The Institution of Engineering and Technology

IC 2024

The 7th International Conference on Innovative Computing

Final Program

January 23 - 26, 2024

Taichung, Taiwan

The 7th International Conference on Innovative Computing (IC 2024)

Co-Located Event

The International Workshop on Future Information Technology (FutureIT 2024)

IC 2024
Final Program

Taichung, Taiwan

January 23 - 26, 2024

Organized by

Frontier Computing Conference Group

Sponsors

IET

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國際工程與科技學會中華民國分會

National Taichung University of Science and Technology

NATIONAL TAICHUNG UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Providence University

PROVIDENCE UNIVERSITY

Message from Organizing Committees

The 7th International Conference on Innovative Computing (IC 2024) will be held in January 23 - 25, 2024 at Taichung, Taiwan. This event is the 7th event of the conference series, in which fruitful results can be found in IC2015 (Xiamen, China), IC2016 (Taichung, Taiwan), IC2020 (Ho Chi Minh, Vietnam), IC2021 (Online), IC2022 (Online), IC2023(Singapore). Each event brings researchers worldwide together to have exciting and fruitful discussions as well as future collaborations.

This conference series aims at providing an open forum to reach a comprehensive understanding of the recent advances and emergence of innovative computing in information technology, science, and engineering. There is an international workshops and international conferences are jointly operated with IC2024 at the same time and place, the International Workshop on Future Information Technology (FutureIT 2024), which is organized by FC conference group and Korean Institute of Information Technology, Korea Institute of information technology and innovation (KIITI) and SIEC Korea Chapter.

The papers accepted for inclusion in the conference proceeding primarily cover the topics: networking and communications, embedded system, soft computing, social network analysis, security and privacy, optics communication, ubiquitous, artificial intelligence, and pervasive computing. Many papers have shown their great academic potential and value and indicate promising directions of research in the focused realm of this conference series. We believe that the presentations of these accepted papers will be more exciting than the papers themselves, and lead to creative and innovative applications. We hope that the attendees (and readers as well) will find these results useful and inspiring to your field of specialization and future research.

On behalf of the organizing committee, we would like to thank the members of the organizing and the program committees, the authors, and the speakers for their dedication and contributions that make this conference possible. We appreciate the contributions of these experts and scholars to enrich our IC2024. A warm welcome is extended to all participants, with a hope that the conference not only serves as a platform for technical discussions but also fosters strong connections and friendships among attendees from across the globe.

Once again, we express our heartfelt appreciation to the authors for their valuable contributions and acknowledge the vital role played by all participants in making IC2024 a reality. Special appreciation is extended to the numerous experts whose efforts contribute to the success of this event in Taichung, Taiwan.

IC2024 Organizing Committees
FC Conference Group
Korean Institute of Information Technology
Korea Institute of Information Technology and Innovation
SIEC Korea Chapter

January 2024

Organizing Committees

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- Jun-Hong Shen, National United University, Taiwan
- Ching-Ta Lu, Feng-Chia University, Taiwan
- Goldina Ghosh, Indian Institute of Information Technology, India

Schedule

Day 1 - January 23, 2024 (Tuesday)			
	Room 115	**Room 116**	**Room 118**
9 : 30 ~ 10 : 00	**Registration**		
10 : 00 ~ 10 : 10	**Opening Ceremony**		
10 : 10 ~ 10 : 30	**-- Coffee break --**		
10 : 30 ~ 12 : 00	**Session 1**	**Session 2**	**Session 3**
12 : 00 ~ 13 : 30	**Lunch (Room 118)**		
13 : 30 ~ 14 : 30	**Keynote Speaker: Dr. Feng-Tsun Chien Chair: Dr. Yu-Wei Chan (Room 115)**		
14 : 30 ~ 15 : 00	**-- Coffee break --**		
15 : 00 ~ 16 : 30	**Session 4**	**Session 5 FutureIT 2024**	**Session 6 FutureIT 2024**
16 : 30 ~ 18 : 00	**Meeting time**		
18 : 00~	**Banquet**		

Day 2 - January 24, 2024 (Wednesday)	
	Virtual Room
10 : 30 ~ 12 : 00	**Session 7 ICIC 2024**
12 : 00 ~ 13 : 30	**Lunch**
13 : 30 ~ 15 : 00	**Session 8 ICIC 2024**

Day 3 - January 25, 2024 (Thursday)	
	Virtual Room
10 : 30 ~ 12 : 00	**Session 9** **ICIC 2024**
12 : 00 ~ 13 : 30	**Lunch**
13 : 30 ~ 15 : 00	**Organizing Committee Meeting**

Day 4 - January 26, 2024 (Friday)	
	Virtual Room
10 : 30 ~ 12 : 00	**Session 10** **ICIC 2024**
12 : 00 ~ 13 : 30	**Lunch**
13 : 30 ~ 15 : 00	**Executive Committee Meeting**

Keynote Speaker

Dr. Feng-Tsun Chien

Professor

Institute of Electronics and the Institute of Artificial Intelligence Innovation, National Yang Ming Chiao Tung University (NYCU), Taiwan

Title: Green Learning for OFDM Signal Classification

Feng-Tsun Chien received the B.S. degree from National Tsing Hua University, Hsinchu, Taiwan, in 1995, the M.S. degree from National Taiwan University, Taiwan, in 1997, and the Ph.D. degree from the University of Southern California (USC), Los Angeles, CA, USA, in 2004, all in electrical engineering. From 2005 to 2021, he was with the Department of Electronics Engineering, National Chiao Tung University, Hsinchu, Taiwan. Since 2021, Dr. Chien has been with the Institute of Electronics and the Institute of Artificial Intelligence Innovation, National Yang Ming Chiao Tung University (NYCU), where he is currently a Professor. Dr. Chien was a Fulbright Scholar with the University of California at Los Angeles (UCLA), during the academic year 2016–2017.

Dr. Chien co-directs the Communication Electronics and Signal Processing Laboratory (CommLab) in the Institute of Electronics, NYCU. He also serves as the division head of the Data Governance in the Center of Institutional Research and Data Analytics (CIRDA). His research interests include wireless communications, signal and image processing, and machine learning. Dr. Chien is currently an Associate Editor for IEEE Transactions on Signal and Information Processing over Networks and APSIPA Transactions on Signal and Information Processing.

Abstract of Talk

Data-driven deep learning (DL)-based wireless systems have received widespread attention in the communications community in recent years. While DL for wireless communications is promising to improve performance and break boundaries in traditional communication architectures, many challenges such as lack of interpretability and tractability as well as large training overhead still need to be resolved in order for the marriage between DL and wireless communications to be fully embraced by the academia and even more so by the industry. To simultaneously address the issues of computational complexity and model interpretability, a suite of novel, powerful and yet very low-complexity machine learning models, termed as the green learning (GL), has been developed recently to tackle various problems in computer vision with the specific goal of achieving low carbon footprint and high logical transparency with modularized designs. The design of a GL system represents a significant deviation from all modern DL architectures. Notably, GL does not require backpropagation learning process, which contributes to substantial savings in computations while offering comparable or even better inference performance. In this talk, I will briefly introduce the fundamentals of green learning, show its performance advantages over other DL-based approaches in computer vision applications, and discuss how green learning can be applied to replace the DL block in classical DL-based OFDM signal detection.

-Day 1-
January 23, 2024

Session 1
Chair: Dr. Tsan-Ching Kang, Providence University, Taiwan

1. **Communication-Aware Optimization of Microservice Scheduling on Edge Computing**
   Hokun Park and Heonchang Yu

2. **A Study on the Continued Viewing Intention of YouTuber Videos: Experiential Marketing, Social Capital, and Habit Perspectives**
   Yu-Sheng Lee, Jia-Lun Li, Tsan-Ching Kang and Ya-Hsueh Chuang

3. **The Interplay Between Self-Regulated Learning and Programming Learning Achievement**
   Si-Qi Li, Ya-Hsueh Chuang, Yu-Ting Lin and Tsan-Ching Kang

Session 2
Chair: Dr. Ya-Fen Chang, National Taichung University of Science and Technology, Taiwan

1. **Partnerships Analysis Base on Measurements of Common Research Interest**
   Chia-An Tsai, Meng-Feng Tsai and Chi-Sheng Huang

2. **Adaptive Sorting-Based Data Hiding Scheme for JPEG Images**
   Che-Hong Lin, Wien Hong and Guan-Zhong Su

3. **Lossless Data Hiding with VQ Indices Encoding Using Genetic Algorithm**
   Minyu Hsu, Jeanne Chen and Wien Hong

Session 3

Chair: Dr. Hao-Shang Ma, National Taichung University of Science and Technology, Taiwan

1. **Implementation of a High Quality Cardiopulmonary Resuscitation Teaching Intelligence Training and Assessment System**
   Qi-Xiang Zhang, Yu-Wei Chan, Yu-Tse Tsan, Li-Wen Huang and Chih-Hung Chang

2. **Integration of Generative Adversarial Networks (GAN) and AI Drawing in Criminal Sketches — Applied in Crime Scene Investigation by Law Enforcement**
   TzuChi Chen and Jainshing Wu

3. **Proactive Auto Scaling Based on Marginal Request Change Analysis for Reducing Tail Latency in Kubernetes Cluster**
   Donggyun Kim and Heonchang Yu

4. **Comments on a Blockchain-based Dynamic and Traceable Data Integrity Verification Scheme**
   Ya-Fen Chang, Sin-En Yao, Yi-Ming Chan, Yun-Qing You and Wei-Liang Tai

Session 4

Chair: Dr. Jain-Shing Wu, Providence University, Taiwan

1. **Implementation of A Classification System of Calcaneal Fracture with Deep Learning Techniques**
   Yi-Cyuan Tseng, Yu-An Chen, Wei-En Hsu, Yu-Wei Chan and Shun-Ping Wang

2. **3D self-positioning method using stepped-frequency radar and MMSE estimator**
   In-Sik Choi and Jong-Hee Kim

3. **Predicting Twitter Posts from Fake Accounts Using XGBoost Model**
   Yan-Long Huang and Jainshing Wu

Session 5 FutureIT

Chair: Dr. Hwa-Young Jeong, Kyung Hee University, Korea

1. **A study on predictive maintenance system for industrial robot RV reducers based on AI and ROM**
   Nam-gyu Kim and Dongwoo Seo

2. **Failure Diagnosis and Maintenance of Industrial Robot based on Deep Learning and Augmented Reality**
   Dongwoo Seo, Minseok Kim and Namgyu Kim

3. **Design of hardware cryptographic module-based authentication protocol for interworking with 5G and Heterogeneous networks**
   Hyeongyeop Kim, Hansaem Wi, Changuk Jang and Okyeon Yi

Session 6 FutureIT

Chair: Dr. Yan Pei, University of Aizu, Japan

1. **Integrating Spatiotemporal and Visual Features for Enhanced Object Re-identification in Multi-Camera Networks for Intelligent Transportation Systems**
   Seongjong Kim, Haeun Lee, Jiwon Kwak, and Seokil Song

2. **Real-Time 3D Position Estimation from Monocular Cameras to Enhance Sensor Data Sharing for Extended Recognition Range in Autonomous Vehicles**
   Seongjong Kim, Haeun Lee, Jiwon Kwak, and Seokil Song

3. **Two-layer Minimum Variance FIR Filter-based DPLL Design**
   Sin Kim, Sung Shin, and Sung Hyun You

Video Session

1. **A Novel Sizing Approach for Robust and Efficient Near-Threshold Standard Cells Using Statistical Models**
   Runze Yu, Zhenhao Li, Xi Deng and Zhenglin Liu

2. **An Exploratory Study on the Design of HumanComputer Interaction Interfaces for Augmented Reality Integrated Museum Exhibitions**
   Ming-Feng Lee and Yung-Hui Yang

3. **Towards Score-Based Black-Box Adversarial Examples Attack in Real World**
   Wei Jia, Zhenglin Liu, Haichun Zhang, Runze Yu and Liaoyuan Li

4. **Adversarially Residual U²Net for COVID-19 Lung Infection Segmentation form CT Images**
   Yifei Xu, Fujiao Ju, Jianqiang Li and Baokai Zu

5. **A Method of Image Denoising via Dense Attention DnCNN**
   Mingshou An, Hye-Youn Lim and Dae-Seong Kang

-Day 2-
January 24, 2024

Session 7 ICIC 2024

1. **Layout Control Algorithm of Interior Lighting Design Based on Atmega16**
   Jinmin Cui

2. **Pricing Basis System Planning of New Electric Power System**
   Ye Ke, Fangshun Xiao, Cong Zeng, Xuemei Zhu and Ying Wang

3. **Application of Intellectualization in Medical Beauty Space**
   Yu Gui, Shuaipeng Liu, Jian Tian, Zonghui Bo, Yuxin Miao, Yuxiao Fan, Shunzi Ren and Lei Cui

Session 8 ICIC 2024

1. **Dynamic Value Control Index of Power Grid Project Investment under New Policy Environment**
   Shiyan Mei, Gang Sun, Kai Hou and Jia Li
2. **Application of Vulnerability Detection Technology Based on Network Space Recognition**
   Hongxi Chen and Fanfeng Lin

3. **Exploration of Building a Lean Energy Service System Based on Digital Economy**
   Jiang Yu, Shuqi Liu, Xiao Tang, Jin Yu and Senlin Lan

-Day 3-
January 25, 2024

Session 9 ICIC 2024

1. **Research on Design and Construction of Drainage and Prevention System of Cold Region High-Speed Railway Tunnel**
   Di Jiang and Zhiqiang Liu

2. **Diversified Reliability Improvement Measures and Cost-Benefit Analysis of New Power Distribution System Based on Distributed Technology**
   Dongsheng Shu, Jie Yang, Yaxin Li, Shuzhong Li and Xianglu Pang

3. **Research Hotspots and Trend Analysis on the Impact of Digital Economy on Carbon Emissions**
   Jiayu Li and Wei Wei

PM: Organizing Committee Meeting

-Day 4-
January 26, 2024

Session 10 ICIC 2024

1. **Operation and Sustainable Development of Digital Technology Driven Sharing Economy Platform**
   Haochun Liu and Pinxi Wu

2. **Optimization of Intelligent Line Matching Transmission Online Monitor Based on Remote Detection Algorithm**
   Xiongjun Tao, Hualu Yuan and Yifeng Zhu

3. **Development of Health Assistant WeChat Applet**
   Zhenhui Wang

PM: Executive Committee Meeting

Conference Venue & Banquet

The 7th International Conference on Innovative Computing will be held at the **Providence University**, Taichung, Taiwan.

Address

The 1st floor, Providence Hall, 200, Sec. 7, Taiwan Boulevard, Shalu Dist., Taichung City 43301 Taiwan

Access

1. By Car:
   - A. Through National Freeway No.1
     (Both Northbound and Southbound) Take the exit at Jhonggang Interchange (178.6km) and follow the directionto Shalu. Drive along Taiwan Boulevard (about 11 km), Providence University is on the right.
   - B. Through National Freeway No.3
     1.) Northbound Take the exit at Longjing Interchange (182.8 km) and follow the direction to Taichung, turn left at the first traffic light (about 700m after exit) then follow the direction to Shalu. Turn left at Taiwan Boulevard (about 4km) and Providence University is on the right. 2.) Southbound Take the exit at Shalu Interchange (176.1 km) and follow the direction to Shalu then turn left at Taiwan Boulevard (about 2km) and Providence University is on the left.

2. By Train:
A. Mount. Line Take BRT at Taichung Tran Station, then get off at Providence University. It takes about 50 minutes to get to Providence University. B. SEA Line From Shalu Station, either take a taxi or a bus to Providence University. (1) Taxi: NT$150. (2) Bus: It takes about 10 minutes Juye Bus Shalu Main Station to Providence University.

3. By Taiwan High Speed Rail:
Get off at the Taichung Station. then take a taxi to Providence University. It costs about NT$500.

4. By Bus:
   - A. From Chaoma Station
     It takes about 20 minutes to get to Providence University by BRT from Chaoma.
   - B. From Taichung Train Station
     It takes about 50 minutes to get to Providence University by BRT from Taichung Train Station.
   - We highly recommend conference attendees to take **Bus No. 301**, which goes directly to the main guest building inside Providence University whether departing from Point A (Chaoma Station) or Point B (Taichung Train Station). Additionally, buses numbered from **No. 300 to 310** can also reach Providence University.

Floor Map of Providence Hall

All of IC2024 events will take place on the 1st floor. The main session rooms are 115, 116, and 118.