

The 15th KIPS International Conference on Ubiquitous Information Technologies and Applications (CUTE 2021)
The 13th International Conference on Computer Science and its Applications (CSA 2021)

**The 15th KIPS International Conference on
Ubiquitous Information Technologies and
Applications
(CUTE 2021)
&
The 13th International Conference on Computer
Science and its Applications
(CSA 2021)**

December 15-17, 2021
Jeju, Korea

Organized by

KIPS & KIPS CSWRG



2022 International Conferences
(Sponsored / Technically Sponsored by KIPS & KIPS SWRG)

**The 8th World Congress on Information Technology Applications and Services
(World IT Congress 2022)**

- February 14-16, 2022 (Jeju, Korea)
- <http://www.worlditcongress.org/2022/>

**The 16th International Conference on Multimedia and Ubiquitous Engineering
(MUE 2022)**

- April 21-23, 2022 (location undecided)

**The 17th International Conference on Future Information Technology
(FutureTech 2022)**

- April 21-23, 2022 (location undecided)

Message from the CUTE 2021 General Chairs

On behalf of the organizing committees, it is our pleasure to welcome you to the 15th International Conference on Ubiquitous Information Technologies and Applications (CUTE 2021), will be held in Jeju, Korea on December 15-17, 2021.

This conference provides an international forum for the presentation and showcase of recent advances on various aspects of ubiquitous computing. It will reflect the state-of-the-art of the computational methods, involving theory, algorithm, numerical simulation, error and uncertainty analysis and/or novel application of new processing techniques in engineering, science, and other disciplines related to ubiquitous computing.

The papers included in the proceedings cover the following topics: Ubiquitous Communication and Networking, Ubiquitous Software Technology, Ubiquitous Systems and Applications, Ubiquitous Security, Privacy and Trust. Accepted papers highlight new trends and challenges in the field of ubiquitous computing technologies. We hope you will find these results useful and inspiring for your future research.

We would like to express our sincere thanks to Steering Committees: James J. Park (SeoulTech, Korea), Doo-Soon Park (SoonChunHyang University, Korea), Young-Sik Jeong (Dongguk University, Korea), Hsiao-Hsi Wang (Providence University, Taiwan), Laurence T. Yang (St.Francis Xavier University, Canada), Hai Jin (Huangzhong University of Science and Technology, China), Chan-Hyun Youn (KAIST, Korea), Jianhua Ma (Hosei University, Japan), Mingyi Guo (Shanghai Jiao Tong University, China), Weijia Jia (City University of Hong Kong, Hong Kong). We would also like to express our cordial thanks to the Program Chairs & Program Committee members for their valuable efforts in the review process, which helped us to guarantee the highest quality of the selected papers for the conference.

Finally, we would thank all the authors for their valuable contributions and the other participants of this conference. The conference would not have been possible without their support. Thanks are also due to the many experts who contributed to making the event a success.

CUTE 2021 General Chairs

Jungho Kang, Baewha Woman University, Korea
Simon James Fong, University of Macau, Macau, China
Luis Javier Garcia Villalba, Universidad Complutense de Madrid, Spain

Message from the CUTE 2021 Program Chairs

Welcome to the 15th International Conference on Ubiquitous Information Technologies and Applications (CUTE 2021), will be held in Jeju, Korea on December 15-17, 2021.

The purpose of the CUTE 2021 conference is to promote discussion and interaction among academics, researchers and professionals in the field of ubiquitous computing technologies. This year the value, breadth, and depth of the CUTE 2021 conference continues to strengthen and grow in importance for both the academic and industrial communities. This strength is evidenced this year by having the highest number of submissions made to the conference.

For CUTE 2021, we received a lot of paper submissions from various countries. Out of these, after a rigorous peer review process, we accepted only high-quality papers for CUTE 2021 proceeding, published by the Springer. All submitted papers have undergone blind reviews by at least two reviewers from the technical program committee, which consists of leading researchers around the globe. Without their hard work, achieving such a high-quality proceeding would not have been possible. We take this opportunity to thank them for their great support and cooperation.

Finally, we would like to thank all of you for your participation in our conference, and also thank all the authors, reviewers, and organizing committee members. Thank you and enjoy the conference!

CUTE 2021 Program Chairs

Ji Su Park, Jeonju University, Korea
Muhammad Khurram Khan, King Saud University, Kingdom of Saudi Arabia
Neil Y. Yen, The University of Aizu, Japan

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Message from the CSA 2021 General Chair

International Conference on Computer Science and its Applications (CSA 2021) is the 13th event of the series of international scientific conference. This conference takes place Jeju, Korea, December 15 - 17, 2021. CSA 2021 will be the most comprehensive conference focused on the various aspects of advances in computer science and its applications. CSA 2021 will provide an opportunity for academic and industry professionals to discuss the latest issues and progress in the area of CSA. In addition, the conference will publish high quality papers which are closely related to the various theories and practical applications in CSA. Furthermore, we expect that the conference and its publications will be a trigger for further related research and technology improvements in this important subject. CSA 2021 is the next event in a series of highly successful International Conference on Computer Science and its Applications, previously held as CSA 2020 (12th Edition: Jeju, Korea, 2020), CSA 2019 (11th Edition: Macao, China, 2020), CSA 2018 (10th Edition: Kuala Lumpur, Malaysia), CSA 2017 (9th Edition: Taichung, Taiwan), CSA 2016 (8th Edition: Bangkok, Thailand, 2016), CSA 2015 (7th Edition: Cebu, December, 2015), CSA 2014 (6th Edition: Guam, December, 2014), CSA 2013 (5th Edition: Danang, December, 2013), CSA 2012 (4th Edition: Jeju, November, 2012), CSA 2011 (3rd Edition: Jeju, December, 2011), CSA 2009 (2nd Edition: Jeju, December, 2009), and CSA 2008 (1st Edition: Australia, October, 2008).

The papers included in the proceedings cover the following topics: Mobile and ubiquitous computing, Dependable, reliable and autonomic computing, Security and trust management, Multimedia systems and services, Networking and communications, Database and data mining, Game and software engineering, Grid and scalable computing, Embedded system and software, Artificial intelligence, Distributed and parallel algorithms, Web and internet computing and IT policy and business management.

Accepted and presented papers highlight new trends and challenges of Computer Science and its Applications. The presenters showed how new research could lead to novel and innovative applications. We hope you will find these results useful and inspiring for your future research. We would like to express our sincere thanks to Steering Chairs: James J. (Jong Hyuk) Park (SeoulTech, Korea), Young-Sik Jeong (Dongguk University, Korea), Yi Pan (Georgia State University, USA), Vincenzo Loia (University of Salerno, Italy), Han-Chieh Chao (National Ilan University, Taiwan).

Our special thanks go to the Program Chairs: Ji Su Park (Jeonju University, Korea), Yan Li (Inha University, Korea), S. Vimal (National Engineering College, India), Joon-Min Gil (Catholic University of Daegu, Korea), Alireza Souri (Islamic Azad University, Iran), Neil Y. Yen (The University of Aizu, Japan) and all Program Committee members and all the additional reviewers for their valuable efforts in the review process, which helped us to guarantee the highest quality of the selected papers for the conference.

We cordially thank all the authors for their valuable contributions and the other participants of this conference. The conference would not have been possible without their support. Thanks are also due to the many experts who contributed to making the event a success.

CSA 2021 General Chair

Jungho Kang, Baewha Woman University, Korea
Kim-Kwang Raymond Choo, The University of Texas at San Antonio, USA
Piao Changhao, Chongqing University of Post and Telecom, China

Message from the CSA 2021 Program Chairs

Welcome to the 11th International Conference on Computer Science and its Applications (CSA 2021) which will be held in Jeju, Korea, December 15 - 17, 2021. CSA 2021 will be the most comprehensive conference focused on the various aspects of advances in computer science and its applications.

CSA 2021 provides an opportunity for academic and industry professionals to discuss the latest issues and progress in the area of Computer Science. In addition, the conference contains high quality papers which are closely related to the various theories and practical applications in Computer Science. Furthermore, we expect that the conference and its publications will be a trigger for further related research and technology improvements in this important subject. CSA 2021 is the next event in a series of highly successful International Conference on Computer Science and its Applications, previously held as CSA 2020 (12th Edition: Jeju, Korea, 2020), CSA 2019 (11th Edition: Macao, China, 2020), CSA 2018 (10th Edition: Kuala Lumpur, Malaysia), CSA 2017 (9th Edition: Taichung, Taiwan), CSA 2016 (8th Edition: Bangkok, Thailand, 2016), CSA 2015 (7th Edition: Cebu, December, 2015), CSA 2014 (6th Edition: Guam, December, 2014), CSA 2013 (5th Edition: Danang, December, 2013), CSA 2012 (4th Edition: Jeju, November, 2012), CSA 2011 (3rd Edition: Jeju, December, 2011), CSA 2009 (2nd Edition: Jeju, December, 2009), and CSA 2008 (1st Edition: Australia, October, 2008).

CSA 2021 contains high quality research papers submitted by researchers from all over the world. Each submitted paper was peer-reviewed by reviewers who are experts in the subject area of the paper. Based on the review results, the Program Committee accepted papers.

For organizing an International Conference, the support and help of many people is needed. First, we would like to thank all authors for submitting their papers. We also appreciate the support from program committee members and reviewers who carried out the most difficult work of carefully evaluating the submitted papers.

We would like to give my special thanks to Prof. James J. (Jong Hyuk) Park, Prof. Young-Sik Jeong, Prof. Yi Pan, Prof. Vincenzo Loia, and Prof. Han-Chieh Chao the Steering Committee Chairs of CSA for their strong encouragement and guidance to organize the symposium. We would like to thank CSA 2021 General Chairs: Prof. Jungho Kang, Prof. Kim-Kwang Raymond Choo, Prof. Piao Changhao. We would like to express special thanks to committee members for their timely unlimited support.

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Jinzhao Liu, Yunnan University

Invited Speaker



Deep Learning Platform for B5G Mobile Network

Prof. Han-Chieh Chao

President
National Dong Hwa University, Taiwan

Abstract:

The 3G and 4G mobile communications had been developed for many years. The 5G mobile communication is scheduled to be launched in 2020. In the future, a wireless network is of various size of cells and different type of communication technologies, forming a special architecture of Heterogeneous Networks (HetNet). Under the complex network architecture, interference and handover problems are critical challenges in access network. How to efficiently manage small cells and to choose an adequate access mechanism for the better quality of service is a vital research issue. Traditional network architecture can no longer support existing network requirements. It is necessary to develop a novel network architecture. Therefore, this keynote speech will share a solution of deep learning-based B5G mobile network which can enhance and improve communication performance through combing some specific technologies. e.g., deep learning, fog computing, cloud computing, cloud radio access network (C-RAN) and fog radio access network (F-RAN).

Biography:

Han-Chieh Chao received his M.S. and Ph.D. degrees in Electrical Engineering from Purdue University, West Lafayette, Indiana, in 1989 and 1993, respectively. He is currently a professor with the Department of Electrical Engineering, National Dong Hwa University, where he also serves as president. He was the Director of the Computer Center for Ministry of Education Taiwan from September 2008 to July 2010. His research interests include IPv6, Cross-Layer Design, Cloud Computing, IoT, and 5G Mobile Networks. He has authored or co-authored 4 books and has published about 400 refereed professional research papers. He has completed more than 150 MSEE thesis students and 11 Ph.D. students. Dr. Chao has been invited frequently to give talks at national and international conferences and research organizations. He serves as the Editor-in-Chief for the Institution of Engineering and Technology Networks, the Journal of Internet Technology, the International Journal of Internet Protocol Technology, and the International Journal of Ad Hoc and Ubiquitous Computing. He is a Fellow of IET (IEE) and a Chartered Fellow of the British Computer Society. Due to Dr. Chao's contribution of suburban ICT education, he has been awarded the US President's Lifetime Achievement Award and International Albert Schweitzer Foundation Human Contribution Award in 2016.

PROGRAM SCHEDULE FOR CUTE & CSA 2021

Day 1, December 15, 2021			
Time	Min	HALL A	HALL B
09:00-11:00	120	Local Arrangement Committee Meeting I	
12:30-13:00	30	Registration	
13:00-14:30	90	Offline Session A-1 CUTE Chair: Yan Li	Offline Session B-1 ATFC 2021 Chair: Nammee Moon
14:30-14:40	10	Coffee Break	
14:40-16:10	90	Offline Session A-2 CUTE Chair: Kwang Sik Chung	Offline&Video Session B-2 CSA Chair: Jaesoo Kim
16:10-16:20	10	Coffee Break	
16:20-17:30	70	Keynote Speech: Han-Chieh Chao “Deep Learning Platform for B5G Mobile Network” Chair: Kwang-il Hwang	
17:30-18:00	30	Break	
18:00-20:00	120	Banquet (Only for Invited Members)	

Day 2, December 16, 2021			
Time	Min	ZOOM 1	ZOOM 2
10:00-10:30	30	Registration (Open only until 12 AM)	
10:30-12:00	90	Online Session 1-1 CUTE	Online Session 2-1 CSA

12:00-13:00	60	Lunch	
13:00-14:30	90	Online Session 1-2 CUTE	Online Session 2-2 CSA
14:30-14:40	10	Break	
14:40-16:10	90	Online Session 1-3 Quantum Computing/CSA	Online Session 2-3 Chongqing University
16:10-16:20	10	Break	
16:20-18:00	100	Organizing Committee Meeting I	

Day 3, December 17, 2021		
Time	Min	HALL A
09:00-10:30	90	Local Arrangement Committee Meeting II
10:30-12:00	90	Organizing Committee Meeting II

- 1. A paper presentation should be made by one of authors of the paper for 15 minutes (10 minutes for the presentation itself and 5 minutes for Q/A).**
- 2. All speakers of each session should meet the session chair at their room 10 minutes before the session begins.**
- 3. Windows 7 laptops running the Adobe Reader and Microsoft Office for paper presentations will be prepared. Please prepare for your presentation.**
- 4. All online sections are played on Zoom with recorded video only.**
- 5. For Q&A in the online section, please email the author.**

DETAILED SCHEDULE FOR
THE 14TH KIPS INTERNATIONAL CONFERENCE
ON UBIQUITOUS INFORMATION TECHNOLOGIES AND
APPLICATIONS (CUTE 2021)
&
THE 11TH INTERNATIONAL CONFERENCE ON
COMPUTER SCIENCE AND ITS APPLICATIONS (CSA 2021)

Day 1, December 15, 2021 (Wednesday)

09: 00-11: 00 Local Arrangement Committee Meeting

12: 30-13: 00 Registration

13: 00-14: 30 Session A-1 : CUTE
(HALL A)
(Chair: Yan Li)

- 1. Design of Time Synchronization Protocol in a Multi-Layer Network for Effective Data Collection for the Digital Twin System**
Minsang Yu, Changseok Yoon
- 2. A Study on The Comment Classification System**
Ha Jimin, Park Hyaelim, Park Heeji, Kang Jungho
- 3. IIA Metaverse : Constructing a Digital Reality of Incheon International Airport for Flight Transfer Services**
Jooik Jung, Ihnsik Weon, Seok-Hyun Son
- 4. A study on the building the geospatial data of airports applying 3D scanning and the utilization of metaverse**
Ihn-Sik Weon, Jooik Jung, Seok-Hyun Son
- 5. Toward Robust Vision AI: The Uncomfortable Truths of State-of-the-art Augmentation Methods**
Weebum Yoo
- 6. Comparison of GSR and PPG signals in Arousal and Valence**
Dong-Hyun Kang, Heung-Gu Lee, Ji-Hye Jang, Deok-Hwan Kim

13: 00-14: 30 Session B-1 : ATFC 2021
(HALL B)
(Chair: Nammee Moon)

- 1. Pet Behavior Classification based on Graph Attention Network**
Jihoon Lee, Nammee Moon
- 2. DeepLabCut and CNN-LSTM based pet behavior classification method**
MinChan Shin, Nammee Moon
- 3. Multimodal depression detection system based on attention mechanism using AI speaker**
Junhee Park, Nammee Moon
- 4. Performance evaluation of CycleGAN based on Data Augmentation for Pet-species Classification**
Chan Park, Nammee Moon
- 5. 1D-CNN-LSTM based Pet Behavior Recognition using Wearable device**
Hyungju Kim, Nammee Moon
- 6. Deep multimodal network-based Pet Behavior Recognition using wearable device and camera**
Jinah Kim, Hyungju Kim, Chan Park, Nammee Moon

14: 30-14: 40 Coffee Break

14: 40-16: 10 Session A-2 : CUTE
(HALL A)
(Chair: Kwang Sik Chung)

- 1. A Study on Automated Generation of attack graph for Critical Infrastructure**
Sumin Yim, Sayeon Kim, Ieckchae Euom
- 2. A study on the optimization of weapon system vulnerabilities applying Explored-CNN**
Yun-hee Kim, Jin-Young Choi
- 3. Integrated vulnerability analysis framework reflecting the characteristics of National industrial control systems**
MiJoo Shin, Seong Su Yoon, Ieck Chae Euom
- 4. Implementation of Integrated Control System Prototype for the Next-Generation Integrated Forecasting and Alerting Platform**
Seung-Hyung Lee, Jae-Young Lee, Gi-Yeon Park
- 5. Patent Analysis of Intelligent Vehicle Black Box**
Kyongho Kim, Yeongwoong Yu, Ahyun Lee, Daesub Yoon, Sungwoong Shin
- 6. Architecture of Open Source-based Digital Twin System for Smart Factory**
Yang Koo Lee, Youngjae Lim, Daesub Yoon

14: 40-16: 10 Session B-2 : CSA
(HALL A)
(Chair: Jaesoo Kim)

- 1. Impact of tuning parameters of deep convolutional neural network using a crack image dataset**
Mahe Zabin, Ho-Jin Choi, Md. Monirul Islam, Jia Uddin

2. **Parallel Collision Handling using Grid-Based Culling and Shader in Unity3D**
Tae-won Kim, Nak-Jun Sung, Min Hong, Yoo-Joo Choi
3. **A fast enumeration maximal γ -Quasi-Clique algorithm based on FCA**
Yixuan Yang, Doo-Soon Park, Sony Peng, Makara Mao
4. **Adaptive Vertical Pod Autoscaler for Efficient Cloud Computing Resource Utilization based on Bi-LSTM**
SeungChul Kim, Byeonghui Jeong, Sihyun Park, Jueun Jeon, Young-Sik Jeong
5. **Music Plagiarism Detection using Deep Learning based on Symbolic Domain**
Kyuwon Park, Seungyeon Baek, Jueun Jeon, Young-Sik Jeong
6. **Machine Learning-based pRBC Transfusion Prediction for Major Internal Medical Condition in Intensive Care Unit(ICU)**
Seongbin Lee, Seunghee Lee, Duhyeuk Chang, Mi-Hwa Song, Jong-Yeup Kim, Suehyun Lee

16: 10-16: 20 Coffee Break

16: 20-17: 30 Keynote Speech
(HALL A)
(Chair: Kwang-il Hwang)

Keynote Speech : Han-Chieh Chao
“Deep Learning Platform for B5G Mobile Network”

17: 30-18: 00 Break

18: 00-20: 00 Banquet (Only for Invited Members)

Day 2, December 16, 2021 (Thursday)

10: 00-10: 30 Registration

10: 30-12: 00 Online Session 1-1 : CUTE
(ZOOM 1)

1. **A bibliometric study of digital image forensics**
Saurabh Agarwal, Ki Hyun Jung
2. **Rehabilitation Assistance System for Improving Cognitive Ability Using Image Synthesis**
Seungjun Lee, Woojin Kim, Hyunwoo Joe, HyunSuk Kim, Daesub Yoon

3. **Anomaly Detection for Cloud Virtual Environment via Graph Attention based LSTM Autoencoder**
Yoojong Lee, Hoyeong Yun, Wooju Kim
4. **An Attention Mechanism Based Segmentation Network for Detection of Plant Diseases**
Usman Afzaal, Joonwhoan Lee
5. **Adaptive Power Scaling by Predictable Energy Harvesting on Low-Power Sensor Node**
Hyo-Joong Suh, Hoyoung Hwang
6. **Multicollinearity Analysis for Detecting Diabetes at Risk of Lung Cancer using a Feature Selection**
Khongorzul Dashdondov, Mi-Hye Kim
7. **Multi-task Learning for Single Stage Detector and Feature Embedding**
Minsung Kang, Young-Chul Lim

10: 30-12: 00 **Online Session 2-1 : CSA**
(ZOOM 2)

1. **Spatial Mask-Guided Colorization Using Generative Adversarial Network**
Zuyu Zhang, Yan Li, Byeong-Seok Shin
2. **A Temperature Prediction Model Using Machine Learning Algorithms in Smart Farms**
SaravanaKumar Venkatesan, Jonghyun Lim, Chanagsun Shin, Kyongryong Cho, Yongyun Cho
3. **The application of Hybrid deep learning Approach to evaluate chest ray images for the diagnosis of pneumonia in children, Mohammad Ali Abbasa**
Syed Usama Khalid Bukhari, Syed Khuzaima Arssalan Bokhar, Manal Niazi, Wajahat Ali Khan, Asad Masood Khattak
4. **Adaptive Template-based Scattering Illumination for Realistic Visualization of Volumetric Dataset**
Byeong-Joon Lee, Byeong-Seok Shin
5. **Blockchain-Based Secure Multi-party Computation Framework for Privacy Protection in IoT Networks**
Hao-Tian CHEN, Azzaoui Abir EL, Jong Hyuk Park
6. **Efficient Scent Text Decision Algorithm for Vehicle Text Recognition**
Young-bin Jeong, Kwang-il Hwang
7. **Deep Learning based Data Analytics and Optimization Platform for Industry 4.0**
Yan Li, Byeong-Seok Shin

12: 00-13: 00 **Lunch**

13: 00-14: 30 **Online Session 1-2 : CUTE**
(ZOOM 1)

1. **Design and Implementation of IoT Botnet Malware Digital Forensic Artifacts Acquisition and AI-based Formalization Mechanism**
Hyung-Woo Lee

2. **An Empirical Study of Elastic Memory Platform on PageRank Algorithm in Spark**
Yeonwoo Jeong, Suyeon Lee, Jinhoon Lee, Sungyong Park, Youngjae Kim
3. **Analysis on AMD Secure Encrypted Virtualization Vulnerabilities and Attack Mitigations**
Junseung You, Inyoung Bang, Yunheung Paek
4. **Why Rust Is the Future Of the Cloud**
Inyoung Bang, Martin Kayondo, Junseung You, Yunheung Paek
5. **Improved Disaster Warning System based on Common Alerting Protocol to Increase Disaster Situation Awareness**
Sang gu Jeong, Seung-Hee Oh, Hyunjoo Kang, Kyeong Seob Cho, Woo-sug Jung, Yong Tae Lee
6. **Trajectory privacy protection of selective partial area using the GAN model**
Yeji Song, Jihwan Shin, Jinhyun Ahn, Taewhi Lee, Dong-Hyuk Im
7. **Collecting Physiological Data from Multiple Sources for Detecting Stress**
Kyounghyun Park, Minjung Kim, Jungsook Kim, Daesub Yoon, HyunSuk Kim

13: 00-14: 30 Online Session 2-2 : CSA
(ZOOM 2)

1. **A study on ML model performance analysis according to multiple levels of learning data for building energy consumption prediction**
Taehyung Kim, Youn Kwaee Jeong, Seok Jin Lee
2. **Quantum Computing SW Platform for Fault Tolerant Logical Qubit**
Cheiyol Kim, Soocheol Oh, Sangmin Lee, Youngchul Kim, Jinho On, Gyuil Cha
3. **A Study on Defect Detection System in Gas Lighter Manufacturing Process using Deep Learning and OpenCV**
Sang-Hyun Park, Kang-Hee Lee, Youn-soon Shin
4. **Design of Document HTML Generation Technique for Preserving Content Integrity**
Hyun Cheon Hwang, Ji Su Park, Jin Gon Shon
5. **Vulnerability Analysis of Language Models Generating Mobile Application Reviews**
Seung-Cheol Lee, Yeong-Seok Seo
6. **Design and Implementation of Research Paper Classification Systems based on Word Embedding**
Biswas Dipto, Joon-Min Gil
7. **AI-based Insect Pest Determination Method in Smart Farm**
Chan Heang Lee, Na-young Kwak, Jiwon Choi, Ji Su Park

14: 30-14: 40 Break

14: 40-16: 10 Online Session 1-3: Quantum Computing/CSA
(ZOOM 1)

1. **Federated Learning based Privacy Preserving Medical Data Management scheme**
Mikail Mohammed Salim, Jong Hyuk Park

2. **SDN-based High-performance Cloud Architecture for Secure Smartcity**
Abir EL Azzaoui, Tae Woo Kim, Jong Hyuk Park
3. **Quantum Approximate Optimization Algorithm for Sustainable Smart Logistics System**
Tae Woo Kim, Abir EL Azzaoui, Jong Hyuk Park
4. **Effect of improved learning data quality on automatic document classification model performance**
Byoungwook Kim, Yeongwook Yang, Hong-Jun Jang, Ji Su Park
5. **Automated Classification of Representative Spatio-temporal Documents using Deep Learning**
Hong-Jun Jang, Yeongwook Yang, Byoungwook Kim, Ji Su Park
6. **Extractive summarization with spatio-temporal document**
Yeongwook Yang, Hong-Jun Jang, Jisu Park, Byoungwook Kim

14: 40-16: 10 Online Session 2-3 : Chongqing University
(ZOOM 2)

1. **A Research on Mail Anti-virus Gateway Technology under the Background of Industrial Internet**
Yuhong Wu, Xiangdong Hu
2. **Evaluation of Eco-driving Based on Data-Driven**
Lin Liu, Nenglong Hu, Zhihu Peng, Shuxian Zhan, Jingting Gao, Hong Wang
3. **Research on V2V Image Transmission Method for Networked Vehicles**
Xiaoyue Ding, Changhao Piao, Kang Xiang
4. **An Intrusion Detection Method Fused Deep Learning and Fuzzy Neural Network for Smart Home**
Xiangdong Hu, Qin Zhang, Xi Yang, Liu Yang
5. **A Global-Local Lightness Enhancement Network for Underexposed Images**
yong chen, meiyong huang, huanlin liu, jinliang zhang, kaixin shao
6. **A New LCU Level Bit Allocation Method in VVC**
Donghang Yu, Xiaoyue Ding, Qiang Li
7. **A Study on the Blockchain Utilization in IoT Environment**
Dae Young Kim, Deok Gyu Lee

16: 10-16: 20 Break

16: 20-18: 00 Organizing Committee Meeting I

Day 3, December 17, 2021 (Friday)

09: 00-10: 30 Local Arrangement Committee Meeting II

10: 30-12: 00 Organizing Committee Meeting II

Conference Venue



MAISON GLAD JEJU

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