

The 12th International Conference on Computer Science and its Applications (CSA 2020)

December 14-16, 2020
Jeju, Korea

Organized by

**KIPS CSWRG of Korea
Chongqing Univ. of Post & Telecom of China**

Conferences

The 15th International Conference on Multimedia and Ubiquitous Engineering (MUE 2021)

- April 22-24 2021, Seoul, South Korea
- <http://www.mue-conference.org/2021/>

The 16th International Conference on Future Information Technology (FutureTech 2021)

- April 22-24 2021, Seoul, South Korea
- <http://www.futuretech-conference.org/2021/>

Message from the CSA 2020 General Chair

International Conference on Computer Science and its Applications (CSA 2020) is the 12th event of the series of international scientific conference. This conference takes place Jeju, Korea, December 14 - 16, 2020. CSA 2020 will be the most comprehensive conference focused on the various aspects of advances in computer science and its applications. CSA 2020 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 2020 is the next event in a series of highly successful International Conference on Computer Science and its Applications, previously held as CSA 2019 (11th Edition: Macau, China), 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), Yi Pan (Georgia State University, USA), Han-Chieh Chao (National Ilan University, Taiwan), Young-Sik Jeong (Dongguk University, Korea), Vincenzo Loia (University of Salerno, Italy).

Our special thanks go to the Program Chairs: Yan Li (Inha University, Korea), S. Vimal (National Engineering College, India), Joon-Min Gil (Catholic University of Daegu, Korea), Alireza Souril (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 2020 General Chair

Jungho Kang, Baewha Women's 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 2020 Program Chairs

Welcome to the 12th International Conference on Computer Science and its Applications (CSA 2020) which will be held in Jeju, Korea, December 14 - 16, 2020. CSA 2020 will be the most comprehensive conference focused on the various aspects of advances in computer science and its applications.

CSA 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. CSA 2020 is the next event in a series of highly successful International Conference on Computer Science and its Applications, previously held as CSA 2019 (11th Edition: Macau, China), 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 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 Prof. James J. (Jong Hyuk) Park, Prof. Yi Pan, Prof. Han-Chieh Chao, Prof. Young-Sik Jeong, and Prof. Vincenzo Loia the Steering Committee Chairs of CSA for their strong encouragement and guidance to organize the symposium. We would like to thank CSA 2020 General Chairs: Prof. Jung-ho Kang, Prof. Kim-Kwang Raymond Choo and Prof. Piao Changhao. We would like to express special thanks to committee members for their timely unlimited support.

CSA 2020 Program Chairs

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

Organization

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Piao Changhao, Chongqing University of Post and Telecom, China

Program Chairs

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Jinho Park, Soongsil University, Korea
Seokhong Min, Mindata co, Korea
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Rui Li, Chongqing University of Post and Telecom, China
Mingjie Liu, Chongqing University of Post and Telecom, China

Invited Speaker



Recent Developments in Deep Learning Research

Prof. Laurence T. Yang

CRegents' Professor and Chair

Department of Computer Science

Georgia State University, Atlanta, Georgia, USA

Biography:

Dr. Yi Pan is currently a Regents' Professor and has served as Chair of Computer Science Department at Georgia State University since January 2006. 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 13,500 times based on Google Scholar and his current h-index is 70. 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 60 international conferences around the world.

Dr. Pan is a "Great Master Face-to-Face" Series Speaker (2012), an IEEE Distinguished Speaker (2000-2002), a Yamacraw Distinguished Speaker (2002), and a Shell Oil Colloquium Speaker (2002). He is a Fellow of RSPH, IET and JSPS and a member of EUAS. He is listed in Men of Achievement, Who's Who in Midwest, Who's Who in America, Who's Who in American Education, Who's Who in Computational Science and Engineering, and Who's Who of Asian Americans.

PROGRAM SCHEDULE FOR CSA 2020

Day 1, December 14, 2020			
Time	Min	HALL A	HALL B
08:40-09:00	20	Registration	
09:00-10:30	90	Session A-1(Online) Chair:	Session B-1(Online) Chair:
10:30-10:40	10	Coffee Break	
10:40-12:10	90	Session A-2 Network, Security, and privacy Chair:	Session B-2 Internet of Things and Sensors Chair:
12:10-13:40	90	Lunch	
13:40-14:20	40	Online Keynote Speech: Yi Pan “Recent Developments in Deep Learning Research”	
14:20-14:30	10	Coffee Break	
14:30-16:00	90	Session A-3 Presentation of young researchers Chair: Pradip Kumar Sharma	Chongqing University Online Session B-3 Chair:
16:00-16:10	10	Coffee Break	
16:10-17:30	90	Session A-4 Data and Multimedia Chair:	Chongqing University Online Session B-4 Chair:
17:30-18:00	30	Break	
18:00-19:30	90	Banquet	

Day 2, December 15, 2020		
Time	Min	HALL A
08:40-09:00	20	Registration
09:00-10:30	90	Session A-5 Artificial intelligence and Multimedia Chair:
10:30-10:40	10	Coffee Break
10:40-12:10	90	Session A-6(Online) Chair:

Day 3, December 16, 2020		
Time	Min	HALL A
09:30-11:00	90	Organizing Committee Meeting
11:00-12:30	90	Local Arrangement Committee Meeting

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.

DETAILED SCHEDULE FOR
THE 12TH INTERNATIONAL CONFERENCE ON
COMPUTER SCIENCE AND ITS APPLICATIONS (CSA 2020)

Day 1, December 14, 2020 (Monday)

08: 30-09: 00 Registration

09: 00-10: 30 Session A-1 : Online
(HALL A)
(Chair:)

- 1. Title**
Authors

09: 00-10: 30 Session B-1 : Online
(HALL B)
(Chair:)

- 1. Title**
Authors

10: 30-10: 40 Coffee Break

10: 40-12: 10 Session A-2 : Network, Security, and privacy
(HALL A)
(Chair:)

- 1. Deep Character-Level URL Model Based on Convolutional Autoencoder for Zero-Day Phishing Website Detection**
Seok-Jun Bu, Hae-Jung Kim
- 2. Expert Knowledge Fusion based on a Convolutional Gated Network for Phishing URL Classification**
Seok-Jun Bu, Hae-Jung Kim
- 3. Dynamic offloading method based on the dependencies of space for Edge Computing**
Jieun Kang, Svetlana Kim, Jaeho Kim, NakMyoung Sung, Yong Ik Yoon
- 4. Maximal Balanced Clique Detection in Signed Networks Based on a Modified Three-way Concept Lattice**
Yixuan Yang, Doo-Soon Park, Fei Hao, Sony Peng, Min-Pyo Hong
- 5. Movie Recommendation System based on Belief Propagation Technique with a doParallel Algorithm**

Sony Peng, Doo-Soon Park, Yixuan Yang, Han-Na Lee, Hyejung Lee

6. A Brief Analysis on State of the Art Spatial Steganalysis Techniques

Saurabh Agarwal, Ki-Hyun Jung

7. Distributed Quantum-Cloud Approach based on Blockchain for Future Smart City

Abir EL Azzaoui, Vincenzo Loia, Jong Hyuk Park

8. FogKeyAuth: Secure Key Agreement scheme for IoT D2D Networks

Mikail Mohammed Salim, Yi Pan, Jong Hyuk Park

10: 40-12: 10 Session B-2 : Internet of Things and Sensors

(HALL B)

(Chair:)

1. Real-time Automatic Passenger Counting using Head Detection in Embedded System

Hyunduk Kim, Sang-Heon Lee, Myoung-Kyu Sohn

2. An Efficient Communication-Overhead-Reduction Algorithm Using Template-based Adaptive Signal Compression in Lightweight Embedded IoT Devices

Daejin Park, SeungMin Lee

3. Distance measurement and notification service between objects using Wi-Fi Fingerprinting and YOLOv4 to prevent the spread of COVID-19 in indoor spaces

Minchan Shin, Nammee Moon

4. Abnormal Beat Detection from Unreconstructed Compressed Signals Based on Linear Approximation in ECG Signals Suitable for Embedded IoT Devices

Daejin Park, SeungMin Lee

5. A Study on the Image Resolution Enhancement Method for Far Face Recognition in Smart Glasses

Yong-Kyun Kim, Geon Woo Kim

6. Prediction of Gas Leak Risk using Log Transform Based K-means Clustering

Khongorzul Dashdondov, Mi-Hye Kim

7. A Blockchain-based Secure Framework using BitTorrent and Telehash Protocols for Smart Manufacturing

Sushil Kumar Singh, Jong Hyuk Park

12: 10-13: 30 Lunch

13: 30-14: 20 Keynote Speech

Keynote Speech: Yi Pan
“Recent Developments in Deep Learning Research”

14: 20-14: 30 Coffee Break

14: 30-15: 50 Session A-3 : Presentation of young researchers

(HALL A)

(Chair : Pradip Kumar Sharma)

- 1. A Defense Technique of Web Session Hijacking Attacks using Authentication of User Information**
Woo Seob Hwang, Ji Su Park, Jin Gon Shon
- 2. An Edge Detection Technique for Improving the Performance of eGAN Model**
Cho Youn Lee, jisun park, Jin Gon Shon
- 3. Blockchain-based IoT cloud Architecture for Security Policy Management**
Tae Woo Kim, Jong Hyuk Park
- 4. Discussion & Mentoring**

14: 30-15: 50 Session B-3 : Online Session B-3

(HALL B)

(Chair:)

- 1. Hot spot detection of thermal infrared image of photovoltaic power station based on multi-task fusion**
Piao Changhao, Li Gong, Wang Xianhao, Liu Mingjie
- 2. Gauss Pseudo-spectrum Optimization-based Velocity Planning of Rail Transit Trains with Running and Computation Delays**
Zhou Lei, Liu Ping
- 3. Improved Gauss pseudospectral method for UAV trajectory planning with terminal position constraints**
Hu Qingquan, Liu Ping
- 4. Study of Hollow Letter CAPTCHAs Recognition Technology Based on Color Filling Algorithm**
Shao Huishuang, Meng Kai, Piao Changhao
- 5. Multi-sensor information ensemble-based automatic parking system for vehicle parallel/nonparallel initial state**
Changhao Piao, Jun Zhang, Mingjie Liu

15: 50-16: 00 Coffee Break

16: 00-17: 30 Session A-4 : Data and Multimedia

(HALL A)

(Chair:)

- 1. The Needs Analysis of Software Safety Education Program for Common Competency Area (Re-upload)**
Ji-Woon Kang, Sung-Ryoung Do
- 2. Prediction of Methane Emissions from Incubated Streambed Sediments Using Normalization**
Khongorzul Dashdondov, Mi-Hye Kim
- 3. Optimized FPGA Accelerator with a Fidelity-Controllable Sliding-Region for Energy-Efficient Matrix Calculation**

Dongkyu Lee, Daejin Park

4. **Design of Virtual Reality contents recommendation service based on Object Recognition with Eye-Tracking in Virtual Reality and CNN-LSTM**

Jihoon Lee, Namme Moon

5. **Cow Activity Analysis Using Movement Rate Based on Image Processing**

Keunho Park, Sunghwan Jeong

6. **A Study on the Processing of Timestamps in Creating Multimedia Files on Mobile devices**

Jaehyeok Han, Sangjin Lee

7. **A Probabilistic Regular Expression based DGL for Synthetic Big Data Generation**

Kai Cheng, Kesuke Abe

16: 00-17: 30 Session B-4 : Online Session B-4

(HALL B)

(Chair:)

1. **High-Efficiency Doherty Power Amplifier Based on an Asymmetric Structure**

Maolin Liu, Bin Wang, Jiang Teng

2. **Optimized Multilayer Structure for Enhanced and Broadband Electromagnetic Wave Absorption Properties**

Yang Ping-an, Huang Yuxuan, Yang Sun, Li Yuanyuan, Li Rui, Wang Xiaojie

3. **Design a magnetically controlled soft gripper with versatile grasping based on magneto-active elastomer**

Mengjie Shou, Shenyao Fen, Hao Wang, Ping-an Yang, Yuanyuan Li, Yuxuan Huang, Rui Li

4. **Design of MCU automatic test system for pure electric vehicle air conditioner based on virtual instrument**

Xu Yang, Chen Shang

5. **Research on Single-phase Grounding Fault Classification and Diagnosis Model Based on Wavelet Analysis and Support Vector Machine**

Zuohong Yang, Pan Duan, Changhao Piao, Ben Zhang, Ya He

17: 30-18: 00 Break

18: 00-19: 30 Banquet

Day 2, December 15, 2020 (Tuesday)

08: 40-09: 00 Registration

09: 00-10: 30 Session A-5 : Artificial intelligence and Multimedia

(HALL A)

(Chair:)

1. **A Study on Cloud Resource Allocation for Efficient Online Video Service Based on Reinforcement Learning**
Misun Park, Yeseul Lee, Soobeen Oh, Minkyung Jo, Hyerim Jang, Yongik Yoon, Tai-Won Um
2. **Recommendation System Based on Reinforcement Learning with Categorized Conditional Replay Memory for Online Media Content**
Hyerim Jang, Minkyung Jo, Misun Park, Soobeen Oh, Yeseul Lee, Yongik Yoon, Tai-Won Um
3. **Multi-modal emotional analysis mental care service through AI speaker**
junhee park, nammee moon
4. **Ensemble learning with breed classification model for improving the performance of dog face identification model**
Bohan Yoon, Hyeonji So, Piao Wenbin, Jongtae Rhee
5. **Classification of glioma subtype from pathological images using deep transfer learning**
Eun Young Rha, Sang Hyuk Im, Jonghwan Hyeon, Ho-Jin Choi, Seungjong Kim, Gilly Yun, Yuchae Jung, Tae-Jung Kim
6. **Understanding Temporal Relations for Clinical Trials Based on End-to-End Learning Approach**
Chae-Gyun Lim, Yuchae Jung, Ho-Jin Choi
7. **Text Classification with Attention Network under Semantic Tensor Space Model**
Gil-jae Lee, Han-joon Kim
8. **Deep Learning-based Object Tracking in Mobile Robot**
Myeongsuk Pak, Sanghoon Kim
9. **A Deep Bidirectional Similarity Learning for multivariate time series clustering**
Jinah Kim, Nammee Moon
10. **Classification of Growth Conditions in Paprika Leaf Using Hyperspectral Images and Deep Neural Network**
Kangin Choi, Keunho Park, Sunghwan Jeong

10: 30-10: 40 **Coffee Break**

10: 40-12: 10 **Session A-6 : Online**

(HALL A)

(Chair:)

1. Title

Authors

Day 3, December 16, 2020 (Wednesday)

09:30-11:00 **Organizing Committee Meeting**

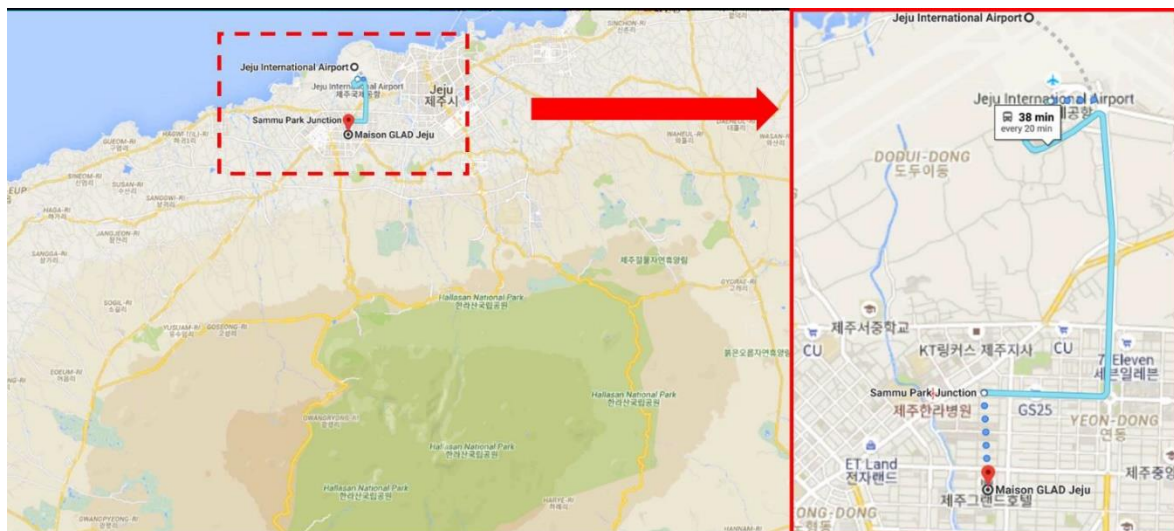
11:00-12:30 **Local Arrangement Committee Meeting**

Conference Venue



MAISON GLAD JEJU

- MAISONGLAD JEJU Hotel
- 80, Noyeon-ro, Jeju-si, Jeju-do, Korea
- Front dest TEL +82-64-717-5000 / FAX +82-64-742-3150
- Reservation TEL +82-64-747-5000 / FAX +82642-742-3150
- Web : <https://maisongladjeju-hotels.com/en/web/maison-en>





ChongQing, China(Online)

- Chongqing University of Posts & Telecommunications
- 2, Chongwen Road, Nan-an, Chongqing, China

