The International Conference on Big data, IoT, and Cloud Computing (BIC 2020)

August 17-19, 2020
Jeju, Korea

Organized by

KIPS CSWRG

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2020 International Conferences
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The 12th International Conference on Computer Science and its Applications (CSA 2020)
  - December, 14-16, 2020, Seoul, Korea
  - http://www.csa-conference.org/2020

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Message from the BIC 2020 General Chairs

The 2020 International Conference on Big data, IoT, and Cloud Computing will be held in Jeju, Korea, August 17-19, 2020. The BIC 2020 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 2020 will be the most comprehensive conference focused on Big data, IoT, and Cloud Computing (BIC). The BIC 2020 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.

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BIC 2020
General Chairs

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

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Message from the BIC 2020 Program Chairs

Welcome to the BIC 2020 which will be held in Jeju, Korea on August 17~19, 2020. The BIC 2020 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 2020 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 2020 General Chairs for their advices to make possible organization of The BIC 2020. We would like to express special thanks to execute members for their timely unlimited support.

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Invited Speaker

Current status of ICT Education for National University of Laos

Somphone KANTHAVONG, Ph.D.
Head of Department
Department of Computer Engineering and Information Technology, Faculty of Engineering
National University of Laos, Laos

Abstract
National University of Laos "NUOL" was established by merging the higher education institutes which were under the supervision of several ministries into one university under the Ministry of Education and sports. NUOL has played 4 roles in 1) providing higher education in areas required for the socio-economic development of Laos; 2) performing research in natural and social sciences; 3) preserving the arts, culture and traditions of the nation; and 4) providing academic services to society. It is known for its diversity programs in Bachelor degrees; Master degree programs are conducted in its academic disciplines, and some Doctoral degree programs, as well. In modernization of the university toward digital-based university in the future. NUOL is upgraded for ICT roles to 1) Develop and Manage the ICT infrastructure in the whole university, 2) Develop ICT human resource toward "ICT based society", 3) Supporting and Doing research in the field of Computer Science, Computer Engineering and ICT, and 4) to provide academic services. For strengthening the ICT system in line with the University ICT Development Plan, The ICT Development plan of university is adjusted or improved almost every year in order to catch up with the Rapid pace of the technology. However, it is hard in order to take it into action due to insufficient budget for investment itself. 2011, Since the project called "ASEAN Cyber University" which continuously support by the Republic of Korea, the e-Learning has been being done in NUOL. In addition Lao IT Business Incubation Center (LIBIC) is also one of the core activities and will be identified in this talk.

Professional Experience Record:
- From 1987-1996 : Lecture at Electronic and Electrical College, Ministry of Education and sports
- From 1996-2004 : professor at Department of Electronic and Telecommunication Engineering, Faculty of Engineering, National University of Laos
- From 2004-2008 : Director of Lao-Japan Technical Training Center, Faculty of Engineering, National University of Laos
- From 2008-present : Head of Department of Computer Engineering and Information Technology, Faculty of Engineering, National University of Laos

Research Area:
- QoS Based Routing Algorithm with Crank-Back Ability. International Conference on Control, Automation and System (ICCAS 2003)
- Optical-Quantum Security using Dark-Bright Solution Conversion in a Ring Resonator System, Procedia Engineering
- Evaluation of Medical Ultrasonic Echo Image Quality for No-Reference Image, Regional Conference on Information and Communication Technology
- Intelligent for 3D Localization Supported visitor Tracking Service in Lao's Museum RCCIE-2013,
- Image Quality Criterion of Ultrasonic Echo Image using Standard Deviation, JICTEE 2014
- Smart Tracking System Applied for Lao's Museum using RFID Technology based on Fingerprint Technique
- A Context-Aware Application for Controlling Multi-sensors to Monitor Energy Use in Rooms, The 3rd International Conference on Big Data Applications and services

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PROGRAM SCHEDULE FOR
BIC 2020

Day 1, Aug. 17, 2020			
Time	**Min**	**HALL A**	**HALL B**
08:40-09:00	20	**Registration**	
09:00-10:20	80	**Session A-1** **BIC2020** Chair : Koojoo Kwon	**Session B-1** **FT2020/MUE2020** Chair : Dohyun Kim
10:20-10:30	10	**Coffee Break**	
10:30-11:50	80	**Session A-2** **BIC2020** Chair : Yan Li	**Session B-2** **FT2020/MUE2020** Chair : Shon Jin Gon
11:50-13:00	70	**Lunch**	
13:00-13:30	30	**Keynote Speech: Somphone KANTHAVONG, Ph.D.** **"Current status of ICT Education for National University of Laos"** Chair : Kwang-il Hwang	
13:30-13:40	10	**Coffee Break**	
13:40-15:00	80	**Session A-3** **BIC2020** Chair : Youngkon Lee	**Session B-3** **FT2020/MUE2020** Chair : KeeHyun Park
15:00-15:10	10	**Coffee Break**	
15:10-16:30	80	**Session A-4** **HCIS Workshop2020** Chair : Min Choi	**Session B-4** **BIC2020/FT2020/MUE2020** Chair : Byoungwook Kim
16:30-16:40	10	**Coffee Break**	
16:40-18:00	80	**Session A-5** **HCIS Workshop2020** Chair : Min Choi	**Session B-5** **BIC2020/FT2020/MUE2020** Chair : Ji Su Park

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Day 2, Aug. 18, 2020		
Time	**Min**	**HALL A**
09:00-10:30	90	**Session A-6** **HCIS Workshop2020** Chair : Yan Li
10:30-10:40	10	**Coffee Break**
10:40-12:10	90	**Session A-7** **BIC2020/FT2020/MUE2020** Chair : Im Y. Jung

Day 3, Aug. 19, 2020		
Time	**Min**	**HALL -A**
10:00-12:00	120	Organizing Committee Meeting (Only for Invited Members)
13:00-15:00	120	Local Arrangement Committee Meeting (Only for Invited Members)
16:00-17:30	90	Executive Meeting - Organized by BIC2020, FT2020, MUE2020 (Only for Invited Members)

1. **A paper presentation should be made by one of authors of the paper for 15 minute.**
   (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.**

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DETAILED SCHEDULE FOR
The International Conference on
Big data, IoT, and Cloud Computing (BIC 2020)

Day 1, Aug. 17, 2020 (Monday)

08:40-09:00 Registration

09:00-10:20 Session A-1 : BIC2020
(HALL A)
(Chair: Koojoo Kwon)

1. **Electrostatic Coupling Intra-Body Communication Based on Frequency Shift Keying and Error Correction for Asynchronous Clock-less IoT Applications**
   Seongho Cho, Sanghoon Lee and Daejin Park
2. **A Deep Learning Approach for Identifying User Interest from Targeted Advertising**
   Wonkyung Kim, Kukheon Lee, Hongkyun Kwon, Gimin Hur, Hoyong Choi, Sangjin Lee, Doowon Jeong
3. **Forensic Analysis of Storage Space: RAID System on Windows**
   Junho Kim, Jonghyun Choi, Sangjin Lee, Doowon Jeong
4. **PicTalky: Deep learning-based speech therapy platform for developmental disabilities**
   Chanjun Park, Yanghee Kim, Yoonna Jang, Umadevi G.R, Heuiseok Lim
5. **Accuracy-Power Controllable LiDAR Sensor for Autonomous Vehicles using an Algorithm of Variable Resolution**
   Sanghoon Lee, Dongkyu Lee, Seongho Cho, Pyung Choi and Daejin Park
6. **OTP-based Cloud System Architecture for Secure Data Transmission**
   Tae Woo Kim, Jong Hyuk Park

09:00-10:20 Session B-1 : FT2020 / MUE2020
(HALL B)
(Chair: Dohyun Kim)

1. **Research on Optimization of Knapsack Problem in Logistics Distribution**
   Yan Zhang, Yanmei Zhou, Hao Hu
2. **System architecture with respect to indoor localization**
   Martin Zmítko, Jan Budina, Tomáš Kozel
3. **Improvement Efficiency of Fingerprint Database using Mathematical Methods**
   Martin Zmítko, Jan Budina, Tomáš Kozel

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4. **Blended Learning as an Effective Approach to English Language Teaching at the Institutions of Higher Learning – A Case Study**
   Blanka Klimova

5. **Cultural Discourse in Human-Computer Interactions: Linguistic Aspects of Digital Communication**
   Marcel Pikhart

6. **Automatic Computing Device Selection Scheme between CPU and GPU for Enhancing the Computation Efficiency**
   Geunmo Kim, Sungmin Kim, Jinsung Cho, Jeong-Dong Kim, and Bongjae Kim

10:20-10:30 Coffee Break

10:30-11:50 Session A-2 : BIC2020
(HALL A)
(Chair: Yan Li)

1. **Improving Autoencoder using Latent Variables for Novelty Detection**
   Seung Yeop Shin and Han-joon Kim
2. **Real-Time Abnormal Beat Detection Method using Template Cluster for ECG Diagnosis on IoT Devices**
   SeungMin Lee, Daejin Park
3. **Template-Based Local Linear Approximation Using Modified Dynamic Programming for Lightweight ECG Signal Processing on Edge Devices**
   SeungMin Lee, Daejin Park
4. **Investigating Cognitive Load in Multimedia Presentation Using an Eye Tracker**
   Ruichen Cong, Kiichi Tago, Qun Jin
5. **Predicting the Housing Purchase Price Index using Deep Learning Model**
   SeungJu Baek, MoonHyun Kim
6. **Rotation-Invariant and Scale-Invariant Color Content-Based Image Retrieval**
   Hee-Hyung Bu, Sung-Ho Kim

10:30-11:50 Session B-2 : FT2020 / MUE2020
(HALL B)
(Chair: Jin Gon Shon)

1. **Interlacing Data to Classify Software in Linear Regression Approach**
   Hyun-il Lim

2. **A Study on Dropout Techniques to Reduce Overfitting in Deep Neural Networks**
   Hyun-il Lim

3. **Hierarchical Similarity Hash for Fast Malware Detection**
   Sunoh Choi

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4. **Academic Paper Personalized Search based on Interest Subject Tracking and Search Performance Evaluation**
   Sangjun Han, Sukhyung Lee, Namgyu Kang, Heeseok Choi and Sungpil Choi
5. **Analysis Design Study for Fake News Identification and Evaluation**
   Lee Won Park, Hangbae Chang
6. **Current Status and Forecast of Blockchain Application in Security Technology**
   Jiwon Han, Yerin Yu, Hanmi Lee, and Jungho Kang

11:50-13:00 Lunch

13:00-13:30 <u>Invited Speaker</u>
(Chair: Kwang-il Hwang)

Current status of ICT Education for National University of Laos

Somphone KANTHAVONG, Ph.D.
Head of Department
Department of Computer Engineering and Information Technology, Faculty of Engineering
National University of Laos, Laos

13:30-13:40 Coffee Break

13:40-15:00 <u>Session A-3 : BIC2020</u>
(HALL A)
(Chair: Youngkon Lee)

1. **R Parallel Computing to Applicable in Recommendation System**
   Phonexay Vilakone, Sony Peng, Hyejung Lee, Doo-Soon Park
2. **A Study of Reference Model and Operation Process for PPP(Public-Private-Partnership) Cloud**
   Youngkon Lee, Ukhyun Lee
3. **Model Aggregation Technique for Smart Wafer Fabrication Facility**
   Moon Gi Seok and Daejin Park
4. **The Authentication Framework for clinical data in IoT**
   Jae Dong Lee, Park Phil Lip, DongHun Kyeng, Hyo Soung Cha
5. **Responsive Clinical Research Search Portal (CRSP) in Single Institution**
   Jip Min Jung, Phil Lip Park, Jong Soo Hong, Min Shik Rhie, Kyung Lak Jung, Kui Son Choi
6. **A Lightweight Cryptography using Blockchain for Preventing Privacy in Heterogeneous Network**
   Jeonghun Cha, Jong Hyuk Park

13:40-15:00 Session B-3 : FT2020 / MUE2020
(HALL B)
(Chair: KeeHyun Park)

1. **Implementation of an Authentication System GTPass**
   Monsoon Khadka and Gi-Chul Yang
2. **A Benchmark Test for Stateless Stream Partitioning over Distributed Network Environments**
   Siwoon Son and Yang-Sae Moon
3. **Blockchain and Trusted Execution Environment Based Fairness Incentive Mechanism in Crowdsensing**
   Yihuai Liang, Yan Li, Byeong-Seok Shin
4. **Entity Summarization in Fuzzy Knowledge Graph Based on Fuzzy Concept Analysis**
   Erhe Yang, Fei Hao, Jie Gao, Doo-Soon Park
5. **Design of a Multi-core IP-NDN Gateway for Smart Dust IoT Environments**
   JuGeon Pak, Joonsuu Park, KeeHyun Park
6. **Construct of data compression system for urgent data transmission in smart dust environment**
   Joonsuu Park, KeeHyun Park

15:00-15:10 Coffee Break

15:10-16:30 Session A-4 : HCIS Workshop2020
(HALL A)
(Chair: Min Choi)

1. **PTMVR: Efficient Path Tracer for Mobile Virtual Reality based on Gaze Point and Reprojection with CPU/GPU Coordination**
   SeongKi Kim, Mankyu Sung
2. **Performance Comparison on Network Protocols for Blockchain-based IoT platforms**
   Minkyung Kim, Kangseok Kim, Jai-Hoon Kim
3. **Comparison and Analysis of Artificial Intelligence based Filtering Algorithms for Monte-Carlo Noises**
   Soroor Malekmohammadi faradounbeh, SeongKi Kim
4. **Human Mesh Reconstruction with Generative Adversarial Networks from Single RGB Image**
   Rui Gao, Mingyun Wen, Phuong Minh Chu, Jisun Park, Kyungeun Cho

15:10-16:30 Session B-4 : BIC2020 / FT2020 / MUE2020
(HALL B)
(Chair: Byoungwook Kim)

1. **Analysis of Communication between Software Part and Hardware Part in APSoC Device**
   Shinho Lee, Ara hur and Yeonseung Ryu
2. **Identifying Critical Topics for Successful Games in Game Reviews by Applying Latent Dirichlet Allocation**

Mookyung Kwak, Ji Su Park, Jin Gon Shon

3. **A Study on Protocol Comparison for Energy-efficient Network Configuration in Mobile Edge Computing**
Bok Gi Min, Ji Su Park, Jin Gon Shon

4. **A Survey on Safety Services for Automated Convergence Security System in Smart City**
Youngboo Kim, Gayoung Kim, Junho Jeong

5. **Energy Efficient Enhanced KCCED Routing Protocol Based Wireless Sensor Network**
SeaYoung Park, Jong-Yong Lee, Daesung Lee

6. **Designing a Predictive Model for Efficient Learning Outcomes in Korean Education**
Ji-Hoon Seo, Kil-Hong Joo

7. **Development of Korean Tourist Information Platform based on Big Data**
Ji-Hoon Seo, Kil-Hong Joo

16:30-16:40 Coffee Break

16:40-18:00 Session A-5 : HCIS Workshop2020
(HALL A)
(Chair: Min Choi)

1. **IoT edge server based solid distributed processing platform**
Seonyong Eom, Min Choi

2. **PBFT Blockchain-based Identity Service for OpenStack**
Youngjong Kim, Sungil Jang, Myungho Kim, Jinho Park

3. **Automatic Spine Bone Segmentation using Convolutional Neural Networks**
Xu Yin, Yan Li, Byeong-Seok Shin

4. **Google Knows What You Did: Cloud Forensic Investigation for Google Cloud**
Dohyun Kim, Junki Kim, Sangjin Lee

16:40-18:00 Session B-5 : BIC2020 / FT2020 / MUE2020
(HALL B)
(Chair: Ji Su Park)

1. **An SDN-based Scheduling Method for Industrial IoT Environment with Edge Computing**
Chan Haeng Lee, Jihie Kim, Joon-Min Gil, Ji Su Park

2. **Development of a non-contact autostereoscopic 3D button using artificial intelligence**
Sang-Hee You, Min Hwang, Ki-Hoon Kim, Chang-Suk Cho

3. **Deep Learning Adoption Blockchain Secure Framework for Cyber Physical System**
Jose Costa Sapalo Sicato, Yi Pan and Jong Hyuk Park

4. **Blockchain-based Secure Digital Twin Framework for Smart Healthy City**
Abir EL Azzaoui, Vincenzo Loia and Jong Hyuk Park

Day 2, Aug. 18, 2020 (Tuesday)

09:00-10:30 Session A-6 : HCIS Workshop2020
(HALL A)
(Chair: Yan Li)

1. **Optimum Preventive Replacement Interval for the Physical Component of Cyber Physical Systems**
   Temesgen Alemayehu, Jai-Hoon Kim, We-Duke Cho
2. **Data analysis for voice phishing detection and blocking using voice recognition and document classification**
   Jeong-Wook Kim, Gi-Wan Hong, Hang-Bae Chang
3. **Research on data storage technology based on Wireless Sensor Network**
   Peng Fu, Haifeng Wang

10:30-10:40 Coffee Break

10:40-12:10 Session A-7 : BIC2020 / FT2020 / MUE2020
(HALL A)
(Chair: Im Y. Jung)

1. **A provenance-based approach of event tracking for connected vehicle**
   Keonhyeong Kim, Im Y. Jung
2. **Deep Attention-based Transformer Model for MIDI Music Genre Classification**
   Lvyang Qiu, Shuyu Li, Sumi Ji, Yunsick Sung
3. **Experimentation of Human Activity Recognition by Using Accelerometer data based on LSTM**
   Phataratah Sa-nguannarm, Ermal Elbasani, Bongjae Kim, Eung-Hee Kim, and Jeong-Dong Kim
4. **Graph and Convolution Recurrent Neural Networks for Protein-compound interaction prediction**
   Ermal Elbasani and Jeong-Dong Kim
5. **Fake review analysis based on text generation model**
   Seung Cheol Lee, Yeong-Seok Seo
6. **Deep Learning-based Object Tracking in Mobile Robot**
   Myeongsuk Pak, Sanghoon Kim

Day 3, Aug. 19, 2020 (Wednesday)

10:00-12:00 **Organizing Committee Meeting**

13:00-15:00 **Local Arrangement Committee Meeting**

16:00-17:30 **Executive Meeting – Organized by BIC 2020, FT2020, MUE 2020**

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Conference Venue

MAISON GLAD JEJU

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