

The 5th International Conference on Big data, IoT, and Cloud Computing (BIC 2021)

August 16-18, 2021
Jeju, Korea

Organized by

KIPS CSWRG of Korea

Conferences

The 13th International Conference on Computer Science and its Applications (CSA 2021)

- Dec 15-17, 2021, Jeju, South Korea
- <http://csa-conference.org/2021>

The 15th KIPS International Conference on Ubiquitous Information Technologies and Applications (CUTE 2021)

- Dec 15-17, 2021, Jeju, Korea
- <http://cute-conference.org/2021>

Message from the BIC 2021 General Chair

The 2021 International Conference on Big data, IoT, and Cloud Computing will be held in Jeju, Korea, August 16-18, 2021. The BIC 2021 is the newly renamed conference from highly successful series of the International Conference on Ubiquitous Computing Application and Wireless Sensor Network (UCAWSN) - 4th UCAWSN (July, 2016), 3rd UCAWSN (July, 2015), 2nd UCAWSN (July, 2014), and 1st UCAWSN (July, 2013) since 2013. The BIC 2021 will be the most comprehensive conference focused on Big data, IoT, and Cloud Computing (BIC). The BIC 2021 will provide an opportunity for academic and industry professionals to discuss the latest issues and progress in the area of BIC such as model, algorithms, applications, services, performance and reliability for Big data, IoT, Cloud Computing. Also, the conference will publish high-quality papers which are closely related to the various theories and practical applications in Big data, IoT, and Cloud computing. Furthermore, we expect that the conference and its publications will be a trigger for further related research and technology improvements in those important subjects. 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 Doo-soon Park (SoonChunHyang University, Korea), James J. (Jong Hyuk) Park (SeoulTech, Korea), and Young-Sik Jeong (Dongguk University, Korea). Our special thanks go to the Program Chairs, 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.

BIC 2021 General Chair

Han-Chieh Chao, National Ilan University, Taiwan
Jungho Kang, Baewha Women's University, Korea
Qun Jin, Waseda University, Japan
Yi Pan, Georgia State University, USA

Message from the BIC 2021 Program Chairs

Welcome to the BIC 2021 which will be held in Jeju, Korea on August 16~18, 2021. The BIC 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. The BIC 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 Doo-soon Park (SoonChunHyang University, Korea), James J. (Jong Hyuk) Park (SeoulTech, Korea), Young-Sik Jeong (Dongguk University, Korea) as the Steering Chairs of BIC for their strong encouragement and guidance to organize the conference. We would like to thank BIC 2021 General Chairs for their advices to make possible organization of The BIC 2021. We would like to express special thanks to execute members for their timely unlimited support

BIC 2021 Program Chairs

Ji Su Park, Jeonju University, Korea
Arun Kumar Sangaiah, VIT University, India
Jin Wang, Yangzhou University, China

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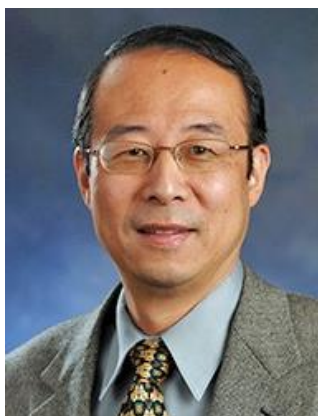
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Invited Speaker



AI in Biological and Biomedical Data Applications

Yi Pan, Ph.D.

Regents' Professor and Chair

Department of Computer Science

Georgia State University, Atlanta, Georgia, USA

Biography:

Dr. Yi Pan is currently a Chair Professor and the Dean of Faculty of Computer Science and Control Engineering at Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China and a Regents' Professor Emeritus at Georgia State University, USA. He served as Chair of Computer Science Department at Georgia State University from 2005 to 2020. He has also served as an Interim Associate Dean and Chair of Biology Department during 2013-2017. Dr. Pan joined Georgia State University in 2000, was promoted to full professor in 2004, named a Distinguished University Professor in 2013 and designated a Regents' Professor (the highest recognition given to a faculty member by the University System of Georgia) in 2015.

Dr. Pan received his B.Eng. and M.Eng. degrees in computer engineering from Tsinghua University, China, in 1982 and 1984, respectively, and his Ph.D. degree in computer science from the University of Pittsburgh, USA, in 1991. His profile has been featured as a distinguished alumnus in both Tsinghua Alumni Newsletter and University of Pittsburgh CS Alumni Newsletter. Dr. Pan's current research interests mainly include bioinformatics and health informatics using big data analytics, cloud computing, and machine learning technologies. Dr. Pan has published more than 450 papers including over 250 journal papers with more than 100 papers published in IEEE/ACM Transactions/Journals. In addition, he has edited/authored 43 books. His work has been cited more than 16000 times based on Google Scholar and his current h-index is 82. Dr. Pan has served as an editor-in-chief or editorial board member for 20 journals including 7 IEEE Transactions. Currently, he is serving as an Associate Editor-in-Chief of IEEE/ACM Transactions on Computational Biology and Bioinformatics. He is the recipient of many awards including one IEEE Transactions Best Paper Award, five IEEE and other international conference or journal Best Paper Awards, 4 IBM Faculty Awards, 2 JSPS Senior Invitation Fellowships, IEEE BIBE Outstanding Achievement Award, IEEE Outstanding Leadership Award, NSF Research Opportunity Award, and AFOSR Summer Faculty Research Fellowship. He has organized numerous international conferences and delivered keynote speeches at over 70 international conferences around the world.

Dr. Pan is a Member of the Academy of the United Nations Sciences and Technology Organization, Foreign Member of Ukrainian Academy of Engineering Sciences, Fellow of American Institute for Medical and Biological Engineering and Fellow of Royal Society for Public Health.

PROGRAM SCHEDULE FOR BIC 2021

Day 1, August 16, 2021			
Time	Min	HALL A	HALL B
08:40-09:00	20	Registration	
09:00-10:30	90	Session A-1 (Presentation of young researchers) Chair: Pradip Kumar Sharma Vice-Chair: Yan Li	Session B-1 (Internet of Things) Chair: : Byoungwook Kim
10:30-10:40	10	Coffee Break	
10:40-12:10	90	Session A-2 (Cloud Computing) Chair: Kwang-il Hwang	Session B-2 (ICT Applications and Services) Chair: Joon-Min Gil
12:10-13:40	90	Lunch	
13:40-14:20	40	Online Keynote Speech: Yi Pan “AI in Biological and Biomedical Data Applications” Chair: Yan Li	
14:20-14:30	10	Coffee Break	
14:30-16:00	90	Session A-3 (Big Data) Chair: Yeong Seok Seo	Session B-3 (HCIS2021 Summer Workshop) Chair: Hong Jun Jang
16:00-16:10	10	Coffee Break	
16:10-17:40	90	Session A-4 (Big Data Center Workshop & BIC2021) Chair: Jun-Ho Huh	Session B-4 (HCIS2021 Summer Workshop) Chair: Ji Su Park
17:40-18:00	20	Break	

Day 2, August 17, 2021		
Time	Min	HALL A
10:00-12:00	120	Organizing Committee Meeting 1
12:00-13:00	60	Lunch
13:00-15:00	120	Local Arrangement Committee Meeting

Day 3, August 18, 2021		
Time	Min	HALL A
10:00-12:00	120	Executive Meeting – Organized by BIC 2021
12:00-13:00	60	Lunch
13:00-15:00	120	Organizing Committee Meeting 2

- 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 10 laptops running the Adobe Reader and Microsoft Office for paper presentations will be prepared. Please prepare for your presentation.**

*** DO NOT PROVIDE ALL MEALS, ONLY WATER ***

DETAILED SCHEDULE FOR THE 5TH INTERNATIONAL CONFERENCE ON BIG DATA, IOT, AND CLOUD COMPUTING (BIC 2021)

Day 1, August 16, 2021 (Monday)

08: 40-09: 00 Registration

09: 00-10: 30 Session A-1 : Presentation of young researchers
(HALL A)
(Chair : Pradip Kumar Sharma)
(Vice-Chair: Yan Li)

1. **A Recognition Method of Handwritten Mathematical Expression Using Learning Contextual Information**
Sungbum Baek, Ji Su Park, Jin Gon Shon
2. **Khmer Word segmentation using maximum matching algorithm**
Makara Mao, Sony Peng, Yixuan Yang, Doo-Soon Park
3. **A Web-based On-demand Streaming System for Senior Behavioral Management Services**
Seokjin Kim, June Hong Park, Dongmahn Seo
4. **VAIAS:Voice recognition-based AI Assistance System for efficient nursing**
Ye Rim Lee, Jae Dong Lee, Ji Sung Yoo, Yul Hwangbo
5. **A Scalable Blockchain-based Secure Authentication Framework for Cloud Video Conferencing**
Abir EL Azzaoui, Jong Hyuk Park
6. **Obfuscated Malware Detection using Multimodal Deep Learning**
Jueun Jeon, Seungyeon Baek, Byeonghui Jeong, Young-Sik Jeong

09: 00-10: 30 Session B-1 : Internet of Things
(HALL B)
(Chair : Byoungwook Kim)

1. **Implementation of a multi-link IoT sensor communication considering scalability**
Yeong-Mo Yeon, Seung-Hee Kim
2. **Optimal Path Design of Drone for Wireless Power Transmission in Solar-Powered LoRaWAN IoT**
Yujin Gong, Minjae Kang, Younghyun Kim, Ikjune Yoon, Dongkun Noh
3. **Dynamic Task-offloading Scheme Using the Reinforcement Learning to Improve QoE in Energy Harvesting IoT Edge Computing Environment**
Minjae Kang, Seungwoo Lee, Yujin Gond, Youngyun Kim, Ikjune Yoon, DongKun Noh
4. **Positioning method using dimensional transformation of space in wireless sensor network environment**
Wonchan Lee, Chang-sung Jeong

5. **Secret Sharing based computation privacy for IoT**
Mikail Mohammed Salim, Changhoon Lee, Jong Hyuk Park
6. **Blockchain-sharing based IoT Cloud Architecture for Large-scale Network**
Tae Woo Kim, Jong Hyuk Park

10: 30-10: 40 Coffee Break

10: 40-12: 10 Session A-2 : Cloud Computing
(HALL A)
(Chair : Kwang-il Hwang)

1. **Difference Analysis of Process Engineering Between on premise ERP and Cloud ERP**
Duk-Soo Oh, Hyung-Soo Kim, Seung-Hee Kim
2. **Implementation of MES in steel maker to build smart factories**
Seon-yong Eom, Seok-jin Shin, Choi Min
3. **Predictive Edge Server Migration Method based on Factor Graph and Formal Concept Analysis**
Yixuan Yang, Sony Peng, Mao Makara, Doo-Soon Park, Fei Hao
4. **Implementation of a Continuous Authentication System for Software Defined Perimeter**
Hwijoon Jeong, Yoojae Won
5. **A Development of Baseline Algorithm for Detecting Representative Spatio-temporal Event**
Byoungwook Kim, Jin Gon Shon, Jisu Park, Joon Min Gil, Hong-Jun Jang
6. **Blockchain-enabled Federated Learning Model for Efficient and Secure Data Communication in Smart Industrial Paradigm**
Sushil Kumar Singh, Changhoon Lee, Jong Hyuk Park

10: 40-12: 10 Session B-2 : ICT Applications and Services
(HALL B)
(Chair : Joon-Min Gil)

1. **Implementation of Safety Services for Children by Using LoRa(Long Range)**
Bo-Kyung Lee, In-Hyo Park, Hyun-Yong Yang, Seung-Hoon Han
2. **A case study of a blockchain-based online secret electronic voting system**
Young-Sung Ihm, Seung-Hee Kim
3. **RASurv: Residual Attention-aware Method for Progression-free Survival of Alzheimer's Disease**
Ngoc-Huynh Ho, Hyung-Jeong Yang, Jahae Kim, Duy-Phuong Dao, Sudarshan Pant
4. **Position prediction system for humans using spatial dimension transformation and machine learning**
Wonchan Lee, Chang-sung Jeong
5. **An adaptive educational computer game for computational thinking education**
Yeongwook Yang
6. **Brain Password System based on Graphical Password**
Gi-Chul Yang

12: 10-13: 40 **Lunch**

13: 40-14: 20 Keynote Speech

Keynote Speech: Yi Pan
“AI in Biological and Biomedical Data Applications ”
(Chair: Yan Li)

14: 20-14: 30 Coffee Break

14: 30-16: 00 Session A-3 : Big Data
(HALL A)
(Chair : Yeong Seok Seo)

- 1. A Sports Activity Recognition Model based on 2D CNN-LSTM with Attention Modules**
Kwanghyun Ryu, Soowon Lee
- 2. Attention-based Image and Text Fusion for Deep Multimodal Classification in Disaster Analysis**
Hoai-Duy Le, Hyung-Jeong Yang, Ngoc-Huynh Ho, Sudarshan Pant
- 3. Machine learning method for positioning data of the sensor in the space**
Wonchan Lee, Chang-sung Jeong
- 4. Movie Recommendation via Wide and Deep Learning**
Sony Peng, Yixuan Yang, Makara Mao, Doo-Soon Park
- 5. Design of Prognosis Support System Model for Cancer Patients using Multi-Agency Medical Data Federated Learning based on Distributed Networks**
Kyoung Yeon Back, Hyun Woo Park, Yul Hwangbo, Hyo Soung Cha
- 6. Region-based FP-Growth algorithm for Association Rule Mining**
Byoungwook Kim, Yeongwook Yang, Hong-Jun Jang, Jisu Park

14: 30-16: 00 Session B-3 : HCIS2021 Summer Workshop
(HALL B)
(Chair : Hong Jun Jang)

- 1. MKFFNet: Multi-scale Keypoints Feature Fusion Network for 3D Object Detection**
Xu Zhang, Linjuan Bai, Zuyu Zhang, Yan Li
- 2. NIOS II Firmware over FPGA based Board Management Controller for HPC Servers**
Min Choi, Seonyong Eom, K.H. Lee
- 3. Fast Shadow Generation of Massive Crowds Based on Screen space**
Mankyu Sung
- 4. Multi-Scale Feature-Based Spatial-Temporal Pyramid Networks for Hand Gesture Recognition**
Zongjing Cao, Yan Li, Byeong-Seok Shin
- 5. Face Detection Using Haar Classifiers Based on Vertical Component Calibration**
Cheol-Ho Choi, Junghwan Kim, Jongkil Hyun, Younghyeon Kim, Byungin Moon

6. An Empirical Study on Spread of COVID-19 Prevention and Control with Patient Contact Network

Yixuan Yang, Fei Hao, Doo-Soon Park, Sony Peng, Makara Mao

16: 00-16: 10 Coffee Break

16: 10-17: 40 Session A-4 : Big Data Center Workshop & BIC2021

(HALL A)

(Chair : Jun-Ho Huh)

- 1. Overview of Smart Aquaculture: Focusing on Machine Learning and Its Applications**
Vo Thi Thu Em, Jun-Ho Huh, Yonghoon Kim
- 2. Deep Learning Based Sharding Distributed Environment Energy Technology for Renewable Energy REC**
Seong-Kyu Kim, Jun-Ho Huh
- 3. A Survey on Efficient Implementation in IoT Aquaculture Systems**
Vo Thi Thu Em, Ngoc Bao Van Le, Yonghoon Kim, Jun-Ho Huh
- 4. Design and Development of User-Centered Fitness Content Interfaces using Smart Mirror**
Yoonjin Jung, Chae Hyun Kim, Myeong-Hyeon Heo, Jinu Kim, Dongho Kim
- 5. Bare-hand Pointer Interface using RGB Camera based Motion Recognition**
Chae Hyun Kim, Yoonjin Jung, Jinu Kim, Myeong-Hyeon Heo, Dongho Kim
- 6. Blockchain-based wild-simulated ginseng Quality Management System**
Youngjun Sung, Heungyoul Youm, Yoojae Won

16: 10-17: 40 Session B-4 : HCIS2021 Summer Workshop

(HALL B)

(Chair : Ji Su Park)

- 1. Correlation between Enterprise Security Performance and Business Performance**
Eunhee Shin, Harang Yu, Sungyun Bae, Hangbae Chang
- 2. Machine Learning and Deep Learning based HTTP-DoS Detection using Performance Metrics in AWS**
Seung-Ah Hong, Minsun Shim, Yu-Ri Song, Ji-Won Kim, Jiyeon Kim
- 3. Comparative Neural Network base on Template Cluster for Automated Abnormal Beat Detection in Electrocardiogram Signals**
Seungmin Lee, Daejin Park
- 4. Trustworthy method for monitoring and tracking in Digital Twins**
SVETLANA KIM, Subi Kim, YongIk Yoon

Day 2, August 17, 2021 (Tuesday)

- 10:00-12:00 **Organizing Committee Meeting 1**
- 12:00-13:00 **Lunch**
- 13:00-15:00 **Local Arrangement Committee Meeting**

Day 3, August 18, 2020 (Wednesday)

- 10:00-12:00 **Executive Meeting – Organized by BIC 2021**
- 12:00-13:00 **Lunch**
- 13:00-15:00 **Organizing Committee Meeting 2**

Conference Venue



MAISON GLAD JEJU

- MAISONGLAD JEJU Hotel
- 80, Noyeon-ro, Jeju-si, Jeju-do, Korea
- Hotel TEL +82-64-747-5000 / FAX +82-64-742-3150
- Web : <https://maisongladjeju-hotels.com/en/web/maison-en>

