S. degrees at Seoul National University and Ph. D. degree at University of Illinois at Urbana-Champaign. In 2010, he joined Qualcomm at San Diego where he participated in research on advanced signal processing technology for the next generation wireless systems. In 2013, he joined Electrical Engineering Department in Hanyang University as a faculty member. His research area includes signal processing, machine learning, wireless communications, intelligent vehicles, etc. He has served as Associate Editor of IEEE Trans. Vehicular Technology and IEEE Trans. Intelligent Transportation Systems.

15:30 ~ 16:30, Aug 19, 2021 (Thursday)

Room: Room D

Tutorial 3: Distributed and Split Deep Learning: Theory and Applications

Speaker: Prof. Joongheon Kim, Korea University, Korea

Abstract:
In modern machine learning and deep learning research trends, distributed computation of deep learning training/inference over multiple computing machines is widely and actively discussed. This distributed computation is actively studied in medical applications for patient privacy-preserving and also studied in communication/networks applications in order to reduce the computation overhead for gathering all data in a single machine. Thus, this tutorial introduces and reviews distributed deep learning. In addition, this tutorial covers modern and various research results including Linear/XOR mixup computiation (presented at ICML Federated Learning Workshop 2020), spatio-temporal split learning for medical deep learning (presented at IEEE DSN 2021), and slimmable/controllable federated learning (presented at ICML Federated Learning Workshop 2021).

Biography

Dr. Joongheon Kim has been with Korea University, Seoul, Korea, since 2019, and he is currently an associate professor at the Department of Electrical and Computer Engineering. He is also a vice director of the Artificial Intelligence Engineering Research Center at Korea University, Seoul, Korea. He received the B.S. and M.S. degrees in computer science and engineering from Korea University, Seoul, Korea, in 2004 and 2006, respectively; and the Ph.D. degree in computer science from the University of Southern California (USC), Los Angeles, CA, USA, in 2014. Before joining Korea University, he was with LG Electronics (Seoul, Korea, 2006-2009), InterDigital (San Diego, CA, USA, 2012), Intel Corporation (Santa Clara in Silicon Valley, CA, USA, 2013-2016), and Chung-Ang University (Seoul, Korea, 2016-2019).

He is a senior member of the IEEE, serves as an associate editor for IEEE Transactions on Vehicular Technology, and also serves as a guest editor for IEEE Communications Standards Magazine. He was a recipient of Annenberg Graduate Fellowship with his Ph.D. admission from USC (2009), Intel Corporation Next Generation and Standards (NGS) Division Recognition Award (2015), Haedong Young Scholar Award by KICS (The Korean Institute of Communications and Information Sciences) (2018), IEEE Vehicular Technology Society (VTS) Seoul Chapter Award (2019), Outstanding Contribution Award by KICS (2019), Paper Awards from IEEE Seoul Section Student Paper Contests (2019, 2020), IEEE Systems Journal Best Paper Award (2020), IEEE ICOIN Best Paper Award (2021), and Haedong Paper Award by KICS (2021).

Aug 18, 2021 (Wednesday)

Session 1A: Vehicular Ad-hoc Networks

Session Chair: Dr. Rahid Ali, Sejong University

Room A, Time 09:00-10:30

[1A.1] Analysis of Transport Layer Congestion Control Algorithms over 5G Millimeter Wave Networks
Farhan Siddiqui and Quan Chau (Dickinson College, USA)

[1A.2] Collaborative Multi-Agent Resource Allocation in C-V2X Mode 4
Malik Muhammad Saad, Md. Mahmudul Islam, Muhammad Ashar Tariq, Muhammad Toaha Raza Khan and Dongkyun Kim (Kyungpook National University, Korea)

[1A.3] Efficient Task Offloading for MEC-Enabled Vehicular Networks: A Non-Cooperative Game Theoretic Approach
Md Delowar Hossain, Subina Khanal and Eui-Nam Huh (Kyung Hee University, Korea)

[1A.4] Content-Oriented Multicamera Trajectory Forecasting Surveillance Network System
Xin Qi (Global Information and Telecommunication Institute, Waseda University, Japan); Toshio Sato, Keping Yu, Zheng Wen and San Hlaing Myint (Waseda University, Japan); Yutaka Katsuyama (Global Information and Telecommunication Institute Waseda University, Japan); Kazuhiko Tamesue (Waseda University, Japan); Kiyohito Tokuda (YRP International Alliance Institute, Japan); Takuro Sato (Waseda University, Japan)

[1A.5] Adaptive V2X Platform for Guaranteed QoS/QoE Service Based on Cloud Computing and Deep Reinforcement Learning
Bokyun Jo and Sunghwan Jeong (Korea Electronics Technology Institute, Korea)

Session 1B: Embedded Systems

Session Chair: Dr. Jehad Ali, Ajou University

Room B, Time 09:00-10:30

[1B.1] Multi-Switch Integrated Circuit Design for Micro Sensors of Smart Factory
Lee Sung-Hun, Jung Yong-An, Han Dong-Cheul,Cho Soo-Hyun, Byun Sang-Bong, Kim Seung-Soo (Gumi Electronics & Information Technology Research Institute, Korea)

[1B.2] Design of Voltage Selectable Circuit Based on Power Mux for Charger IC
Dae Geun Cho and Kang-Yoon Lee (Sungkyunkwan University, Korea)

[1B.3] Higher Order Statistics of Channel Capacity in κ-μ Fading Channel
Ishan Khatri, Toyanath Acharya, Annamalai Annamalai and Mohamed Chouikha (Prairie View A&M University, USA)

[1B.4] RFID Tag Antenna Attached to Drug Nozzle and Electronic Fishing Float
Dong Su Choi, Yoon-Seon Choi, Min-Seok Baik, Bang Chul Jung and Jong-Myung Woo (Chungnam National University, Korea)

[1B.5] High-Efficiency, High-Power Class-D Power Amplifier with 50W Output Using GaN Devices
Yeun Jeong Park and Kang-Yoon Lee (Sungkyunkwan University, Korea)

Session 1C: E-Health & IoT

Session Chair: Dr. Farman Ali, Sejong University

Room C, Time 09:00-10:30

[1C.1] E-Health and Resource Management Scheme for a Deep Learning-Based Detection of Tumor in Wireless Capsule Endoscopy Videos
Tariq Rahim, Arslan Musaddiq and Dong Seong Kim (Kumoh National Institute of Technology, Korea)

[1C.2] Stroke Medical Ontology for Supporting AI-Based Stroke Prediction System Using Bio-Signals
SoonHyun Kwon (Electronics and Telecommunications Research Institute, Korea); Se Jin Park (Korea Research Institute of Standards and Science (KRISS), Korea); Jaehak Yu, Jong-arm Jun and Cheol Sig Pyo (Electronics and Telecommunications Research Institute (ETRI), Korea)

[1C.3] Securing Healthcare IoT (HIoT) Monitoring System Using Blockchain
Arsalan Siddiqui, Jihad Qaddour and Sameeh Ullah (School of Information Technology, Illinois State University, USA)

[1C.4] Feasibility Study of the LoRaWAN Blind Adaptive Data Rate
Arshad Farhad, Dae-Ho Kim, Jeong-Sun Yoon and Jae-Young Pyun (Chosun University, Korea)

[1C.5] Active Control and Management System for Providing the Ultra-Low Latency Service on Deterministic Networks
Eungha Kim, Yeoncheol Ryoo, Binyeong Yoon and Taesik Cheung (Electronics and Telecommunications Research Institute (ETRI), Korea)

Session 2A: Machine Learning and its Applications

Session Chair: Dr. Murad Khan, Kyungpook National University

Room A, Time 10:40-12:10

[2A.1] Keyword Extraction in Economics Literatures Using Natural Language Processing
Soojeong Kim, Sunho Choi and Junhee Seok (Korea University, Korea)

[2A.2] Analyzing Motion of Touching Screen for Inferring User Characteristics
Woonghee Lee (Hansung University, Korea)

[2A.3] Exploring a link between network topology and active learning
Michael Hopwood, Phuong Pho and Alexander V. Mantzaris (University of Central Florida, USA)

[2A.4] Deep Learning-based Power Allocation in Massive MIMO Systems with SLNR and SINR Criterions
Ridho Hendra Yoga Perdana, Toan-Van Nguyen and Beongku An (Hongik University, Korea)

[2A.5] Classification of Growth Conditions in Paprika Leaf Using Deep Neural Network and Hyperspectral Images
Kangin Choi, Keunho Park and Sunghwan Jeong (Korea Electronics Technology Institute, Korea)

Session 2B: AI enabled IoT Networks

Session Chair: Dr. Muhammad Ibrahim, Jeju National University

Room B, Time 10:40-12:10

[2B.1] Feature Expansion of Single Dimensional Time Series Data for Machine Learning Classification
Daeun Jung, Jungjin Lee and Hyunggon Park (Ewha Womans University, Korea)

[2B.2] Deep Learning-Based 3D Printer Fault Detection
Mark Verana, Cosmas Ifeanyi Nwakanma, Jae Min Lee and Dong Seong Kim (Kumoh National Institute of Technology, Korea)

[2B.3] Binary Classification for Linear Approximated ECG Signal in IoT Embedded Edge Device
Seungmin Lee, Dongkyu Lee and Daejin Park (Kyungpook National University, Korea)

[2B.4] Balancing the Detection of Malicious Traffic in SDN Context
Bruno Salgado Machado (Centro Algoritmi, Universidade do MInho, Portugal); João Marco C. Silva (HASLab, INESC TEC & Universidade do Minho, Portugal); Solange Rito and Lima Paulo Carvalho (Centro Algoritmi, Universidade do Minho, Portugal)

[2B.5] A Faulty Node Detection Method in Wireless Sensor Network in Seedling for Hydroponics
Dong-Hee Noh, Tae-Hwan Ko, Ahhyeon Hong, Kyeong-Hun Kim and Seok-Bong Noh (Korea Electronics Technology Institute(KETI), Korea)

Session 2C: Edge Computing & Ad-hoc Networks

Session Chair: Dr. Shaohua Wan, Zhongnan University of Economics and Law, China

Room C, Time 10:40-12:10

[2C.1] Dynamic Priority Scheduling Mechanism Based on Spatio-Temporal Correlation for VANETs
Shuai Zhang , Jinglei Li and Qinghai Yang (State Key Laboratory of Integrated Services Networks, Xindian University Xi'an, China); Kyung Sup Kwak(Department of Information and Communication Engineering, Inha University, Korea)

[2C.2] Message Dissemination Scheme for Rural Areas Using VANET (Hardware Implementation)
Hassan Mistareehi (University of Kentucky, USA)

[2C.3] Avoiding Content Storm Problem in Named Data Networking
Sungwon Lee (Hanny University, Korea); Junho Seo, Jeongwon Ha and Dongkyun Kim (Kyungpook National University, Korea)

[2C.4] Proactive Content Caching at Self-Driving Car Using Federated Learning with Edge Cloud
Subina Khanal, Kyi Thar, Md Delowar Hossain and Eui-Nam Huh (Kyung Hee University, Korea)

Session 3A: Underwater & Optical Communication

Session Chair: Dr. Haleem Farman, Islamia College University, Pakistan

Room A, Time 14:00-15:30

[3A.1] Multi-Objective Hybrid Evolution with Information Entropy Awareness for Controller Placement
Xing Li, Zhanqi Xu and Fan Yang (School of Telecommunications Engineering, Xidian University, China); Yunbo Li (China Mobile Communication Corp, Research Institute CMCC Beijing, China)

[3A.2] Multiband FSK with Direct Sequence Spread Spectrum for Underwater Acoustic Communications
Hyunwoo Jeong, Ji-Eun Shin and Ji Won Jung (Department of Radio Communication Engineering, Korea Maritime and Ocean University, Busan, Korea)

[3A.3] Three-Dimensional Foot Contact Position on a Smart Fitness Trampoline with a Upward Looking Wide View Imaging System
Sekyung Park, Jun-Kyu Park, Boram Cho and Suwoong Lee (Advance Mechatronics Group, Korea Institute of Industrial Technology, Korea); Jongsik Ahn and Min Young Kim (Kyungpook National University, Korea)

[3A.4] A Weighted Multi-Band Algorithm Using Estimation BER in Underwater Acoustic Communication
Jieun Shin, Hyunwoo Jeong and Ji Won Jung (Korea Maritime and Ocean University, Korea)

[3A.5] Supervised Learning-Based Noisy Optical Signal Estimation for Underwater Optical Wireless Communications
Sudhanshu Arya and Yeonho Chung (Pukyong National University, Korea)

Session 3B: SDN & Network Virtualization

Session Chair: Dr. Muhammad Afaq, Jeju National University

Room B, Time 14:00-15:30

[3B.1] Lightweight Collaboration of Detecting and Tracking Algorithm in Low-Power Embedded Systems for Forward Collision Warning
Sunghoon Hong (Carnavicom, Korea); Daejin Park (Kyungpook National University, Korea)

[3B.2] Stable Matching-Based Mobility Agent Selection in Distributed Mobility Management
Hyeon Jae Jeong, Hongrok Choi and Sangheon Pack (Korea University, Korea)

[3B.3] An IoT Framework Based on SDN and NFV for Context-Aware Security
Arlyn Verina Ong and Marnel Peradilla (De La Salle University, Philippines)

[3B.4] Design of Baseband Analog with Filter Tuning for 5.8GHz DSRC Transceiver in ETCS
Ji Hoon Song and Kang-Yoon Lee (Sungkyunkwan University, Korea)

[3B.5] IAB-Based Railway Communication Method for Stable Service Provision
MinSuk Choi and Byungsik Yoon (Electronics and Telecommunications Research Institute (ETRI), Korea); Dongjoon Kim and Dongil Sung (Korea Railway Network Authority, Korea)

Session 3C: PHY Layer Aspects & Future Network Technologies

Session Chair: Dr. Ihtesham Ul Islam, Military College of Signals, NUST, Pakistan

Room C, Time 14:00-15:30

[3C.1] Design of Ridge Waveguide Array Antenna for Radar
In-Hee Han and Jong-Myung Woo (Chungnam National University, Korea)

[3C.2] A High Power High Efficient 5.8 GHz CMOS Class-A Power Amplifier for a WPT Application
Reza E. Rad, Sung-Jin Kim, Behnam S. Rikan and Kang-Yoon Lee (Sungkyunkwan University, Korea)

[3C.3] Proposal of Interference Power Occupancy Estimation Method Using Chirp Demodulation
Gaku Kobayashi and Osamu Takyu (Shinshu University, Japan); Koichi Adachi (The University of Electro-Communications, Japan); Mai Ohta (Fukuoka University, Japan); Takeo Fujii (The University of Electro-Communications, Japan)

[3C.4] Performance Analysis of Cell-Free mmWave Massive MIMO with Low-Resolution DAC Quantization
Seung-Eun Hong (Electronics and Telecommunications Research Institute (ETRI), Korea)

[3C.5] Design of Frequency Multiplier with Delay Locked Loop That is Insensitive to PVT Variation and Prescreen Harmonic Lock
HoWon Kim and Kang-Yoon Lee (Sungkyunkwan University, Korea)

Aug 19, 2021 (Thursday)

Session 4A: Machine Learning & Computational Intelligence

Session Chair: Dr. Safdar Bouk, Daegu Gyeongbuk Institute of Science and Technology

Room A, Time 09:00-10:40

[4A.1] Measurement of Colored Noise from Spot-Welding Machine in a Factory
Joo Hyun Park, WanJei Cho, KyoungMin Park and Seong-Hwan Hyun (Seoul National University, Korea); DongEun Kim and Hyung Jun Park (Hyundai Motors Group, Korea); Seong-Cheol Kim (Seoul National University, Korea)

[4A.2] Electric Vehicle Charging Terminal 3D Docking Method Using Stereo Camera
Keunho Park, Donghoon Kim and Seon-Hyeong Kim (Korea Electronics Technology Institute, Korea); Kyoungho Choi (EKOS ENC, Korea); Sunghwan Jeong (Korea Electronics Technology Institute, Korea)

[4A.3] Construction of Frequency-Hopping System Using Carrier-Signal Generator
Eisuke Kudoh and Keisuke Watanabe (Tohoku Institute of Technology, Japan)

[4A.4] Cascade AOA Estimation Based on Combined Array Antenna with URFA and UCA
Tae-yun Kim (Chosun University, Korea); Hua Lee (University of California Santa Barbara, USA); Suk-seung Hwang (Chosun University, Korea)

[4A.5] Enhancing IEEE 802.15.4 Access Mechanism with Machine Learning
Arslan Musaddiq, Tariq Rahim and Dong Seong Kim (Kumoh National Institute of Technology, Korea)

[4A.6] Sequencing Universal Quantum Gates for Arbitrary 2-Qubit Computations
An Taegun (Korea University, Korea); Hoon Ryu (Korea Institute of Science and Technology Information, Korea); Changhee Joo (Korea University, Korea)

Session 4B: Network Security & Intelligent Networks

Session Chair: Dr. Diyan, Kyungpook National University

Room B, Time 09:00-10:40

[4B.1] High Efficiency & Low Area DC-DC Buck Converter with the Digital Feedback Loop for the Wireless Applications
Hyunjin Jeong and Kang-Yoon Lee (Sungkyunkwan University, Korea)

[4B.2] Augmented Reality Musical Service Part 1 for Non-Face-To-Face Watching by Multiple Audiences
Young-Suk Yoon, Hyunwoo Choo, Chanho Park and Sangheon Park (Electronics and Telecommunications Research Institute (ETRI), Korea)

[4B.3] Intelligent Learning Architecture with Hybrid Features for Phishing Detection
Yu-Hung Chen and Jiann-Liang Chen (National Taiwan University of Science and Technology, Taiwan)

[4B.4] Comparative Analysis of IEC 62439-3 (HSR) and IEEE 802.1CB (FRER) Standards
Duc N. M. Hoang and Jong Myung Rhee (Myongji University, Korea)

[4B.5] FPGA-Based Cloudification of ECG Signal Diagnosis Acceleration
Dongkyu Lee, SeungMin Lee and Daejin Park (Kyungpook National University, Korea)

Session 4C: Power Electronics

Session Chair: Prof. DoHyeun Kim, Jeju National University

Room C, Time 09:00-10:40

[4C.1] A Design of 20MS/s 12-Bit Charge Sharing SAR ADC for Ultrasound Diagnostic Medical Devices
Jung-Hyun Lee and Kang-Yoon Lee (Sungkyunkwan University, Korea)

[4C.2] Examination of Efficient Aggregation Method of Sensor Information by Wireless Sensor Network for Event Detection in Frequency Sharing
Tsuyoshi Kobayashi, Taiki Suehiro, Osamu Takyu and Yasushi Fuwa (Shinshu University, Japan)

[4C.3] 12-Bit 5 MS/s SAR ADC with Hybrid Type DAC for BLE Applications
Behnam S. Rikan, Dae-Young Choi, Reza E. Rad, Arash Hejazi, YoungGun Pu and Kang-Yoon Lee (Sungkyunkwan University, Korea)

[4C.4] Chip Pulse Design for an Additional Satellite Navigation Signal in L6 Band
Hyoungsoo Lim, Sanguk Lee and JoonGyu Ryu (Electronics and Telecommunications Research Institute (ETRI), Korea)

[4C.5] Full-Color High Transparent VHOE HoloGlass Digital Signage Display for AI Holo-Avatar
Yong Seok Hwang and Eun-Soo Kim (Kwangwoon University, Korea)

[4C.6] Design of DC-DC Boost Converter with Digital Pulse Width Modulation for Transducer
Jin-Ho Kang and Kang-Yoon Lee (Sungkyunkwan University, Korea)

Session 5A: 5G and Beyond Wireless Networks

Session Chair: Prof. Pin-Han Ho, Department of Electrical and Computer Engineering, University of Waterloo, Canada

Room A, Time 10:50-12:30

[5A.1] Weighted MMSE Optimization of Conjugate Beamforming for Cell-Free Massive MIMO
Daesung Yu (Jeonbuk National University, Korea); Hoon Lee (Pukyong National University, Korea); Seung-Eun Hong (Electronics and Telecommunications Research Institute (ETRI), Korea); Seok-Hwan Park (Jeonbuk National University, Korea)

[5A.2] 5.8GHz Ultra-Low-Power Based Wake-Up Receiver for DSRC Application
Mweonggwan Kim and Kang-Yoon Lee (Sungkyunkwan University, Korea)

[5A.3] Machine Learning-Based Channel Tracking for Next-Generation 5G Communication System
Hyeonsung Kim (Chonnam National University, Korea); Sangmi Moon (Korea Nazarene University, Korea); Intae Hwang (Chonnam National University, Korea)

[5A.4] The Method of Emergency Message Retransmission for the Disaster Vulnerable People
SeungHee Oh (Electronics and Telecommunications Research Institute (ETRI), Korea); Kyungseok Kim (Chungbuk National University, Korea)

[5A.5] Residual Frequency Offset Estimation Scheme for 5G NR System
Yong-An Jung, Sang-Bong Byun, Han-Jae Shin, Dong-Cheul Han and Soo-Hyun Cho (Gumi Electronics & Information Technology Research Institute, Korea); Sung-hun Lee (Kwangwoon University, Korea)

Session 5B: Wireless Sensor Networks

Session Chair: Prof. Ki-Hyung Kim, Ajou University

Room B, Time 10:50-12:30

[5B.1] UHF RFID Wireless Communication System for Real Time ECG Monitoring
Md. Moklesur Rahman, Toufiq Aziz and Heung-Gyoon Ryu (Chungbuk National University, Korea)

[5B.2] Performance Analysis of QTP-Based S2S Transmission in IEEE 802.11ax WLANs
Youngboo Kim and Seungmin Oh (Kongju National University, Korea); Gayoung Kim (Kangnam University, Korea); Junho Jeong (Dongguk University, Korea)

[5B.3] LoRa-DuCy: Duty Cycling for LoRa-Enabled Internet of Things Devices
Thenuka Karunathilake and Asanga Udugama (University of Bremen, Germany); Anna Förster (University of Bremen, Germany)

[5B.4] The Impact of Energy-Inefficient Communications on Location Privacy Protection in Monitoring Wireless Networks
Lilian Mutalemwa and Seokjoo Shin (Chosun University, Korea)

[5B.5] A High Accuracy Low Power Convolution Operator with 12T SRAM for CNN
Tae Seob Oh, YoungGun Pu and Kang-Yoon Lee (Sungkyunkwan University, Korea)

[5B.6] Storing Blockchain Data in Public Storage
Khikmatillo Tulkinbekov and Deok-Hwan Kim (Inha University, Korea)

Session 5C: QoS, QoE and Optimization

Session Chair: Prof. Long Hu, School of Computer Science and Technology, Huazhong University of Science and Technology, China

Room C, Time 10:50-12:30

[5C.1] A Study on Rainfall Prediction Based on Meteorological Time Series
KangWoon Hong and Taegyu Kang (Electronics and Telecommunications Research Institute (ETRI), Korea)

[5C.2] Time-Compressed Synchronization Sequence for Future Spectrally Efficient Transmission Schemes
Myungsup Kim, Jiwon Jung, and Ki-Man Kim (Korea Maritime and Ocean University)

[5C.3] Performance Improvement for Windowed OFDM Using Pre-Coding and Sub-Carriers Interleaving
Kohei Ohno (Meiji University, Japan)

[5C.4] Distance Estimation Algorithm Based on Multi-Antenna Signal Attenuation Model
Jing Wang, Jishen Peng, Xianqing Wang, Jun Gyu Hwang and Joon Goo Park (Kyungpook National University, Korea)

[5C.5] Deep Learning-Assisted Beamforming Design and BER Evaluation in Multi-User Downlink Systems
Junbeom Kim (Jeonbuk National University, Korea); Hoon Lee (Pukyong National University, Korea); Seung-Eun Hong (Electronics and Telecommunications Research Institute (ETRI), Korea); Seok-Hwan Park (Jeonbuk National University, Korea)

[5C.6] Indoor Fingerprinting Localization Based on Fine-Grained CSI Using Principal Component Analysis
Jing Wang, Xianqing Wang, Jishen Peng, Jun Gyu Hwang and Joon Goo Park (Kyungpook National University, Korea)

August 17, 2021 (Tuesday)

Workshop 1A: SRIoT 2021 (The 2nd International Workshop on Smart Radio for IoT Era)

Workshop Chair: Prof. Takeo Fujii, The University of Electro-Communications, Japan

Room A, Time 14:30 ~ 16:00

[1A.1] USRP Implementation of Transmission Timing Control Function for Synchronized SS-CDMA Using Wireless Two-Way Interferometry (Wi-Wi)
Suguru Kameda (Hiroshima University, Japan); Yusaku Honma and Noriharu Suematsu (Tohoku University, Japan); Satoshi Yasuda and Nobuyasu Shiga (National Institute of Informations and Communications Technology, Japan)

[1A.2] A Study on Antenna Polarization Plane for UL/DL Drone Access Network
Takuma Okada and Gia Khanh Tran (Tokyo Institute of Technology, Japan)

[1A.3] Channel Capacity for a Model of Packet Level Index Modulation in LPWA Networks
Riku Yamabe, Mikihiko Nishiara and Osamu Takyu (Shinshu University, Japan)

[1A.4] Mesh-Clustering-Based Radio Maps Construction for Autonomous Distributed Networks
Keita Katagiri (The University of Electro-Communication & Advanced Wireless and Communication Research Center (AWCC), Japan); Takeo Fujii (The University of Electro-Communications, Japan)

[1A.5] Local 5G mmWave Signal Measurement and Analysis for Spectrum Database
Hirofumi Nakajo (The University of Electro-Communications & Advanced Wireless and Communication Research Center (AWCC), Japan); Takeo Fujii (The University of Electro-Communications, Japan)

Workshop 1B: IV 2021 (The 8th International Workshop on Intelligent Vehicles)

Workshop Chair: Prof. Dong Seog Han, School of Electronic and Electrical Engineering, Kyungpook National University

Room B, Time 14:30 ~ 16:00

[1B.1] Foreground Extraction Based Facial Emotion Recognition Using Deep Learning Xception Model
Alwin Poulose (Kyungpook National University, Korea); Chinthala Sreya Reddy (Kyungpook National University & Christ University, Korea); Jung Hwan Kim, Dong Seog Han (Kyungpook National University, Korea)

[1B.2] A Sensor Fusion System with Thermal Infrared Camera and LiDAR for Autonomous Vehicles: Its Calibration and Application
Ji Dong Choi and Min Young Kim (Kyungpook National University, Korea)

[1B.3] Lidar Upsampling Using HSD Color Space Guided Image
Sangha Oh and Soon-Yong Park (Kyungpook National University, Korea)

[1B.4] FPGA Based Approach for Heterogenous Sensors Data Fusion in Autonomous Vehicles
Danny Créno (Central Electronic Engineering School & ECE-Paris, France); Ben Senouci and Rafik Zitouni (ECE Paris, France)

[1B.5] The Design and Implementation of Autonomous Driving Pallet Robot System Using ROS
Ung-Gyo Lee, Kyung-Jea Choi and Soon-Yong Park (Kyungpook National University, Korea)

[1B.6] Optimal Decision-Making Strategies for Self-Driving Car Inspired by Game Theory
Kyoungtae Ji, Kyoungseok Han (Kyungpook National University & School of Mechanical Engineering, Korea)

Workshop 1C: Energy Data and DDI 2021

Workshop Chair: Prof. Sang-Chul Kim, School of Computer Science, Kookmin University

Room C, Time 14:30 ~ 16:00

[1C.1] User Clustering Techniques for Massive MIMO-NOMA Enabled mmWave/THz Communications in 6G
Md. Shahjalal, Md. Habibur Rahman, Md. Osman Ali and Yeong Min Jang (Kookmin University, Korea)

[1C.2] Heart Rate Monitoring System Using Feature Extraction in Electrocardiogram Signal by Convolutional Neural Network
Hsing-Chung Chen, Karamsetty Shouryadhar (Asia University, Taiwan)

[1C.3] Metal Defect Classification Using Deep Learning
Aji Teguh Prihatno, Ida Bagus Krishna Yoga Utama and Yeong Min Jang (Kookmin University, Korea)

[1C.4] OA-GAN: Overfitting Avoidance Method of GAN Oversampling Based on XAI
Jiha Kim and Hyunhee Park (Myongji University, Korea)

[1C.5] Optimal Energy Management Among Multiple Households with Integrated Shred Energy Storage System (ESS)
Md. Morshed Alam, Md. Osman Ali, Md. Shahjalal and Yeong Min Jang (Kookmin University, Korea)

[1C.6] Reducing Model Cost Based on the Weights of Each Layer for Federated Learning Clustering
Hyungbin Kim, Yongho Kim and Hyunhee Park (Myongji University, Korea)

[1C.7] Schema Ontology Model to Support Semantic Interoperability in Healthcare Applications: Use Case of Depressive Disorder
Il Young Chong (DL Information Technology)

August 20, 2021 (Friday)

Workshop 2A: AIEA 2021 (The 1st Artificial Intelligence Emerging Applications)

Workshop Chair: Prof. Joongheon Kim, Department of Electrical and Computer Engineering, Korea University

Room A, Time 9:30 ~ 11:00

[2A.1] Quantum Neural Networks: Concepts, Applications, and Challenges
Yunseok Kwak, Won Joon Yun, Soyi Jung, and Joongheon Kim (Korea University, Korea)

[2A.2] Interesting Projects to Strengthen DSP Teaching
Sophie Liu, Rohan Aby, Matthew Samuelson, Tevin Macias and Emily Garvie (Oral Roberts University, USA)

[2A.3] Trends in LEO Satellite Handover Algorithms
Soohyun Park and Joongheon Kim (Korea University, Korea)

[2A.4] FFT and Machine Learning Application on Major Chord Recognition
Nolan Monnier, Darien Ghali and Sophie Liu (Oral Roberts University, USA)

[2A.5] Trends in Blockchain and Federated Learning for Data Sharing in Distributed Platforms
Haemin Lee and Joongheon Kim (Korea University, Korea)

[2A.6] Secure Aerial Surveillance using Split Learning
Yoo Jeong Ha, Minjae Yoo, Soohyun Park, Soyi Jung and Joongheon Kim (Korea University, Korea)

Workshop 2B: Future Networks and Machine Learning

Workshop Chair: Prof. Joohyun Lee, Department of Electrical and Electronic Engineering, Hanyang University

Room B, Time 9:30 ~ 11:00

[2B.1] Indoor Path Loss Modeling for 5G Communications in Smart Factory Scenarios Based on Meta-Learning
Pei Wang and Hyukjoon Lee (Kwangwoon University, Korea)

[2B.2] Machine Learning-Based Clustering of Load Profiling to Study the Impact of Electric Vehicles on Smart Meter Applications
Saeed Ahmed and Zafar Ali Khan (Mirpur University of Science and Technology, Pakistan); Noor Gul (University of Peshawar & Korea Polytechnic University, Korea); Junsu Kim and Su Min Kim (Korea Polytechnic University, Korea)

[2B.3] Freezing of Gait Detection Using Discrete Wavelet Transform and Hybrid Deep Learning Architecture
Nguyen Thi Hoai Thu and Dong Seog Han (Kyungpook National University, Korea)

[2B.4] Machine Learning and Deep Learning for Throughput Prediction
Dongwon Lee and Joohyun Lee (Hanyang University, Korea)

Workshop 2C: Future Networks and Applications

Workshop Chair: Prof. Sangheon Pack, Korea University

Room C, Time 9:30 ~ 11:00

[2C.1] A Distributed Resource Allocation Algorithm for Task Offloading in Fog-Enabled IoT Systems
Tran Hoa and Dong Seong Kim (Kumoh National Institute of Technology, Korea)

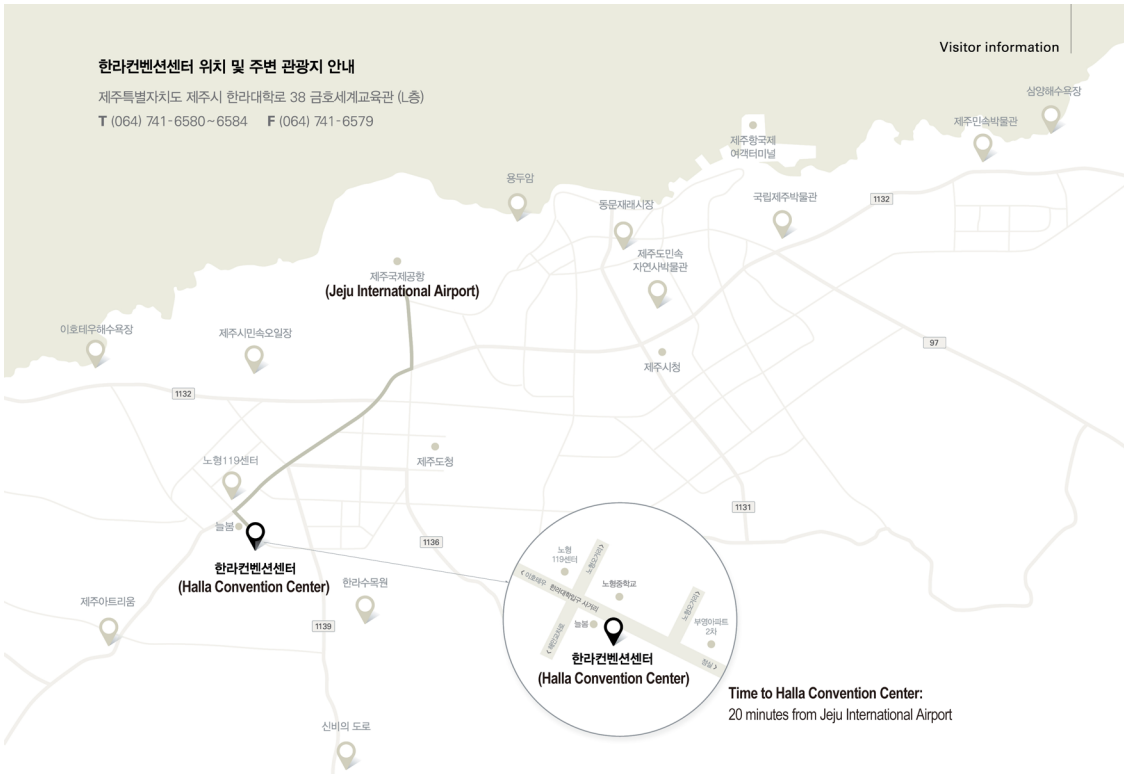
[2C.2] Robust Spectrum Sensing Employing PSO
Noor Gul (University of Peshawar & Korea Polytechnic University, Korea); Saeed Ahmed (Mirpur University of Science and Technology, Pakistan); Najeeb Ullah (Northern University, Nowshera, Pakistan); Su Min Kim and Junsu Kim (Korea Polytechnic University, Korea)

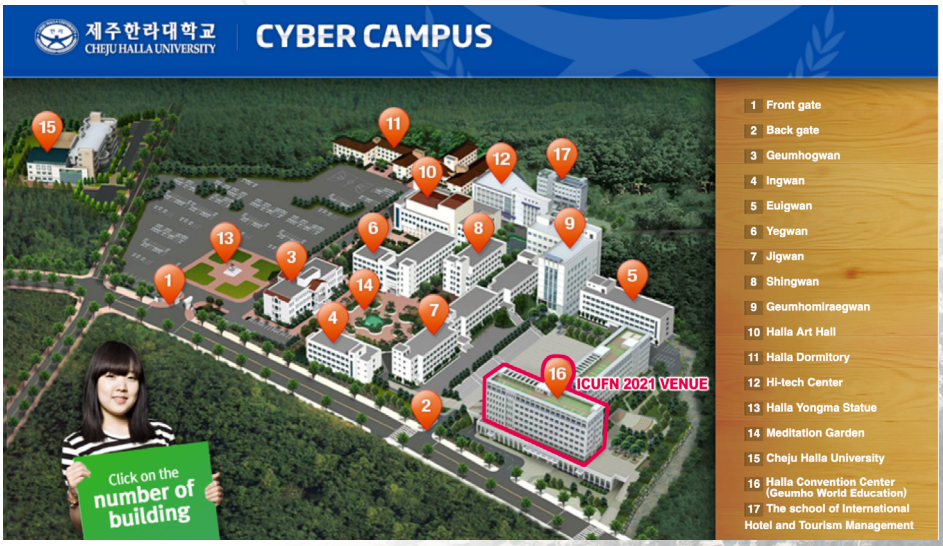
[2C.3] A Cluster-Based Mechanism for Vehicular Networks in the Scale-Free ICN Core Network
Kamrul Hasan and Seong-Ho Jeong (Hankuk University of Foreign Studies, Korea)

[2C.4] Deep Learning Based Pilot Assisted Channel Estimation for Rician Fading Massive MIMO Uplink Communication System
Md. Habibur Rahman, Md. Shahjalal, Md. Osman Ali and Yeong Min Jang (Kookmin University, Korea)

Halla Convention Center, Cheju Halla University

38 Halladaehak-ro, Jeju-si, Jeju Special Self-Governing Province, 63092, Republic of Korea





Hallasan National Park

Hallasan stands out at the center of South Korea's southernmost island, boasting exquisite landscapes due to its varied volcanic topography and vegetation distribution ranging vertically through the subtropical, temperate, frigid and alpine zones. The special nature of this area led to its being designated and managed as a national park in 1970, a UNESCO Biosphere Reserve in 2002, a World Natural Heritage Site in 2007. Muljangori Oreum registered as a Ramsar Wetland in 2008.

Jeju Olle

"Olle" [Ole] is the Jeju word for a narrow pathway that is connected from the street to the front gate of a house. Hence, "Olle" is a path that comes out from a secret room to an open space and a gateway to the world. If the road is connected, it is linked to the whole island and the rest of the world as well. It has the same sound as "Would you come?" in Korean, so Jeju's "Olle" sounds the same as 'Would you come to Jeju?'. The first trail route was opened to the public in September, 2007. Since then, the Jeju Olle exploration team has created a combined total of 200km of walking trails in Jeju island. Currently eleven trail routes have been opened to walkers and the trail exploration team is still working on new routes.

Udo (Cow Islet)

The island was named "Udo" or "Cow Island" as its contours look like a cow lying down on the ground. There are 8 scenic wonders of Udo: day and night(Judan-myeongwol and Yahang-eobeom), sky and earth (Cheonjin-gwansan and Jidu-cheongsa), front and back (Jeonpo-mangdo and Huhae-seokbyeok), and east and west (Dongan-gyeonggul and Seobin-baeksa). The movie "In October" and "The mermaid" were shot at Cow Island, capitalizing on its picturesque scene of a fishing village and a lush, peaceful grassy field. The white sand beach facing the indigo and turquoise sea of Jeju is very impressive.

Seongsan Ilchulbong (Sunrise Peak)

99 rocky peaks surround the crater like a fortress and the gentle southern slope connected to water is a lush grassland. On the grassland at the entrance of Sunrise Peak, you can enjoy horseback riding. Breathtaking scenic views while taking a rest in the middle of climbing up the peak such as Mount Halla, the deep blues of the ocean, the multi-colored coast line, and the picturesque neighboring villages will become unforgettable memories.

Seopjikoji

Jutting out at the eastern seashore of Jeju Island, Seopji-Koji is one of the most scenic views with the bright yellow canola and Seongsan Sunrise Peak as a backdrop. The pristine beauty of Jeju can be seen in Seopji-koji. Sinyang Beach, a meadow filled with canola flowers, peacefully grazing Jeju ponies, a rocky sea cliff, and a towering legendary large rock (Sunbawe) all combine to make nature s masterpiece. Unlike the other coastal areas of Jeju, it has red volcanic rock (songi) and strangely-shaped rocks that at low tide transform this area into a breath-taking stone exhibition gallery.

Manjang Cave

Manjang Cave, situated at Donggimnyeong-ri, Gujwa-eup, North Jeju, 30 kilometers east of Jeju City, was designated as Natural Monument No. 98 on March 28, 1970. The 7,416-meter long cave has been officially recognized as the longest lava tube in the world. The annual temperature inside the cave ranges from 11℃ to 21℃, thus facilitating a favorable environment throughout the year. The cave is also academically significant as rare species live in the cave. Created by spewing lava, "the lava turtle", "lava pillar", and "Wing-shaped Wall" look like the work of the gods. It is considered to be a world class tourist attraction.

Gimnyeong Maze Park

This park was opened to the public in 1997 after its development was begun in 1987. In the area of about 3300 square meters, there are 1232 Leylandii trees and two Gold Leylandii trees from England. The overall extended length of labyrinth is 932 m and the shortest course between entrance and exit is 190 m long. Manjang Cave Culture Center, located between Manjang Cave and Gimnyeoungsa Cave, is a part of Manjang Cave tourist complex which is currently being expanded. Three bridges totaling 46 m and an observatory give visitors ample opportunities for picture taking.

Mysterious Road (Dokkaebi Road)

On Mysterious Road (or Bugaboo Road), a parked car on a slight hill road rolls uphill instead of going downhill. This is a result of an optical illusion in which the lower part looks higher because of its surrounding environment.

Cheonjiyeon Waterfall

The waterfall falls from a precipice with thundering sounds, creating white water pillars. It has the name Cheonjiyon, meaning 'the heaven and the earth meet and create a pond'. At 22 m in height and 12 min width, the waterfall tumbles down to the pond to produce awe-inspiring scenery. The valley near the waterfall is home to Elaeocarpus sylvestrisvar, ellipticus, which is Natural Monument No. 163, Psilotum nudum, Castanopsis cuspidatavar.sieboldii, Xylosma congestum, Camellia and other subtropical trees. This place is also famous as home to the eel of Anguilla mauritiana, which is Natural Monument No. 27 and is active primarily at night.

Jeju International Convention Center (ICC)

The International Conventional Center Jeju serves as a world class venue for hosting a variety of different large-scale international events. With the vast Pacific Ocean at its front and majestic Mt. Halla towering behind it as a backdrop, ICC Jeju, standing 5 stories above ground and two levels underground, sprawls over 54,700 square meters of land. As ICC Jeju is nestled right in the middle of the Jungmun Tourism Resort Complex, major tourist sites such as Yeomiji Botanical Garden, Teddy Bear Museum, Jungmun Beach, Fishing Village Museum, Cheonjeyeon Waterfall, Jusangseolli, Gangjeong Resort, Yakcheonsa Temple and Beophwasa Temple are located conveniently nearby.

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