

**A1****Wireless, RF, and Network Technologies I**

Chair: Ming-Tien Wu (National Penghu University of Science and Technology, Taiwan)

**A1-1 09:00****Multibeam Radiations of Aperiodic Phased Array of Antennas Excited by Fisheye Lens BFN**

*Su-Hsuan Jui (Yuan Ze University, Taiwan); Hsi-Tseng Chou (National Taiwan University, Taiwan); Hao-Ju Huang (National Chung-Shan Institute of Science and Technology, Taiwan); Hsien-Kwei Ho (WavePro Technology Inc., Taiwan)*

**A1-2 09:15****5G MIMO Antenna with Isolation Effect for Handheld Device Applications**

*Chao-Lun Liu, Ming-Tien Wu and Shu-Min Tsai (National Penghu University of Science and Technology, Taiwan)*

**A1-3 09:30****Comparisons of Dielectric Characterization by Microstrip and Grounded Coplanar Waveguide Using Resonator Measurements**

*Chien-Chang Huang, Wen-Tsao Fu and Kuan-Chien Cheng (Yuan Ze University, Taiwan)*

**A1-4 09:45****Data Transmission Efficiency of the Nonorthogonal CSK-used Optical Code Division Multiple Access System**

*Nobuyoshi Komuro (Chiba University, Japan); Hiromasa Habuchi (Ibaraki University, Japan)*

Room 103

**A2****Deep Learning-Based Multimedia Processing**

Chairs: Jieh-Weih Hung (National Chi Nan University, Taiwan), Pei-Jun Lee (National Taiwan University of Science and Technology, Taiwan)

**A2-1 09:00****Infrared imagery super-resolution by using a generative adversarial network**

*Trong-An Bui (National Chi Nan University, Taiwan); Pei-Jun Lee (National Taiwan University of Science and Technology, Taiwan); Kuan-Min Lee (VIPLab, National Chi-Nan University, Taiwan)*

**A2-2 09:15****Superpixel algorithm for objects tracking in satellite video**

*Guo-Cheng Xu (National Chi Nan University, Taiwan); Pei-Jun Lee (National Taiwan University of Science and Technology, Taiwan); Trong-An Bui (National Chi Nan University, Taiwan)*

**A2-3 09:30****Face and Head Detection for Back View Cases Using Gradient Features and Learning Architecture**

*Yi-Wei Tsai, Jian-Jiun Ding and De-Yan Lu (National Taiwan University, Taiwan)*

## A2

**Deep Learning-Based Multimedia Processing**

Chairs: Jieih-Weih Hung (National Chi Nan University, Taiwan), Pei-Jun Lee (National Taiwan University of Science and Technology, Taiwan)

**A2-4 09:45****Integrating deep learning for 360-degree video applying to space user flow and behavior patterns**

*Cheng-Yen Lin and Sheng-Ming Wang (National Taipei University of Technology, Taiwan)*

**A2-5 10:00****The effect of reducing the acoustic-frequency resolution for spectrograms used in deep denoising auto-encoder**

*Yan-Tong Chen, Shu-Ting Tsai and Jieih-Weih Hung (National Chi Nan University, Taiwan)*

## A4

**Artificial Intelligence Applications and Technologies in Internet of Things I**

Chairs: Wen-Hwa Liao (National Taipei University of Business, Taiwan), Jung-Kuei Chang (Tamkang University, Taiwan), Cheng-Chin Chien (Galaxy Software Services Corp., Taiwan), Chih-Yung Chang (Tamkang University, Taiwan)

**A4-1 09:00****Learning Pattern Discovery and Prediction using Decision Tree for SPOC Teaching**

*Chunyan Yu and Qi Hui (Chuzhou University, China)*

**A4-2 09:15****Design and Implementation of Intelligent Identification System of Meter System Based on OpenCV**

*Tao Tao, Zijie Liu, Laibing Chen, Funan Zhang and Yuan Liu (Anhui University of Technology, China)*

**A4-3 09:30****Design and Implementation of Smart Home System Based on OneNet Cloud Platform**

*Tao Tao, Ren Lei, Funan Zhang, Hui Wang and Wang Xiao Lin (Anhui University of Technology, China)*

**A4-4 09:45****Elder action recognition based on convolutional neural network and long short-term memory**

*Hsiao-Ting Tseng (National Central University, Taiwan); Chen-Chiung Hsieh and Ti-Yun Hsu (Tatung University, Taiwan)*

**A4-5 10:00****Emotion Recognition of the Elderly Living Alone Based on Deep Learning**

*Haibao Chen, Yuyan Zhao and Shenghui Zhao (Chuzhou University, China)*

## A5

## Audio/Video Systems and Signal Processing I

Chair: Wei-Tyng Hong (Yuan Ze University, Taiwan)

## A5-1 09:00

**Detecting Test Audio Signal Automatically with Fourier Analysis and Pattern Recognition**

*Luciana Rolim, Alexandre Uchoa, Rafael Giusti and Eulanda Santos (Federal University of Amazonas, Brazil); Agemilson Pimentel, Caio Cruz and Ruan Belem (TPV Technology, Brazil); Andre de Souza Costa, Anderson de Jesus, Lucas Coimbra and Osmar R. A. Silva (ICTS, Brazil)*

## A5-2 09:15

**A Study on Speech Enhancement Using Deep Temporal Convolutional Neural Network**

*Kuldeep Singh Rana (Yuan Zu University, Taiwan); Li-Wei Chen (National Yang Ming Chiao Tung University, Taiwan); Li-Hsin Tang and Wei-Tyng Hong (Yuan Ze University, Taiwan)*

## A5-3 09:30

**Adaptive Color Calibration for Digital Cameras**

*Hsin-Yang Chen, Yi-Peng Hsu, Wei-Te Chang, Ji-Lun Ho, Yi-Fang Lee and Wen-Chung Kao (National Taiwan Normal University, Taiwan)*

## A5-4 09:45

**Noise Reduction System Applied to Machine Tools**

*Wang Boli, Chen Poyi, Chi Junzhe, Xu BoJun, Yuan-Sun Chu and Ting-Chao Hou (National Chung Cheng University, Taiwan)*

## A5-5 10:00

**LDR to HDR Conversion Based on Histogram Extension**

*Huei-Yung Lin, Liu Ya-Fan and Yi-Rung Lin (National Chung Cheng University, Taiwan)*

## A5-6 10:15

**Detection and Recognition of Inframammary Fold on MLO-view Mammograms**

*Yi-Chong Zeng (Institute for Information Industry, Taiwan)*

## A6

## Innovation in Communication Technology I

Chairs: Shyang-Yuh Wang (Chinese Culture University, Taiwan), Sheng-Tsung Tu (Ming Chuan University, Taiwan)

## A6-1 09:00

**The Utilization of Big Data Analysis on the Food Delivery Platforms in Taiwan**

*Shyang-Yuh Wang and Yi Fang Li (Chinese Culture University, Taiwan); Sheng-Tsung Tu (Ming Chuan University, Taiwan); Yue-Nuo Yan and Yu-Chi Chen (Chinese Culture University, Taiwan); Chien-Hsing Chou (Tamkang University, Taiwan); Wei-Lin Chang (Aletheia University, Taiwan)*

# A6

## Innovation in Communication Technology I

Chairs: Shyang-Yuh Wang (Chinese Culture University, Taiwan), Sheng-Tsung Tu (Ming Chuan University, Taiwan)

### A6-2 09:15

#### Utilizing Big Data to Analyze Current Online Payment Development in Taiwan

*Shyang-Yuh Wang, Yue-Nuo Yan and Yu-Ting Huang (Chinese Culture University, Taiwan); Yu-Sheng Su (National Taiwan Ocean University, Taiwan); Shih-Yin Huang (Chinese Culture University, Taiwan)*

### A6-3 09:30

#### Design and Implement a Mobile Fitness Application based on Realtime Image Detection

*Hsien-Yu Kao and Yih-Jiun Lee (Chinese Culture University, Taiwan)*

### A6-4 09:45

#### Opinion Leaders in Internet Public Opinion: A Case Study on the Controversy of U.S. Pork Containing Ractopamine

*Sheng-Tsung Tu (Ming Chuan University, Taiwan); Chia-Yu Wu, Louis Y.Y. Lu and Chih-Hung Hsieh (Yuan Ze University, Taiwan)*

# A7

## Advanced Computing Systems and Applications

Chair: Masaru Fukushi (Yamaguchi University, Japan)

### A7-1 09:00

#### Proposal of Long-Distance Goal Recognition Method Using Deep Learning in CanSat

*Miho Akiyama and Takuya Saito (Shonan Institute of Technology, Japan)*

### A7-2 09:15

#### A Fault-Tolerant Routing Method Using Bus Functions in Two-dimensional Torus Network-on-Chips

*Taiki Tomita, Yota Kurokawa and Masaru Fukushi (Yamaguchi University, Japan)*

### A7-3 09:30

#### A Development Support Tool for Fault-tolerant Routing Methods on Network-on-Chips

*Yota Kurokawa, Daiki Kajimoto and Masaru Fukushi (Yamaguchi University, Japan)*

### A7-4 09:45

#### Synchronization and Asymmetric Error Correction for Nanopore Sequencing

*Ryosuke Nakata and Haruhiko Kaneko (Tokyo Institute of Technology, Japan)*

### A7-5 10:00

#### Spacecraft 6-DoF Localization in a GPS denied Environment

*Chao-Chung Peng (National Cheng Kung University, Taiwan); Chen-Yu Chan, Jhih-Hong Lin and Tung-Yun Hsieh (National Space Organization, Taiwan)*

### A7-6 10:15

#### K-means based RANSAC Algorithm for ICP Registration of 3D Point Cloud with Dense Outliers

*Chao-Chung Peng (National Cheng Kung University, Taiwan)*

# **A7**

## **Advanced Computing Systems and Applications**

Chair: Masaru Fukushi (Yamaguchi University, Japan)

**A7-7 10:30**

**Relaxing device requirements for non-linearity in Deep Neural Networks accelerators with Phase Change Memory**

*Keisuke Kozu and Kazuteru Namba (Chiba University, Japan)*

**B1****Wireless, RF, and Network Technologies II**

Chair: Hsin-Lung Su (National Pingtung University, Taiwan)

**B1-1 10:50****A Uniplanar Multi-Band S-shape Antenna for Smart Phone Applications**

*Jia-Sheng Xu and Hsin-Lung Su (National Pingtung University, Taiwan)*

**B1-2 11:05****A Compact Multi-Bands Antenna for 4G Mobile Terminals**

*Hsin-Lung Su and Huan-Sheng Lyu (National Pingtung University, Taiwan)*

**B1-3 11:20****Power Saving Method using Compressed Sensing Technique for IoT-based Time-series Environment Monitoring System**

*Sorato Mochizuki and Nobuyoshi Komuro (Chiba University, Japan)*

**B1-4 11:35****Vector Spectrum Analyzer using USRP and Matlab applied to Wi-Fi Signals**

*Celso Carvalho and Waldir Silva (Federal University of Amazonas, Brazil); Agemilson Pimentel (TPV Technology, Brazil); Cláudio Henrique Albuquerque Rodrigues (Grupos ICTS, Brazil)*

Room 103

**B2****Artificial Intelligence Models for Multimedia: Representation and Applications I**

Chairs: Li-Wei Kang (National Taiwan Normal University, Taiwan), Jia-Ching Wang (National Central University, Taiwan)

**B2-1 10:50****Age Estimation Model Using Multi-Class Architecture and Adaptive Regression Models**

*Min Chen Hsu, Jian-Jiun Ding and De-Yan Lu (National Taiwan University, Taiwan)*

**B2-2 11:05****Deep Residual and Deep Dense Attentions in English Chinese Translation**

*Yi-Xing Lin, Kai-Wen Liang, Chih-Hsuan Yang and Jia-Ching Wang (National Central University, Taiwan)*

**B2-3 11:20****Evaluation of Attention Mechanisms on Text to Speech**

*Yi-Xing Lin, Kai-Wen Liang, Bing-Jhih Huang and Jia-Ching Wang (National Central University, Taiwan)*

**B2-4 11:35****Voice Activity Detection by Joint MRCG and MFCC Features with Robustness Detection based GRU Networks**

*Rong Zhang, Pin-Hsuan Li, Kai-Wen Liang and Pao-Chi Chang (National Central University, Taiwan)*

**B2-5 11:50****Generative Adversarial Networks-based Face Hallucination with Identity-Preserving**

*Chia-Hung Yeh (National Sun Yat-Sen University, Taiwan); Daniel Chiu and Li-Wei Kang (National Taiwan Normal University, Taiwan); Chih-Chung Hsu (National Cheng Kung University, Taiwan); Chen Lo (National Taiwan Normal University, Taiwan)*

**B3****Intelligent Multimedia Computing**

Chairs: Chih-Yang Lin (Yuan Ze University, Taiwan), Kuan-Hsien Liu (National Taichung University of Science and Technology, Taiwan), Tsung-Jung Liu (National Chung Hsing University, Taiwan)

**B3-1 10:20****Evaluation of Data Augmentation on Surface Defect Detection**

*Isack Farady (Yuan Ze University, Taiwan & Mercu Buana University, Indonesia); Chih-Yang Lin (Yuan Ze University, Taiwan); Fityanul Akhyar (Telkom University & Yuan Ze University, Taiwan); John sahaya rani Alex and Roshini R (Vellore Institute of Technology, India)*

**B3-2 10:35****Automatic Door Detection of Convenient Stores based on Association Relations**

*Kanatip Prompol and Chih-Yang Lin (Yuan Ze University, Taiwan); Somchoke Ruengittinun (Kasetsart University & Faculty of Science, Thailand); Hui-Fuang Ng (University Tunku Abdul Rahman, Malaysia); Timothy Shih (National Central University, Taiwan)*

**B3-3 10:50****Robust 3D Authentication on Point Clouds with Random Sampling and Sequential Dependency**

*Cheng-You Ying, Pin-Hua Huang and Yuan-Yu Tsai (Asia University, Taiwan)*

**B3-4 11:05****Impact of Investor Sentiment on Stock Returns Using Fine-tune BERT**

*Chien-Cheng Lee and Hung-Chun Huang (Yuan Ze University, Taiwan); Chunli Tsai (Cheng Kung University & FinTech Business Models, Taiwan)*

**B3-5 11:20****Evaluation of Face Recognition with Wearing Mask or Not**

*Amornthep Rojanasarit and Chih-Yang Lin (Yuan Ze University, Taiwan); Somchoke Ruengittinun (Kasetsart University & Faculty of Science, Thailand); Kuan-Ju Chen (University of Guam, USA); Chi-Wen Lung (Asia University, Taiwan)*

**B3-6 11:35****DETECTORS++: The Robust Baseline for a Defect Detection System**

*Fityanul Akhyar (Telkom University & Yuan Ze University, Taiwan); Chih-Yang Lin (Yuan Ze University, Taiwan); Gagan S Kathiresan (Vellore Institute of Technology, India); Bharath Surianarayanan (New York University, USA); Chao-Yung Hsu (China Steel Corporation, Taiwan)*

**B3-7 11:50****Facial Age Estimation by Learning Label Distribution CNN**

*Kuan-Hsien Liu (National Taichung University of Science and Technology, Taiwan); Chun-Te Chang and Tsung-Jung Liu (National Chung Hsing University, Taiwan)*

**B3-8 12:05****WBTP-VTON: Whole Body and Texture Preservation based Virtual Try-On Network**

*Huang-Wei Shen, Tsung-Jung Liu and Chi-Mao Fan (National Chung Hsing University, Taiwan); Kuan-Hsien Liu (National Taichung University of Science and Technology, Taiwan)*

**B4****Artificial Intelligence Applications and Technologies in Internet of Things II**

Chairs: Wen-Hwa Liao (National Taipei University of Business, Taiwan), Jung-Kuei Chang (Tamkang University, Taiwan), Cheng-Chin Chien (Galaxy Software Services Corp., Taiwan), Chih-Yung Chang (Tamkang University, Taiwan)

**B4-1 10:50****Data Segmentation Methods for Activity Recognition in Ambient Assisted Living**

*Yuyan Zhao, Haibao Chen, Jie Chen and Shenghui Zhao (Chuzhou University, China)*

**B4-2 11:05****Discovering Behavior Patterns of Solitary Elderly Based on Machine Learning**

*Lin Liu, Shenghui Zhao and Haibao Chen (Chuzhou University, China); Jinjun Liu (Hefei University of Technology, China)*

**B4-3 11:20****Software and Hardware Integration System Design with Fruit Identification for Smart Electronic Scale Applications**

*Wei-Yu Zhu, Wing-Kwong Wong, S M Salahuddin Morsalin, Szu-Hong Wang and Ming-Hwa Sheu (National Yunlin University of Science and Technology, Taiwan)*

**B4-4 11:35****Dynamic sample selection method based on classification prediction**

*Wang Xingfu and Pengfei Xie (University of Science and Technology of China, China)*

**B4-5 11:50****Behavior Recognition Algorithm Using Unsupervised Learning for Home Elderly**

*Cuijuan Shang (Chuzhou University, China); Chih-Yung Chang (Tamkang University, Taiwan)*

**B5****The Emerging Data-Driven Technologies for Smart Service Systems**

Chair: Hsin-Han Chiang (National Taiwan Normal University, Taiwan)

**B5-1 10:50****Design and Implementation of Smart Agricultural Systems Based on Networked PLC and Mobile App**

*Chen Chiu and Jin-Shyan Lee (National Taipei University of Technology, Taiwan); Hsin-Han Chiang (National Taiwan Normal University, Taiwan)*

**B5-2 11:05****Traffic Agent Trajectory Prediction Using a Time Sequence Deep Learning Model with Trajectory Mapping for Autonomous Driving**

*Pei-Yun Hsu, Mei-Lin Huang, Wei-Yen Wabg and Hsin-Han Chiang (National Taiwan Normal University, Taiwan)*

**B5-3 11:20****An Automated Cardiac Ventricle Segmentation on CMR images Using Grey-Level Mask R-CNN**

*Hsiao-Chi Li and Kuan-Yu Chen (Fu Jen Catholic University, Taiwan); Shih-Hsien Sung (National Yang-Ming University, Taiwan); Chun-Ku Chen (Taipei Veterans General Hospital, Taiwan)*

## B5

### The Emerging Data-Driven Technologies for Smart Service Systems

Chair: Hsin-Han Chiang (National Taiwan Normal University, Taiwan)

#### B5-4 11:35

#### Method for Detecting Boar Abdominal Characteristics based on Deep Learning

*Chia-Yun Li (National Sun Yat-sen University, Taiwan); I-Hsi Kao (University of California, Berkeley, USA); Jau-Woei Perng and Yun-Chu Tsai (National Sun Yat-sen University, Taiwan); Wei-Wen Chen and Chung-Li Tai (Industrial Technology Research Institute, Taiwan); Chiao-Chien Chu and Ming-Che Wu (Livestock Research Institute, Council of Agriculture, Executive Yuan, Taiwan)*

## B6

### Innovation in Communication Technology II

Chairs: Shyang-Yuh Wang (Chinese Culture University, Taiwan), Sheng-Tsung Tu (Ming Chuan University, Taiwan)

#### B6-1 10:50

#### Measurement and Analysis of IC EMI synchronous signal

*Wei-Sheng Liu, Sung-Yu Yeh and You-Cheng Li (Feng Cha University, Taiwan)*

#### B6-2 11:05

#### Using Machine Vision Based of Preventive Maintenance and Management of Historic Buildings

*Wei-Yu Chen (Chinese Culture University & Tatung University, Taiwan); Chih-Wen Cheng (Chinese Culture University, Taiwan)*

#### B6-3 11:20

#### Using AI on Improving the Performance of Streaming Video and Audio

*Hsing-Tung Ho (Kun Shan University, Taiwan); Wei-Yu Chen (Chinese Culture University & Tatung University, Taiwan)*

#### B6-4 11:35

#### Analyze the Audience's Perception of YouTube Online Video Advertisements

*Chun-Ting Chang (Chinese Culture University, Taiwan); Oi-Ki Wong (The University of Hong Kong, Hong Kong); Shyang-Yuh Wang (Chinese Culture University, Taiwan)*

## B7

### Computer Communications and Signal Processing for IoT I

Chairs: Pingguo Huang (Gifu Shotoku Gakuen University, Japan), Yutaka Ishibashi (Nagoya Institute of Technology, Japan), Takashi Okuda (Aichi Prefectural University, Japan)

#### B7-1 10:50

#### Passivity of a Dynamic Environment in Telecontrol Systems

*Tho Duc Ho and Takanori Miyoshi (Nagaoka University of Technology, Japan)*

## B7

### Computer Communications and Signal Processing for IoT I

Chairs: Pingguo Huang (Gifu Shotoku Gakuen University, Japan), Yutaka Ishibashi (Nagoya Institute of Technology, Japan), Takashi Okuda (Aichi Prefectural University, Japan)

#### B7-2 11:05

##### **Toward the optimal control of haptic communication - Introduction of force prediction to collaborative work -**

*Hitoshi Watanabe, Yujin Sato, Tomoyuki Hirano and Daiki Inoue (Tokyo University of Science, Japan); Pingguo Huang (Gifu Shotoku Gakuen University, Japan); Yutaka Ishibashi (Nagoya Institute of Technology, Japan)*

#### B7-3 11:20

##### **Evaluating effect of interference on MAC delay in densely deployed IEEE 802.11ad based In-vehicle communications**

*Takumi Shiohara (Nagoya University, Japan); Takayuki Nishio (Tokyo Institute of Technology, Japan); Tutomu Murase (Nagoya University, Japan)*

#### B7-4 11:35

##### **Fatigue Estimation using Nonlinear Disturbance Observer for Tele-Rehabilitation System with Electrical Stimulation**

*Yasunori Kawai, Futoshi Sugimoto and Kenshin Fujie (National Institute of Technology, Ishikawa College, Japan); Hiroyuki Kawai (Kanazawa Institute of Technology, Japan); Takanori Miyoshi (Nagaoka University of Technology, Japan)*

#### B7-5 11:50

##### **Robot Position Control Using Force Information by Neural Network in Remote Robot Systems**

*Xianzhi Wang (Nagoya Institute of Technology, Japan); Pingguo Huang (Gifu Shotoku Gakuen University, Japan); Yutaka Ishibashi (Nagoya Institute of Technology, Japan); Takashi Okuda (Aichi Prefectural University, Japan)*

## C1

### GaN Based Converters for Powering 5G and Beyond

Chair: Chin Hsia (National Central University, Taiwan)

#### C1-1 13:10

##### High Voltage GaN Driver using EED Architecture

Wen-Hao Fan, Deng-Fong Lu and Li-Jie Huang (National Central University, Taiwan); Chin Hsia (Chang Gung University, Taiwan); Gigin Lin (Chang Gung Memorial Hospital at Linkou, Taiwan)

#### C1-2 13:25

##### Level-shifter-less High-side Power Driver

Li-Jie Huang, Deng-Fong Lu, Wen-Hao Fan (National Central University, Taiwan); Chin Hsia (Chang Gung University, Taiwan)

#### C1-3 13:40

##### Parameter Analysis of the Output Filter for Switching Buck Converter in Wideband Envelope Modulator

Deng-Fong Lu and Wen-Hao Fan (National Central University, Taiwan); Chin Hsia (Chang Gung University, Taiwan)

#### C1-4 13:55

##### Comparison of Sliding Mode Functions for the High-Frequency Switching Power Converters

Chin Hsia (Chang Gung University, Taiwan); Hong-Yih Tseng (EpiPower Microelectronics Co. Ltd., Taiwan)

Room 103

## C2

### Artificial Intelligence Models for Multimedia: Representation and Applications II

Chair: Li-Wei Kang (National Taiwan Normal University, Taiwan)

#### C2-1 13:10

##### Query by singing and humming system based on combined DTW and Linear Scaling

Kai-Wen Liang, Hsin Cheng Lee, Yen-Ting Lai and Pao-Chi Chang (National Central University, Taiwan)

#### C2-2 13:25

##### User Background Information-Aware Music Recommendation with Reinforcement Learning-Based Knowledge Graph Exploration

Keigo Sakurai, Ren Togo, Takahiro Ogawa and Miki Haseyama (Hokkaido University, Japan)

#### C2-3 13:40

##### The Development and Implementation of a Smartphone Based Archery Analysis System

Jian-Shiun Peng, Yi-Jui Chen, Wei-Yang Lin, Hsin-Chin Chen and Chien-Nan Liao (National Chung Cheng University, Taiwan)

#### C2-4 13:55

##### A Retention-Error Mitigation Method on TLC NAND Flash Memory for CE Storage Systems

Chin-Hsien Wu, Yi-Lun Lan, Wei-Hao Wu and Chi-Yen Yang (National Taiwan University of Science and Technology, Taiwan)

## C3

### Intelligent Circuits and Systems

Chair: Chang-Ming Wu (Chung Yuan Christian University, Taiwan)

#### C3-1 13:10

##### Reduced-Complexity Quasi-Reversible BCH Decoders for Data Storage Systems

*Chong-Dao Lee (I-Shou University, Taiwan)*

#### C3-2 13:25

##### Improved Deep Learning in Citrus Canker Recognition System Based on FPGA

*Chang-Ming Wu and Liu-I Chen (Chung Yuan Christian University, Taiwan)*

#### C3-3 13:40

##### Block-Based Compression for Reducing Indexing Cost of DNN Accelerators

*Yui-Kai Weng, Shih-Hsu Huang and Hsu-Yu Kao (Chung Yuan Christian University, Taiwan)*

#### C3-4 13:55

##### Hardware Implementation for Fending off Side-Channel Attacks

*Yi-Liang Hong, Yui-Kai Weng and Shih-Hsu Huang (Chung Yuan Christian University, Taiwan)*

## C4

### Artificial Intelligence Applications and Technologies in Internet of Things III

Chairs: Wen-Hwa Liao (National Taipei University of Business, Taiwan), Jung-Kuei Chang (Tamkang University, Taiwan), Cheng-Chin Chien (Galaxy Software Services Corp., Taiwan), Chih-Yung Chang (Tamkang University, Taiwan)

#### C4-1 13:10

##### uHealth: Smart Clothing Enabled Intelligent Ubiquitous Health Monitoring System

*Aiguo Wang, Huancheng Liu, Huihui Chen and Chundi Zheng (Foshan University, China); Guilin Chen (Chuzhou University, China)*

#### C4-2 13:25

##### Distributed Multi-Dimensional Scaling Localization Algorithm Based on Improved Centralized Matrix

*Fei Cheng, Ping Zhang, Qi Zhou, Xinjing Qin and Tao Liu (Anhui Polytechnic University, China)*

#### C4-3 13:40

##### Construction Strategy of Enterprise Security Management Blockchain based on Capsule Network and Situation Awareness

*Boheng Li (Southeast University, China)*

## C5

### Computer Networks, Sensor Technologies and Big Data Computing

Chairs: Tin-Yu Wu (National Ilan University, Taiwan), Dan Tao (Beijing Jiaotong University, China)

#### C5-1 13:10

##### Power Generate Trend Prediction with Machine Learning on Independent Green Energy Smart Power Monitoring and Big Data Collection and Analysis System

*Tey Fu Jie, Sheng-Po Lin and Tin-Yu Wu (National Ilan University, Taiwan)*

#### C5-2 13:25

##### Managing TCP Congestion Control of Smartphones toward Advanced Control

*Natsuki Katsumata, Kouto Miyazawa and Saneyasu Yamaguchi (Kogakuin University, Japan)*

#### C5-3 13:40

##### POI recommendation model based on Attention-based Gated Recurrent Unit Network

*Jinxi Wu, Yi Yao, Ruiming Fan and Dan Tao (Beijing Jiaotong University, China)*

#### C5-4 13:55

##### Children's Implicit Authentication based on Gesture Feature for Smartphone

*Xinxian Zhang, Jiangyang Lan, Ruihan Li and Dan Tao (Beijing Jiaotong University, China)*

## C6

### Smart Technologies, Management and Control for Energy Systems

Chair: Saher Javaid (Japan Advanced Institute of Science and Technology (JAIST), Japan)

#### C6-1 13:10

##### Admission Control Scheme with Balancing Power Negotiation Algorithm for Home Energy Management and Control System

*Yuto Lim, Satsuki Takano and Saher Javaid (Japan Advanced Institute of Science and Technology (JAIST), Japan); Yasuo Tan (Japan Advanced Institute of Science and Technology & National Institute of Information and Communications Technology, Japan)*

#### C6-2 13:25

##### The Magnetic Field and Coupling Between Coils in Wireless Charging System for 3C Electronics

*Shen Shou Max Chung (National Penghu University of Science and Technology, Taiwan); Shih-Chung Tuan (Oriental Institute of Technology, Taiwan)*

#### C6-3 13:40

##### Storage Minimization Considering System Conditions of Power Flow System

*Saher Javaid and Kaneko Mineo (Japan Advanced Institute of Science and Technology (JAIST), Japan); Yasuo Tan (Japan Advanced Institute of Science and Technology & National Institute of Information and Communications Technology, Japan)*

## C7

### Computer Communications and Signal Processing for IoT II

Chairs: Takashi Okuda (Aichi Prefectural University, Japan), Yutaka Ishibashi (Nagoya Institute of Technology, Japan), Pingguo Huang (Gifu Shotoku Gakuen University, Japan)

#### C7-1 13:10

##### Performance analysis of service architectures applying queueing systems

*Mikio Katsu and Takashi Okuda (Aichi Prefectural University, Japan)*

#### C7-2 13:25

##### QoE Assessment of Cooperative Work in Networked Virtual Environment with Haptics

*Khaing Zar Win and Su Thandar Aung (University of Computer Studies, Yangon, Myanmar); Yutaka Ishibashi (Nagoya Institute of Technology, Japan); Khin Than Mya (University of Computer Studies, Yangon, Myanmar)*

#### C7-3 13:40

##### Effect of Position Follow-up Control for Hand Delivery between Remote Robot Systems with Force Feedback

*Luozhang Li and Yutaka Ishibashi (Nagoya Institute of Technology, Japan); Pingguo Huang (Gifu Shotoku Gakuen University, Japan); Yuichiro Tateiwa (Nagoya Institute of Technology, Japan)*

**D1****Signal Processing for Communication, Radar, Optics, Circuit Design, AI and GPU**

Chair: Hsuan-Fu Wang (National Yunlin University of Science and Technology, Taiwan)

**D1-1 15:40****The Efficacy of Radar Absorption Material on the Radar Cross Section Reduction of Simple Shapes**

*Shen-Shou Max Chung (National Penghu University of Science and Technology, Taiwan); Shih-Chung Tuan (Oriental Institute of Technology, Taiwan)*

**D1-2 15:55****Autonomously Vehicle Network PIDs Parsing to Support Threat Monitoring and Early Warning Research**

*Chi-Pan Hwang and Yu-Wei Huang (National Changhua University of Education, Taiwan); Hsuan-Fu Wang (National Yunlin University of Science and Technology, Taiwan)*

**D1-3 16:10****A study of Wavefront Aberration Measurement Technology based on Centroid Calculation**

*Ching-Huang Lin (National Yunlin University of Science and Technology, Taiwan); Hsuan-Fu Wang (Chung Chou University of Science and Technology, Taiwan)*

**D2****Deep Learning Based Robotic Systems**

Chair: Chen-Chien Hsu (National Taiwan Normal University, Taiwan)

**D2-1 15:40****FoodTemi: The AI-Oriented Catering Service Robot**

*Chuan-Fu Hung, Yang Lin, Hao-Jheng Ciou, Wei-Yen Wabg and Hsin-Han Chiang (National Taiwan Normal University, Taiwan)*

**D2-2 15:55****In-Box Picking System Design for Six-Axis Robot Arm**

*Ching-Chang Wong, Ren-Jie Chen, Sheng-Kai Yang, Shao-Yu Chien, Shang-Wen Wong and Chun-An Yeh (Tamkang University, Taiwan)*

**D2-3 16:10****Deep Learning Image-to-Image Translation for Animation**

*Jacky Baltes (National Taiwan Normal University & University of Manitoba, Taiwan); Carolina Rutili de Lima (National Taiwan Normal University, Taiwan)*

**D2-4 16:25****Robotic Grasping Strategies Based on Classification of Orientation State of Objects**

*Jui An Lin and Chen-Chien Hsu (National Taiwan Normal University, Taiwan)*

**D2-5 16:40****A Lightweight Fine-Grained Action Recognition Network for Basketball Foul Detection**

*Cheng-Hung Lin, Min-Yen Tsai and Po-Yung Chou (National Taiwan Normal University, Taiwan)*

## D2

### Deep Learning Based Robotic Systems

Chair: Chen-Chien Hsu (National Taiwan Normal University, Taiwan)

**D2-6 16:55**

#### Automatic Data Acquisition of Indoor Environment Using the Autonomous Mobile Robot

*Chieh Lin, Pei-Che Hsieh, Sih-Han Wang and Hsin-Han Chiang (National Taiwan Normal University, Taiwan)*

## D3

### Advanced Circuits and Signal Processing Systems

Chair: Po-Yu Kuo (National Yunlin University of Science and Technology, Taiwan)

**D3-1 15:40**

#### Receiver Front-End of Continuous-Time Sigma-Delta Modulator for Medical Intubation Wireless Applications

*Wen Cheng Lai (National Taiwan University of Science and Technology, Taiwan)*

**D3-2 15:55**

#### Circuits Design Low-Phase Noise Colpitts VCO with Gm-Boosting

*Wen Cheng Lai (National Taiwan University of Science and Technology, Taiwan)*

**D3-3 16:10**

#### Analysis of the Performance Impact on Dynamic Comparator for Analog to Digital Converter Under Process Mismatch

*Po-Yu Kuo and Mao-Jung Huang (National Yunlin University of Science and Technology, Taiwan)*

**D3-4 16:25**

#### Direct Computation of Discrete Cosine Transform Algorithm and Its Hardware Architecture Design for Mel-scale Frequency Cepstral Coefficients

*Shin-Chi Lai (Nanhua University, Taiwan); Ying-Hsiu Hung and Yu-Syuan Jhang (National Yunlin University of Science and Technology, Taiwan); Yi-Chang Zhu (Nanhua University, Taiwan); Ming-Hwa Sheu (National Yunlin University of Science and Technology, Taiwan); Wen-Ho Juang (Nanhua University, Taiwan)*

**D3-5 16:40**

#### Font-End Integrated Circuit Design for Plant Physiological Sensing

*En-Chi Yang and Ming-Jie Lee (National Yunlin University of Science and Technology, Taiwan); Wen-Ho Juang (Nanhua University, Taiwan); Ming-Hwa Sheu (National Yunlin University of Science and Technology, Taiwan); Shin-Chi Lai (Nanhua University, Taiwan)*

**D3-6 16:55**

#### Investigation on Error-Tolerability Enhancement of Videos via Re-Encoding for Computer Vision: A Case Study on Object Detection

*Tong-Yu Hsieh and Jun-Tsung Wu (National Sun Yat-sen University, Taiwan)*

**D4****Communication and Human-Centered Information Systems for Internet Applications**

Chairs: Nobuo Funabiki (Okayama University, Japan), Shinji Sugawara (Chiba Institute of Technology, Japan), Wen-Chung Kao (National Taiwan Normal University, Taiwan)

**D4-1 15:40****Statistical Language Models for Spelling Error Detection with Web Search New Word Acquisition**

*Jui-Feng Yeh, Guan-Huei Wu, Song-Yi Wang, Chan-Kun Yeh and Yao-Yi Wang (National Chiayi University, Taiwan)*

**D4-2 15:55****Applications of Grammar-Concept Understanding and Value Trace Problems to Novice Students for C Programming Learning**

*Nobuo Funabiki, Xiqin Lu, San Hay Mar Shwe, Ei Ei Htet and Htoo Htoo Sandi Kyaw (Okayama University, Japan); Kiyoshi Ueda (Nihon University, Japan); Wen-Chung Kao (National Taiwan Normal University, Taiwan)*

**D4-3 16:10****Evaluations of Fingerprint-based Indoor Positioning System Using IEEE 802.15.4**

*Pradini Puspitaningayu, Nobuo Funabiki, Kazushi Hamazaki and Minoru Kuribayashi (Okayama University, Japan); Wen-Chung Kao (National Taiwan Normal University, Taiwan)*

**D4-4 16:25****Highly Reliable Redundant Data Allocation Method for High Availability Distributed Clusters**

*Kiyoshi Ueda and Syuhei Matsumoto (Nihon University, Japan)*

**D4-5 16:40****Adaptation to Changes in the Number of Users in P2P Content Sharing System Using Dynamic Fog**

*Takuya Itokazu and Shinji Sugawara (Chiba Institute of Technology, Japan)*

**D4-6 16:55****On Application of Botnet Defense System to IoT Systems Including Private Networks**

*Shingo Yamaguchi (Yamaguchi University, Japan)*

**D4-7 17:10****High-speed High-resolution Image Capture by Using Phase-shift Photographing for Periodic Motion of Machine Element**

*Kazuyuki Kojima and Hiroyuki Sato (Shonan Institute of Technology, Japan)*

**D5****Audio/Video Systems and Signal Processing II & Consumer Systems for Healthcare and Wellbeing**

Chair: Shih-Miao Huang (National Formosa University, Taiwan)

**D5-1 15:40****Quality of Experience evaluation of 4k Video Streaming using Referenced Metrics**

*Celso Carvalho and Waldir Silva (Federal University of Amazonas, Brazil); Agemilson Pimentel (TPV Technology, Brazil); Cláudio Henrique Albuquerque Rodrigues (Grupos ICTS, Brazil)*

**D5****Audio/Video Systems and Signal Processing II & Consumer Systems for Healthcare and Wellbeing**

Chair: Shih-Miao Huang (National Formosa University, Taiwan)

**D5-2 15:55****Assessing Quality of Experience of 4k Video Streams Using No-Referenced Metrics***Celso Carvalho and Waldir Silva (Federal University of Amazonas, Brazil); Agemilson Pimentel (TPV Technology, Brazil); Cláudio Henrique Albuquerque Rodrigues (Grupos ICTS, Brazil)***D5-3 16:10****A theoretical-practical model for 4k multimedia system for wireless communication by light***Celso Carvalho and Waldir Silva (Federal University of Amazonas, Brazil); Agemilson Pimentel (TPV Technology, Brazil); Cláudio Henrique Albuquerque Rodrigues (Grupos ICTS, Brazil)***D5-4 16:25****Development of an ADHD Chair to Promote Safe Fidgeting While Monitoring Symptoms***Kuo-Chen Huang and Nan-Ching Tai (National Taipei University of Technology, Taiwan)***D5-5 16:40****Sleep Stage Prediction Based on Monotonous Sensing Data Using Convolutional Neural Network***Yi-Chong Zeng (Institute for Information Industry, Taiwan)***D5-6 16:55****Development of A Wearable Device of Measuring Viewing Distances in Smartphone Use***Shih-Miao Huang (National Formosa University, Taiwan)***D5-7 17:10****The Efficacy of Heart Spectrum Blood Pressure Monitor: A Study of Bus Drivers***Ya-Ling Kao (National Penghu University of Science and Technology, Taiwan); Yu-Kuang Chen (Doe Li Technology, Taiwan); Jai-Tsung Hong (National Kaohsiung University of Science and Technology, Taiwan)***D6****Smart Sensing Technologies & Applications for Human Health Promotion**

Chair: Wan-Jung Chang (Southern Taiwan University of Science and Technology, Taiwan)

**D6-1 15:40****Glass-based fluorescent immunobiosensor used for urea albumin fast detection***Lien-Chiang Hung, Zhi-You Lin, Wan-Jung Chang and Ying-Nien Chou (Southern Taiwan University of Science and Technology, Taiwan)***D6-2 15:55****Efficient muscle signal collection system of wireless body sensor network based on EMG***Shih Hsiung Lee and Hou-Chuan Tseng (National Kaohsiung University of Science and Technology, Taiwan)***D6-3 16:10****The GaAs-based p-i-n photodetector using in glucose detection***Jun Jia Liu, Jie-Si Jheng, Yu-Zung Chiou and Chun-Kai Wang (Southern Taiwan University of Science and Technology, Taiwan)*

## D6

### Smart Sensing Technologies & Applications for Human Health Promotion

Chair: Wan-Jung Chang (Southern Taiwan University of Science and Technology, Taiwan)

**D6-4 16:25**

#### A Hair Volume Analysis System Using Deep Learning and Image Processing Technologies

*Ming-Che Chen, Wan-Jung Chang, Xiao Yu-Xiang, Zi-Xuan Zhang, Yi-Chan Chiu and Jian-Ping Su (Southern Taiwan University of Science and Technology, Taiwan)*

**D6-5 16:40**

#### An Interactive Modular System and Interface for Laerdal Little Anne™ Manikin in CPR Training

*Yang-Kun Ou, Wan-Jung Chang and Tzu-Hsuan Lin (Southern Taiwan University of Science and Technology, Taiwan)*

**D6-6 16:55**

#### A Mobile Application-Based Learning Aid Developer for Teaching Visually Impaired Students

*Bien Grenier Sasing, Aaron Raymond A. See, Welsey Daniel Advincula and Yeou-Jiunn Chen (Southern Taiwan University of Science and Technology, Taiwan)*

## D7

### Computational Intelligence Techniques for Electronic Design Automation

Chairs: Genggeng Liu (Fuzhou University, China), Wenzhong Guo (Fuzhou University, China)

**D7-1 15:40**

#### An optimized 3D Astar algorithm for multi-layer PCB automatic routing

*Haiyun Li and Ning Xu (Wuhan University of Technology, China); Genggeng Liu (Fuzhou University, China); Jixin Zhang (Hubei University of Technology, China)*

**D7-2 15:55**

#### DDM: Delay driven layer assignment algorithm based on deployment mechanism

*Bao Chenpeng and Chen Zhen (Fuzhou University, China)*

**D7-3 16:10**

#### High-Level Synthesis Considering Cache Minimization for Continuous-flow Microfluidic Biochips

*Hongxing Lin and Hongbin Huang and Chen Zhen (Fuzhou University, China)*

**D7-4 16:25**

#### High-Level Synthesis for Continuous-Flow Microfluidic Biochips Considering Flow-Channel-Intersection Optimization

*Hongbin Huang, Hongxing Lin and Chen Zhen (Fuzhou University, China)*

**E1****Intelligent Devices, Circuits, Systems, and Algorithms for Smart Lives**

Chairs: Chien-Cheng Tseng (National Kaohsiung University of Science and Technology, Taiwan), Ching-Hu Lu (National Taiwan University of Science and Technology, Taiwan)

**E1-1 09:00**

**Accuracy Improvement of Deep Learning 3D Point Cloud Instance Segmentation**

*Ru-Yi Pan and Cheng-Ming Huang (National Taipei University of Technology, Taiwan)*

**E1-2 09:15**

**Development of a Leakage Energy Recovery Applied to Full-Bridge Converter**

*Yong-Dong Chang and Guo-Xiang Liu (National Penghu University of Science and Technology, Taiwan)*

**E1-3 09:30**

**A 24-28 GHz Frequency Synthesizer for 5G Applications**

*Kang-Chun Peng and Wei-Lung Wu (National Kaohsiung University of Science and Technology, Taiwan)*

**E1-4 09:45**

**AIoT-based Audio Recognition System for Smart Home Applications**

*Bo-Wei Chen, Yu-Syuan Jhang, Hao-Ting Pai, Szu-Hong Wang and Ming-Hwa Sheu (National Yunlin University of Science and Technology, Taiwan); Tzu-Hsiung Chen (Taipei Chengshih University of Science and Technology, Taiwan)*

**E1-5 10:00**

**Graph Signal Denoising Method Using the K-Nearest Neighbors Found by Dijkstra's Algorithm**

*Chien-Cheng Tseng (National Kaohsiung University of Science and Technology, Taiwan); Su-Ling Lee (Chang Jung Christian University, Taiwan)*

**E1-6 10:15**

**A Matrix Inversion Free Method for Computing Katz Centrality of Taipei Metro System Using Neumann Series**

*Chien-Cheng Tseng (National Kaohsiung University of Science and Technology, Taiwan); Su-Ling Lee (Chang Jung Christian University, Taiwan)*

**E1-7 10:30**

**High-efficient Semantic Segmentation for Internet-of-Things-enabled Smart Cameras**

*Kuan-Ting Lai (HiMax Corp., Taiwan); Jirayu Petchphan and Ching-Hu Lu (National Taiwan University of Science and Technology, Taiwan)*

**E2****Circuits and Systems for Intelligent Signal Processing Technology**

Chairs: Chih-Peng Fan (National Chung Hsing University, Taiwan), Kuan-Hung Chen (Feng Chia University, Taiwan)

**E2-1 09:00**

**SAFER & SAFEST: Single-Aging-Factor Enhanced Rings and Shadow Trees for Data Annotation and Early Warning in Online Aging Monitors of Automotive SoCs**

*Cho-Sheng Lin, Jing Huang, Po-Sheng Chang, Chun-Yen Tsai and Tsung-Chu Huang (National Changhua University of Education, Taiwan)*

**E2****Circuits and Systems for Intelligent Signal Processing Technology**

Chairs: Chih-Peng Fan (National Chung Hsing University, Taiwan), Kuan Hung Chen (Feng Chia University, Taiwan)

**E2-2 09:15****Reconfigurable Deep Learning Accelerator Hardware Architecture Design for Sparse CNN**

*Chung-Bin Wu, Chung-Hsuan Chen and Chen-Peng Kuan (National Chung Hsing University, Taiwan)*

**E2-3 09:30****Sensing Error Compensation Algorithm for Ultra-Wideband Following Systems**

*Kuang-Hao Lin and Da-Gang Ye (National Formosa University, Taiwan)*

**E2-4 09:45****Ultrasound Phased Array Radar Design for Ranging and Direction of Arrival Estimation**

*Jia-Jhan Nian, Chu-Chen Wu and Yin-Tsung Hwang (National Chung Hsing University, Taiwan)*

**E2-5 10:00****Effective Two-Stage Processing Based Lite Deep Learning Classifier for Gender Detection**

*Hua-Luen Chen, Chi-Chun Lai and Jie-Min Lin (National Chung Hsing University, Taiwan); Kuan Hung Chen (Feng Chia University, Taiwan); Yin-Tsung Hwang and Chih-Peng Fan (National Chung Hsing University, Taiwan)*

**E2-6 10:15****Behavior Detection in Supermarket Based on Image Caption with UNITY**

*Li-Min Chen and Wei-Liang Lin (National Chung Hsing University, Taiwan)*

**E2-7 10:30****Hardware Generator for Edge Artificial Intelligent Inference System**

*Yeong-Kang Lai and Chuan-Wei Huang (National Chung Hsing University, Taiwan)*

**E3****Advanced Machine Learning for Smart IoT Applications**

Chairs: Wen-Huang Cheng (National Yang Ming Chiao Tung University, Taiwan), Ching-Chun Huang (National Yang Ming Chiao Tung University, Taiwan)

**E3-1 09:00****Smart Augmented Reality of the Perspective-Taking Application of Exhibits**

*Tzu-Jung Kung and Chi-Hao Lung (National Taipei University of Technology, Taiwan)*

**E3-2 09:15****Un-rectifying ReLU Deep Neural Network in Compressed Sensing Recovery**

*Shih-Shuo Tung and Wen-Liang Hwang (Institute of Information Science, Academia Sinica, Taiwan)*

**E3-3 09:30****Online Learning for Network Traffic Data Classification**

*Wei-Chen Hsi, Chung-Hao Wu and Henry Horng-Shing Lu (National Yang Ming Chiao Tung University, Taiwan)*

**E3****Advanced Machine Learning for Smart IoT Applications**

Chair: Wen-Huang Cheng (National Yang Ming Chiao Tung University, Taiwan), Ching-Chun Huang (National Chiao Tung University, Taiwan)

**E3-4 09:45**

**ZYELL-NCTU NetTraffic-1.0: A Large-Scale Dataset for Real-World Network Anomaly Detection**

*Lei Chen, Shao-En Weng, Chu-Jun Peng, Hong-Han Shuai and Wen-Huang Cheng (National Yang Ming Chiao Tung University, Taiwan)*

**E3-5 10:00**

**Bio-medical Image Analysis for Diagnosis and Healthcare Detection System of Skin Cancer**

*Chia-Jung Yu and Chiung-An Chen (Ming Chi University of Technology, Taiwan); Shih-Lun Chen (Chung Yuan Christian University, Taiwan)*

**E4****Advanced Cryptography and Its Applications**

Chair: Yasuyuki Nogami (Okayama University, Japan)

**E4-1 09:00**

**A Study on Use of Machine Learning to Evaluate the Security of Common Key Cryptosystem**

*A Inomata, Shunsuke Araki and Ken'ichi Kakizaki (Kyushu Institute of Technology, Japan)*

**E4-2 09:15**

**A Study on Control Parameter and Output Sequence of the Logistic Map over Integers for Pseudorandom Number Generation**

*Gen Osono and Shunsuke Araki (Kyushu Institute of Technology, Japan); Takeru Miyazaki and Satoshi Uehara (The University of Kitakyushu, Japan); Ken'ichi Kakizaki (Kyushu Institute of Technology, Japan)*

**E4-3 09:30**

**A Study on Digital Watermarks for Audio Signals Using Phase of Frequency Signals in Addition to the Other Methods**

*Kako Takahashi and Takeru Miyazaki (The University of Kitakyushu, Japan); Shunsuke Araki (Kyushu Institute of Technology, Japan); Satoshi Uehara (The University of Kitakyushu, Japan); Yasuyuki Nogami (Okayama University, Japan)*

**E4-4 09:45**

**A Study on Relationship Between Period and Number of Divisions in Piecewise Logistic Map over Integers**

*Sota Eguchi, Takeru Miyazaki and Satoshi Uehara (The University of Kitakyushu, Japan); Shunsuke Araki (Kyushu Institute of Technology, Japan); Yasuyuki Nogami (Okayama University, Japan)*

**E4-5 10:00**

**Consideration of Generating Suitable Parameters for Constructing type (h, m) Gauss Period Normal Basis**

*Keiji Yoshimoto, Yuta Koda, Takuya Kusaka and Yasuyuki Nogami (Okayama University, Japan)*

**E4****Advanced Cryptography and Its Applications**

Chair: Yasuyuki Nogami (Okayama University, Japan)

**E4-6 10:15****An Optimal Curve Parameters for BLS12 Elliptic Curve Pairing and Its Efficiency Evaluation***Daichi Hattori, Yuto Takahashi Tomoya Tatara, Yuki Nanjo, Takuya Kusaka and Yasuyuki Nogami (Okayama University, Japan)***E5****Best Paper Competition**

Chair: Robert Chen-Hao Chang (National Chung Hsing University, Taiwan)

**E5-1 09:00****A Posture Features Based Pedestrian Trajectory Prediction with LSTM***I-Hsi Kao (University of California, Berkeley, USA); Xiao Zhou (Wuhan University of Technology, China); I-Ming Chen, Pin Wang and Ching-Yao Chan (University of California, Berkeley, USA)***E5-2 09:15****The Effect of Time Lag between Servers on QoE of Multi-View Video and Audio Transmission***Toshiro Nunome and Takuro Ito (Nagoya Institute of Technology, Japan)***E5-3 09:30****Degradation of Metal Corner Reflectors' Radar Cross-Section in a Radome with Imperfect Characteristics***Hsi-Tseng Chou (National Taiwan University, Taiwan); Rong-Chung Liu (Yuan Ze University & WavePro, Taiwan); Yao-Chiang Kan (Yuan Ze University, Taiwan); Chih-Te Huang (National Chung-Shan Institute of Science and Technology, Taiwan); Hsien-Kwei Ho (WavePro Technology Inc., Taiwan)***E5-4 09:45****FB-KEA: A Feature-Based Keyword Extraction Algorithm for Improving Hit Performance***Ssu-Chi Kuai and Wen-Hwa Liao (National Taipei University of Business, Taiwan); Chih-Yung Chang (Tamkang University, Taiwan); Gwo-Jong Yu (Aletheia University, Taiwan)***E5-5 10:00****An Energy-efficient and Programmable RISC-V CNN Coprocessor for Real-time Epilepsy Detection and Identification on Wearable Devices***Yi-Wen Hung, Yao-Tse Chang and Shuenn-Yuh Lee (National Cheng Kung University, Taiwan); Chou-Ching K. Lin (National Cheng Kung University Hospital, Taiwan); Gia-Shing Shieh (Ministry of Health and Welfare Tainan Hospital, Taiwan)***E5-6 10:15****Discussion on the recent development of OTT platforms in Taiwan***Shyang-Yuh Wang (Chinese Culture University, Taiwan); Sheng-Tsung Tu (Ming Chuan University, Taiwan); Chian-Shin You and Yue-Nuo Yan (Chinese Culture University, Taiwan); Chien-Hsing Chou (Tamkang University, Taiwan)*

## E6

**Efficient Algorithm and Architecture Designs for Circuit and System**

Chairs: Yu-Hsuan Lee (Yuan-Ze University, Taiwan), Duo Sheng (Fu Jen Catholic University, Taiwan)

**E6-1 09:00**

**A Buffer Circuit for the Interface of RF and Baseband System**

*Hung-Wen Lin, Zhi-Sheng Zhang and Zhi-Yi Chen (Yuan Ze University, Taiwan)*

**E6-2 09:15**

**DLL-Based Transmit Beamforming IC for High-Frequency Ultrasound Medical Imaging System**

*Duo Sheng, Chih-Hao Liu, Sih-Ying Chen, Bin-Yang Song, Ying-Chi Chiu and Ming-Han Cai (Fu Jen Catholic University, Taiwan)*

**E6-3 09:30**

**AN-Coded Redundant Residue Number System for Reliable Neural Networks**

*Hsiao-Wen Fu, Ting-Yu Chen, Cheng-Di Tsai, Meng-Wei Shen and Tsung-Chu Huang (National Changhua University of Education, Taiwan)*

**E6-4 09:45**

**Hybrid BP-SC/SCF Decoding for Polar Codes**

*Chih-Heng Cheng and Cheng-Hung Lin (Yuan Ze University, Taiwan)*

**E6-5 10:00**

**Lossless Image/Video Embedded Compression for Memory Bandwidth Saving of AI Applications**

*Yu-Hsing Chiu, Szu-Hsuan Lai and Yu-Hsuan Lee (Yuan-Ze University, Taiwan)*

## E7

**QoS/QoE-Related Technologies for Future Communication Systems**

Chairs: Ryo Yamamoto (The University of Electro-Communications, Japan), Yoshiaki Nishikawa (NEC Corporation, Japan)

**E7-1 09:00**

**Study of flower image classification using deep learning to support agricultural pollination**

*Eisuke Fukuyama (Nippon Institute of Technology, Japan); Tomotaka Kimura (Doshisha University, Japan); Nobuhiko Itoh and Takefumi Hiraguri (Nippon Institute of Technology, Japan)*

**E7-2 09:15**

**Vulnerability Assessment for Deep Learning Based Phishing Detection System**

*Yuji Ogawa, Tomotaka Kimura and Jun Cheng (Doshisha University, Japan)*

**E7-3 09:30**

**Unit Traffic Classification by Two-stage Clustering on P2PTV Applications**

*Rina Ooka, Takumi Miyoshi, Taku Yamazaki and Thomas Silverston (Shibaura Institute of Technology, Japan)*

**E7-4 09:45**

**Mobile User Density Estimation Based on Graph Laplacian Regularized Recursive Least Squares**

*Kaisei Neichi and Takahiro Matsuda (Tokyo Metropolitan University, Japan)*

## E7

### QoS/QoE-Related Technologies for Future Communication Systems

Chairs: Ryo Yamamoto (The University of Electro-Communications, Japan), Yoshiaki Nishikawa (NEC Corporation, Japan)

#### E7-5 10:00

##### Sequential Least Squares-Based Traffic Estimation for Anomaly Detection in Cloud Computing Environments

*Kenta Yumoto and Takahiro Matsuda (Tokyo Metropolitan University, Japan); Takeshi Kodama, Junichi Higuchi and Hitoshi Ueno (Fujitsu Laboratories Ltd., Japan)*

#### E7-6 10:15

##### A Study on effect of Advertisement Insertion to QoE in Video Streaming Services

*Yukiya Kunugi, Ryo Yamamoto, Satoshi Ohzahata and Toshihiko Kato (The University of Electro-Communications, Japan)*

#### E7-7 10:30

##### Delay-based Task Offloading for Fog Computing in IoT Networks

*Takamichi Yamamoto, Ryo Yamamoto, Satoshi Ohzahata and Toshihiko Kato (The University of Electro-Communications, Japan)*

**F1****Consumer IC Researches and Applications**

Chair: Shao-Chang Huang (Vanguard International Semiconductor Corporation, Taiwan)

**F1-1 09:00****Signal Control Switching Applied on Large Array Devices' Layouts**

*Shao-Chang Huang (Vanguard International Semiconductor Corporation, Taiwan); Yu-Yung Kao (National Yang Ming Chiao Tung University, Taiwan); Ching-Ho Li, Li-Fan Chen, Chun-Chih Chen, Kai-Chieh Hsu, Gong-Kai Lin and Jian-Hsing Lee (Vanguard International Semiconductor Corporation, Taiwan); Ke-Horng Chen (National Yang Ming Chiao Tung University, Taiwan)*

**F1-2 09:15****Optimizing Power IC Layouts by Simulation Tools**

*Shao-Chang Huang, Ching-Ho Li, Li-Fan Chen, Chun-Chih Chen, Kai-Chieh Hsu, Gong-Kai Lin and Jian-Hsing Lee (Vanguard International Semiconductor Corporation, Taiwan);*

**F1-3 09:30****Low Latency Design of Polar Decoder for Flash Memory**

*Yi-Fu Tseng, Ming-Der Shieh and Chih-Hung Kuo (National Cheng Kung University, Taiwan)*

**F1-4 09:45****Creating Output Buffer Circuits by Karnaugh Maps**

*Shao-Chang Huang (Vanguard International Semiconductor Corporation, Taiwan); Yu-Yung Kao (National Yang Ming Chiao Tung University, Taiwan); Ching-Ho Li (Vanguard International Semiconductor Corporation, Taiwan); Ching-Hua Liu (National Taiwan University of Science and Technology, Taiwan); Ke-Horng Chen (National Yang Ming Chiao Tung University, Taiwan)*

**F1-5 10:00****Holding-voltage Improvement of UHV Circular nLDMOS Transistors by the Drain-side SCR Engineering**

*Tien-Yu Lan, Shen-Li Chen, Yu-Jie Zhou, Shi-Zhe Hong, Jhong-Yi Lai and Zhi-Wei Liu (National United University, Taiwan)*

**F1-6 10:15****ESD-Immunity Impact of HV pLDMOS with Drain-side Embedded Horizontal P-type Schottky Modulations**

*Shi-Zhe Hong, Shen-Li Chen, Tien-Yu Lan, Yu-Jie Zhou, Zhi-Wei Liu and Jhong-Yi Lai (National United University, Taiwan)*

**F1-7 10:30****Improved UHV IGBT-Cell for ESD Protection with High Holding Voltage via a 0.5 $\mu$ m BCD Process**

*Yu-Jie Zhou, Shen-Li Chen, Tien-Yu Lan, Shi-Zhe Hong, Zhi-Wei Liu and Jhong-Yi Lai (National United University, Taiwan)*

## F2

**Human-Machine Interaction and User Experience I**

Chair: Wen-Liang Hwang (Institute of Information Science, Academia Sinica, Taiwan)

**F2-1 09:00**

**A Mobile App for Travel: Knowing the Foreign Food from the Tastes of Food in Our Memory**

*Chih-Yi Yeh and Nan-Ching Tai (National Taipei University of Technology, Taiwan)*

**F2-2 09:15**

**Innovative CAPTCHA to Both Exclude Robots and Detect Humans with Color Blindness**

*Jia-Ling Wu and Nan-Ching Tai (National Taipei University of Technology, Taiwan)*

**F2-3 09:30**

**Development of human-friendly plant cultivation pot using IoT**

*Kotoko Tanaka (University of Fukui, Japan); Sakiko Ogoshi and Chika Mori (National Institute of Technology, Fukui College, Japan); Yasuhiro Ogoshi (University of Fukui, Japan)*

**F2-4 09:45**

**Evaluating features of Moto Park using The Kano Model**

*Lai-Chung Lee and Monika Panchal (National Taipei University of Technology, Taiwan)*

**F2-5 10:00**

**Effects of Olfactory Memory on Augmented Gustation**

*Ying-Li Lin and Lai-Chung Lee (National Taipei University of Technology, Taiwan); Chien-Hsing Chou (Tamkang University, Taiwan)*

## F3

**Machine Learning, Deep Learning and AI in CE I**

Chairs: Shen-Fu Hsiao (National Sun Yat-sen University, Taiwan), Shingchern D You (National Taipei University of Technology, Taiwan)

**F3-1 09:00**

**Velocity Prediction for MIDI Notes with Deep Learning**

*Chien-Sheng Kuo, Woei-Kae Chen, Chien-Hung Liu and Shingchern D You (National Taipei University of Technology, Taiwan)*

**F3-2 09:15**

**Self-supervised Learning Aided Blind Stitched Panoramic Image Quality Assessment**

*Jui-Hsiu Chiang and Chih-Wei Tang (National Central University, Taiwan)*

**F3-3 09:30**

**Cross-view Self-supervised Learning via Momentum Statistics in Batch Normalization**

*Guang Li, Ren Togo, Takahiro Ogawa and Miki Haseyama (Hokkaido University, Japan)*

**F3-4 09:45**

**Efficient Computation of Depthwise Separable Convolution in MoblieNet Deep Neural Network Models**

*Shen-Fu Hsiao and Bo-Ching Tsai (National Sun Yat-sen University, Taiwan)*

## F3

**Machine Learning, Deep Learning and AI in CE I**

Chairs: Shen-Fu Hsiao (National Sun Yat-sen University, Taiwan), Shingchern D You (National Taipei University of Technology, Taiwan)

**F3-5 10:00****Multi-threaded System Design of a Multi-Precision Deep Learning Accelerator on FPGA with Optimized Memory Usage**

*Shen-Fu Hsiao, Jyun-Liang Chen, Yi Hsu and Xiang-Ting Huang (National Sun Yat-sen University, Taiwan)*

**F3-6 10:15****Quantization of Deep Neural Network Models Considering Per-Layer Computation Complexity for Efficient Execution in Multi-Precision Accelerators**

*Shen-Fu Hsiao and Yu-Che Yen (National Sun Yat-sen University, Taiwan)*

**F3-7 10:30****Model-based Local Distortion Flow Estimation for Wide-angle Image Rectification**

*Ching-Chun Huang (National Chiao Tung University, Taiwan); Zhi-Xiang Liao (National Chung Cheng University, Taiwan); Ching-Chun Hsiao (National Yang Ming Chiao Tung University, Taiwan); Jui-Chiu Chiang (National Chung Cheng University, Taiwan)*

## F4

**Biomedical Circuits and System Technology and Bioinformation Procession & Non-Invasive Biomedical Technology and Digital Health Care**

Chairs: Pao-Cheng Huang (Fujian Agriculture and Forestry University, China), Liang-Hung Wang (Fuzhou University, China)

**F4-1 09:00****Method of ECG Lead Recovery from 3-Lead to 12-Lead**

*Lin-Pei Xu, I-Chun Kuo and Liang-Hung Wang (Fuzhou University, China)*

**F4-2 09:15****Noninvasive Blood Pressure Classification based on ECG with ResNet Algorithm**

*Wei Liu (Fuzhou University, China); Xin-Kang Wang (Fujian Provincial Hospital, China); Liang-Hung Wang (Fuzhou University, China)*

**F4-3 09:30****Design, Integration, and Verification of a Low-Cost Nailfold Capillaroscopy**

*Hung-Hsiang Wang and Chih-Ping Chen (National Taipei University of Technology, Taiwan)*

**F4-4 09:45****A Multi-lead ECG Acquisition Device Base on Bluetooth Microcontroller**

*Pao-Cheng Huang (Fujian Agriculture and Forestry University, China); Wen-Ping Tsai (Fuzhou University, China); Riqing Chen (Fujian Agriculture and Forestry University, China); Liang-Hung Wang (Fuzhou University, China)*

## F4

### Biomedical Circuits and System Technology and Bioinformation Proccession & Non-Invasive Biomedical Technology and Digital Health Care

Chairs: Pao-Cheng Huang (Fujian Agriculture and Forestry University, China), Liang-Hung Wang (Fuzhou University, China)

#### F4-5 10:00

##### Heart Beat Classification Method based on Random Forest Algorithm

*Pao-Cheng Huang (Fujian Agriculture and Forestry University, China); Liang-Hung Wang, Shuo Liu and Ming-Hui Fan (Fuzhou University, China)*

#### F4-6 10:15

##### Selective Microwave Ablation Using Low Power Monolithic Microwave Heater

*Shao-Jyun Lin, Hue-Sin Tian, Hsiao-Chin Chen and Tzu-Yu Tseng (National Taiwan University of Science and Technology, Taiwan); Hung-Wei Chiu (National Taipei University of Technology, Taiwan)*

## F5

### Energy Efficient Objects Detection for Smart Devices

Chair: Shanq-Jang Ruan (National Taiwan University of Science and Technology, Taiwan)

#### F5-1 09:00

##### A Novel Bird Detection and Identification based on DPU processor on PYNQ FPGA

*Guan-Zhou Lin (National Yunlin University Science and Technology, Taiwan); Hoang Minh Nguyen and Chi-Chia Sun (National Formosa University, Taiwan); Po-Yu Kuo and Ming-Hwa Sheu (National Yunlin University of Science and Technology, Taiwan)*

#### F5-2 09:15

##### Multi-language Text Detection and Recognition Based on Deep Learning

*Hao-Hsiang Chaung, Di-Wen Chen and Chang Hong Lin (National Taiwan University of Science and Technology, Taiwan)*

#### F5-3 09:30

##### 31-33 GHz CMOS PA for Ka-Band Radar System

*Chih-Yu Chang, Hsiao-Chin Chen, Chen-Ang Wu, Kun-Yu Lee, Yu-Jie Chou and Li-Tung Chiu (National Taiwan University of Science and Technology, Taiwan)*

#### F5-4 09:45

##### Efficient Hand Gesture Recognition System based on Computer Vision: An Overview

*Chong-Hao Xu and Shanq-Jang Ruan (National Taiwan University of Science and Technology, Taiwan)*

#### F5-5 10:00

##### Unveiling of How Image Restoration Contributes to Underwater Object Detection

*Peng Wen-Yi and Peng Yan-Tsung (National Chengchi University, Taiwan); Lien Wei-Cheng (Hyson Technology Inc., Taiwan); Chen Chu-Song (National Taiwan University, Taiwan)*

## F6

**Artificial Intelligence of Things for the Consumer Technology**

Chairs: Ming-Fong Tsai (National United University, Taiwan), Sheng-Joue Young (National United University, Taiwan)

**F6-1 09:00**

**Attendance Monitoring System based on Artificial Intelligence Facial Recognition Technology**

*Ming-Fong Tsai and Min-Hao Li (National United University, Taiwan)*

**F6-2 09:15**

**AIoT module development for automated production**

*En-Shuo Cheng, Jun-Yi Yang, Jeng-Dao Lee, Kuo-Yi Chen, Nian-Ze Hu and Lin-Yin Chen (National Formosa University, Taiwan)*

**F6-3 09:30**

**The Body Sensor Suit with Mixed Reality Interactive Games**

*Kuo-Yi Chen, Jeng-Dao Lee and Ting-Jia Zhang (National Formosa University, Taiwan)*

**F6-4 09:45**

**Sales Forecasting Using ANNs or RNNs - A Case Study of Freeway Service Station in Taiwan**

*Yi-Fu Lin, Chia-Sheng Cheng and Yi-Chung Chen (National Yunlin University of Science and Technology, Taiwan)*

**F6-5 10:00**

**Optimized Manpower and Location Scheduling Query for Shop Promotion Based on Records of Bicycle Sharing System**

*Hao-Chun Yang, Chung-Yu Yeh, Yu-Rong Lin, Hsin-Yu Chen, Yu-Hsiang Wang and Yi-Chung Chen (National Yunlin University of Science and Technology, Taiwan)*

## F7

**Internet of Things, Internet of Everywhere, and Edge Computing**

Chair: Liang-Bi Chen (National Penghu University of Science and Technology, Taiwan)

**F7-1 09:00**

**Smart Garden Monitoring and Irrigation System in Multiplatform Application Using IoT**

*Celso Carvalho, Waldir Silva, Andrew M Santos, Daniel Frazao Luiz and Adriano Eustaquio Santos (Federal University of Amazonas, Brazil)*

**F7-2 09:15**

**A IoT System for Vehicle Tracking using Long Range Wide Area Network**

*Celso Carvalho, Waldir Silva, Abdel Fady Chabi, Daniel Frazao Luiz and Adriano Eustaquio Santos (Federal University of Amazonas, Brazil)*

**F7-3 09:30**

**Smart Plug Prototype for Residential Electrical Energy Monitoring**

*Celso Carvalho, Waldir Silva, Ângela Kimie Matsuo, Daniel Frazao Luiz and Adriano Eustaquio Santos (Federal University of Amazonas, Brazil)*

## F7

### Internet of Things, Internet of Everywhere, and Edge Computing

Chair: Liang-Bi Chen (National Penghu University of Science and Technology, Taiwan)

#### F7-4 09:45

##### **AI-based Emotion Recognition System with Tensor Decomposition Optimized Pre-processing**

*Chia-Yu Liao, Chia-Yu Li and Wai-Chi Fang (National Yang Ming Chiao Tung University, Taiwan)*

#### F7-5 10:00

##### **Using SRAM-based CIM Architecture as the Event Detector for AIoT Applications**

*Chih-Cheng Lu, Muhammad Bintang Gemintang Sulaiman, Chin-Yu Lin, Jian-Bai Li, Cheng-Ming Shih, Wei-Shu Rih and Kai-Cheung Juang (Industrial Technology Research Institute, Taiwan)*

#### F7-6 10:15

##### **A Smart Mini Marine Fish Tank System Based on AIoT Technology**

*Yi-Hsuan Liu, Wen-Hui Wu, Xiang-Rui Huang, Wei-Han Chen and Liang-Bi Chen (National Penghu University of Science and Technology, Taiwan)*

#### F7-7 10:30

##### **Smart Multi-mode Networking Architecture for Internet of Everywhere Using NB-IoT and LoRa**

*Shang-Liang Chen, Zih-Yun Hong and Hsiang-Yu Chuang (National Cheng Kung University, Taiwan)*

**G1****Automotive CE Applications & Application-Specific CE for Smart Cities**

Chairs: Tsung-Chu Huang (National Changhua University of Education, Taiwan), Jui-Feng Yeh (National Chiayi University, Taiwan)

**G1-1 13:10****Knee Lift Detection using Convolutional Neural Network Method with FPGA Hardware Design**

*Tzu-Chieh Chen, Yi-Jhen Luo, Wei-Chung Wan and Tsung-Han Tsai (National Central University, Taiwan)*

**G1-2 13:25****Pedestrian behavior and agent-based simulation modeling in public space**

*Yu-Chen Wang, Sheng-Ming Wang (National Taipei University of Technology, Taiwan)*

**G1-3 13:40****Automotive Radar Precision Calibration with Compact Antenna Test Range**

*Rong-Chung Liu (Yuan Ze University & WavePro, Taiwan); Chung-Huan Li (WavePro Inc., Taiwan); Teh-Hong Lee (Ohio State University, USA); Yao-Chiang Kan (Yuan Ze University, Taiwan)*

**G1-4 13:55****Intelligent Mango Fruit Glade Classification Using AlexNet with GrabCut Algorithm**

*Jui-Feng Yeh, Kuei-Mei Lin, Chen-Yu Lin and Jen-Chun Kang (National Chiayi University, Taiwan)*

**G1-5 14:10****Error Correctable Range-Addressable Lookup for Activation and Quantization in AI Automotive Electronics**

*Ting-Yu Chen, Cheng-Di Tsai, Hsiao-Wen Fu, Yung-Chun Yang and Tsung-Chu Huang (National Changhua University of Education, Taiwan)*

**G1-6 14:25****Thermal Pad Design Flow for Automotive Electronics**

*Guan-Jia Chen, Hong-Wen Chiou, Yu-Teng Chang and Yu-Min Lee (National Yang Ming Chiao Tung University, Taiwan)*

**G2****Human-Machine Interaction and User Experience II & Sensors and Actuators**

Chair: Meng-Lieh Sheu (National Chi Nan University, Taiwan)

**G2-1 13:10****The effect of children's belongingness on online knowledge-sharing behaviors in a library virtual book club**

*Yun-Hui Chou and Chun-Ching Chen (National Taipei University of Technology, Taiwan)*

**G2-2 13:25****Investigating the Design of the Emotion Function of an APP for Children's Libraries**

*Yu-Wen Hsu and Chun-Ching Chen (National Taipei University of Technology, Taiwan)*

**G2-3 13:40****Design and Evaluation of Children Library App Interface**

*Yu-Wen Hsu and Chun-Ching Chen (National Taipei University of Technology, Taiwan)*

## G2

**Human-Machine Interaction and User Experience II & Sensors and Actuators**

Chair: Meng-Lieh Sheu (National Chi Nan University, Taiwan)

**G2-4 13:55****The individual support system for people with sleeping trouble -a case study of banlangen tea-**

*Chika Mori and Sakiko Ogoshi (National Institute of Technology, Fukui College, Japan); Yasuhiro Ogoshi (University of Fukui, Japan)*

**G2-5 14:10****CMOS Capacitive Fingerprint Sensing Scheme with Transition Band of Low Pass Filter**

*Meng-Lieh Sheu and He-Jin Lee (National Chi Nan University, Taiwan)*

**G2-6 14:25****Development of Skin Sensing Module for Safety Control in Human-Robot Collaboration**

*Hsiang-Yu Hsieh (National Taipei University of Technology, Taiwan); Zong-Yue Deng (Fu Jen Catholic University, Taiwan); Hsin-Han Chiang (National Taiwan Normal University, Taiwan); Hsiao-Chi Li (Fu Jen Catholic University, Taiwan)*

**G2-7 14:40****Gender perception of robots with different anthropomorphism**

*Tung-Yi Cheng and Chun-Ching Chen (National Taipei University of Technology, Taiwan)*

## G3

**Wearable Technology on the Health and Medical Electronics**

Chair: Jian-Chiun Liou (Taipei Medical University, Taiwan)

**G3-1 13:10****Integrated infrared image system within accurate detection**

*Jian-Chiun Liou and Zhen-Yu Yang (Taipei Medical University, Taiwan)*

**G3-2 13:25****An ultrasound system for the detection of dental caries prevention**

*Jian-Chiun Liou and Zhen-Yu Yang (Taipei Medical University, Taiwan)*

**G3-3 13:40****Development of an Electronic Stethoscope Using Raspberry**

*Yu-Chi Wu and Fu-Lin Chang (National United University, Taiwan)*

**G3-4 13:55****Investigation PPG sensor and reflected intensity of the LED irradiated light**

*Jian-Chiun Liou and Jie-Yu Chen (Taipei Medical University, Taiwan)*

**G3-5 14:10****Ultrasonic blood flow rate monitoring**

*Jian-Chiun Liou and Zhen-Yu Yang (Taipei Medical University, Taiwan)*

## G4

### Consumer Electronics and Services for AIoT Technology and Applications

Chair: Chiu-Chin Chen (Zhao Qing University, China), Chia-Chun Liao (Zhao Qing University, China)

#### G4-1 13:10

##### Study the development of 5G applications in Mixed Reality

*Chia-Chun Liao and Chiu-Chin Chen (Zhao Qing University, China)*

#### G4-2 13:25

##### Research on the use of AIoT and 5G in Mobile Commerce

*Chia-Chun Liao and Chiu-Chin Chen (Zhao Qing University, China)*

#### G4-3 13:40

##### Research on the development of Fintech combined with AIoT

*Chiu-Chin Chen and Chia-Chun Liao (Zhao Qing University, China)*

#### G4-4 13:55

##### A Property Management System Using Image Recognition by YOLO

*Taiki Miyamoto, Ryo Fukushima, Keiji Yoshimoto, Yuta Koderu, Takuya Kusaka, Yasuyuki Nogami and Kazuaki Harada (Okayama University, Japan)*

#### G4-5 14:10

##### Development and Evaluation of Innovative Service Design Based on RFID Tag in medicine's Safety Applications and Recycling

*Luoyu Lu (National Taipei University of Technology, Taiwan); Yilei Jin (National Chengchi University, Taiwan); Lai-Chung Lee (Minghsin University of Science and Technology, Taiwan)*

## G5

### Machine Learning, Deep Learning and AI in CE II

Chair: Shu-Min Tsai (National Penghu University of Science and Technology, Taiwan)

#### G5-1 13:10

##### A Hybrid Model of CNN-SVM for Speakers' Gender and Accent Recognition using English Keywords

*Yeshanew Wubet and Kuang-Yow Lian (National Taipei University of Technology, Taiwan)*

#### G5-2 13:25

##### Testing Machine Learning Models for Individual Emotion Estimation from Indoor Environment Data

*Isao Kurebayashi, Nobuyoshi Komuro and Keita Hirai (Chiba University, Japan)*

#### G5-3 13:40

##### An Improved EEG-Based LRCN Emotion Recognition System Using Fuzzy Processing on ECG and PPG Features

*Meng-Ting Wan, Yi-Kai Chen and Wai-Chi Fang (National Yang Ming Chiao Tung University, Taiwan)*

#### G5-4 13:55

##### A Real-time Posture Recognition System using YOLACT++ and ResNet18

*Jia-Cheng Lin and Chen-Chiung Hsieh (Tatung University, Taiwan)*

## G6

### Security and Privacy of CE Hardware and Software Systems & Smartphone and Mobile Device Technologies

Chair: Yi-Chong Zeng (Institute for Information Industry, Taiwan)

#### G6-1 13:10

##### A Proposal for Testing Physical Random Numbers Using Stochastic Process

*Ryoichi Sato, Yuta Kodaera, Takuya Kusaka and Yasuyuki Nogami (Okayama University, Japan)*

#### G6-2 13:25

##### Block Scrambling Image Encryption Used in Combination with Data Augmentation for Privacy-Preserving DNNs

*Tatsuya Chuman and Hitoshi Kiya (Tokyo Metropolitan University, Japan)*

#### G6-3 13:40

##### Generation of Gradient-Preserving Images allowing HOG Feature Extraction

*Masaki Kitayama and Hitoshi Kiya (Tokyo Metropolitan University, Japan)*

#### G6-4 13:55

##### Secure Comparison Protocol for Promoting Business to Business Collaboration on the Blockchain

*Hiroaki Nasu, Yuta Kodaera and Yasuyuki Nogami (Okayama University, Japan)*

#### G6-5 14:10

##### Performance Evaluation of a Deep Learning Model for Time Series Prediction on Android Devices

*Rika Sato (Ochanomizu University, Japan); Saneyasu Yamaguchi (Kogakuin University, Japan); Takeshi Kamiyama (Nagasaki University, Japan); Masato Oguchi (Ochanomizu University, Japan)*

#### G6-6 14:25

##### Optimization of the Stack Structure of Electronic Paper Display Modules by Using the Taguchi Method

*Ning Luo, Huei Chuan Lee and Ching-I Chen (Chung Hua University, Taiwan); Hong Xing Qiu (3DFAMILY Technology Co. LTD., Taiwan)*

PA

Poster Session A

PA-01

**Descriptor Sampling VLSI Design Based on BRIEF Algorithm for Surrounding View Application**

*Jr-Yu Lin, He-Sheng Chou, Kun-Ze Su, Shih-Yao Ke and Wen-Shen Lo (Chung Yuan Christian University, Taiwan); Chiung-An Chen (Ming Chi University of Technology, Taiwan); Shih-Lun Chen (Chung Yuan Christian University, Taiwan)*

PA-02

**An Efficient Data Hiding Method for AMBTC Compressed Images**

*You-An Wang (National Taipei University of Technology, Taiwan); Ming-Chih Chiu (Coretek, Taiwan); Shih-Che Chien and Feng-Chia Chang (National Chung-Shan Institute of Science and Technology, Taiwan); Kai-Lung Hua (National Taiwan University of Science and Technology, Taiwan)*

PA-03

**Forward Vehicle Detection Based on Thermal Vision and Convolutional Neural Network for Autonomous Vehicles**

*Yu-Quan Wang (National Taiwan University of Science and Technology, Taiwan); Ping-Han Chen (National Taipei University of Technology, Taiwan); Sin-Ye Jhong (National Cheng Kung University, Taiwan); Kuan-Ming Yen and Yung-Yao Chen (National Taiwan University of Science and Technology, Taiwan)*

PA-04

**AI in eHealth: Diagnosis of Parkinson's Disease with Augmented Reality**

*Ching-Han Lin and Shan-Bin Chan (National Taipei University of Technology, Taiwan); Yuan-Chun Lai (Open AI Fab Inc., Taiwan); Wen-Long Liang (Jorjin Technologies Inc., Taiwan); Ming-Shih Huang (Open AI Fab Inc., Taiwan); Yung-Yao Chen (National Taiwan University of Science and Technology, Taiwan)*

PA-05

**A Similarity Calculation Method for Originality Evaluation**

*Li Changbao and Xuelin Liu (North China Institute of Computing Technology, China); Zhongliang Ai (China Justice Big Data Service Platform, China); Kewen Lu, Zhonglin Liu and Yawei Su (North China Institute of Computing Technology, China)*

PA-06

**A DRL based Real-time Computing Load Scheduling Method**

*Kewen Lu and Xuelin Liu (North China Institute of Computing Technology, China); Zhongliang Ai (China Justice Big Data Service Platform, China); Zhonglin Liu (North China Institute of Computing Technology, China); Dan Tao and Lou Shuqin (Beijing Jiaotong University, China)*

PA-07

**Green Coffee Beans Classification Using Attention-Based Features and Knowledge Transfer**

*Po-Yen Yang (The Hong Kong University of Science and Technology, China); Sin-Ye Jhong (National Cheng Kung University, Taiwan); Chih-Hsien Hsia (National Ilan University, Taiwan)*

**PA-08****Music Mood Classification System for Streaming Platform Analysis via Deep Learning Based Feature Extraction**

*Yu-Chia Chen and Zih-Ching Chen (National Taiwan University, Taiwan); Chih-Hsien Hsia (National Ilan University, Taiwan)*

**PA-09****A Fully Self-locking/Interlocking Switch Circuit Using Signal Mutual Control**

*Hsin-Chuan Chen and Wenbin Cheng (University of Electronic Science and Technology of China, Zhongshan Institute, China)*

**PA-10****Quality enhancement for point cloud using morphology methods**

*Hong-Bin Bu (National Taipei University of Technology, Taiwan); Ching-Hsuan Lin (Chung Yuan Christian University, Taiwan); Chi-Fu Liang and Ting-Lan Lin (National Taipei University of Technology, Taiwan); Yih-Shyh Chiou (Chung Yuan Christian University, Taiwan)*

**PA-11****Degradation Level Estimation of Road Structures via Attention Branch Network with Text Data**

*Naoki Ogawa, Keisuke Maeda, Takahiro Ogawa and Miki Haseyama (Hokkaido University, Japan)*

**PA-12****Development of Fuzzy-Logic-Based Controllers for Energy Conservation in Human-Electric Bikes**

*Jhen-Hong Dai and Jin-Shyan Lee (National Taipei University of Technology, Taiwan)*

## PB

### Poster Session B

Chair: Chih-Hsien Hsia (National Ilan University, Taiwan)

#### PB-01

##### Enhance Face Recognition Using Time-series Face Images

*Han Tung Chen, Guan Ying Peng, Kai Chi Chang, Jia Yi Lin, Yi-Hsin Chen, Yu Kai Lin, Chao-Yi. Huang and Jong-Chen Chen (National Yunlin University of Science and Technology, Taiwan)*

#### PB-02

##### Analyze the subordination structure between domain-specific vocabulary and meaning with the Word2Vec training process

*Keng-Jung Pai, Chin-Hung Kuo, Cheng-Yen Wu, Jia-Wei Peng, Chao-Yi. Huang and Jong-Chen Chen (National Yunlin University of Science and Technology, Taiwan)*

#### PB-03

##### A research of Hartmann-Shack Wavefront Aberration measurement system validation technology

*Ching-Huang Lin (National Yunlin University of Science and Technology, Taiwan); Hsuan-Fu Wang (Chung Chou University of Science and Technology, Taiwan)*

#### PB-04

##### Development of a Smart Multifunctional Visitor Identification System

*Chih-Chen Chen, Ren-Guang Lue and Tsung-Hsien Hsieh (Hwa Hsia University of Technology, Taiwan); Yu-Luen Chen (National Taipei University of Education, Taiwan); Hsuan Fu Wang (National Yunlin University of Science and Technology, Taiwan); Chi-Pan Hwang (National Changhua University of Education, Taiwan)*

#### PB-05

##### An Embedded All Digital Temperature Sensor with Adjustable Sensitivity

*Po-Hui Yang, Hsin-Wei Dong and Kaun-Chi Huang (National Yunlin University of Science and Technology, Taiwan)*

#### PB-06

##### Overview on Physical Layer Security in Low Earth Orbit (LEO) Satellite System

*Cheng-Ying Yang (University of Taipei, Taiwan); Min-Shiang Hwang (Asia University, Taiwan); Chin-En Yen (Chaoyang University of Technology, Taiwan); Jenq-Foung JF Yao (Georgia College and State University, USA)*

#### PB-07

##### Secrecy Rate Analysis in The Cooperative Communication System

*Jong-Shin Chen (Chaoyang University of Technology, Taiwan); Cheng-Ying Yang (University of Taipei, Taiwan); Min-Shiang Hwang (Asia University, Taiwan); Jenq-Foung JF Yao (Georgia College and State University, USA)*

#### PB-08

##### Enhanced Image Quality Assessment Based on Halftoning Metrics

*Jing-Ming Guo and S Sankarasrinivasan (National Taiwan University of Science and Technology, Taiwan)*

# PB

## Poster Session B

Chair: Chih-Hsien Hsia (National Ilan University, Taiwan)

### PB-09

#### **Modified Attention Spatial Convolution Model for Skin Lesion Segmentation**

*Phuong Le, Yi-Chiung Hsu and Jia-Ching Wang (National Central University, Taiwan)*

### PB-10

#### **Identification System of Fish Freshness Based on Deep Learning**

*Shu Min Tsai, Ming-Lin Chuang, Hong-Wei Yan, Yung-Cheng Yao, Guan-Wei Chen, Lu-Hung Chen and Hao-An Yang (National Penghu University of Science and Technology, Taiwan)*

### PB-11

#### **Automatic Incremental Training of Object Detection by Using GAN for River Level Monitoring**

*Kuei-Chung Chang, Shih-Hong Lin, Jun-Wei Huang and Yi-Fong Wu (Feng Chia University, Taiwan)*

### PB-12

#### **Reversible and Robust Watermarking Technique**

*I-Hui Pan (Air Command and Staff College, National Defense University)*

### PB-13

#### **Towards Personalized Real-time Cardiodynamic Status Monitoring: Multi-scale Modeling of the Heart Sound**

*Tung Jing Fang, Chen Han, Chuan Chia Wang and Lai Chung Lee (National Taipei University of Technology, Taiwan); Whei Jane Wei (Asia University, Taiwan)*

### PB-14

#### **An RSSI-Based Device-Free Localization System for Smart Wards**

*Yu-Siang Feng (National Central University, Taiwan); Hsiao-Yu Liu and Mei-Hui Hsieh (Landseed International Hospital, Taiwan); Hsiao-Chun Fung, Chan-Yi Chang, Chi-Cheng Yu and Chih-Wei Huang (National Central University, Taiwan)*

## PC

### Poster Session C

Chairs: Yen-Lin Chen (National Taipei University of Technology, Taiwan), Yu-Cheng Fan (National Taipei University of Technology, Taiwan)

#### PC-01

##### **High-Order Sychrosqueezing Transforms and Its Application for Highly Accurate Animal Voice Analysis**

*De-Yan Lu and Jian-Jiun Ding (National Taiwan University, Taiwan)*

#### PC-02

##### **Frequency Selective Filtering of Graph Signal in Directed Graph Fourier Transform Domain**

*Chien-Cheng Tseng (National Kaohsiung University of Science and Technology, Taiwan); Su-Ling Lee (Chang-Jung Christian University, Taiwan)*

#### PC-03

##### **Development of a fake news checking crowdsourcing platform consisting of smart contracts combined with gamification**

*Wei-Shuan Wang and Lai-Chung Lee (National Taipei University of Technology, Taiwan)*

#### PC-04

##### **Defect Detection on Wafer Map Using Efficient Convolutional Neural Network**

*Chieng Yang Wang and Tsung-Han Tsai (National Central University, Taiwan)*

#### PC-05

##### **Preliminary Analytics of Video Cache Improvement using Random Linear Network Coding**

*Chao-Hsien Lee and Hsueh-Tse Li (National Taipei University of Technology, Taiwan)*

#### PC-06

##### **Image Quality Analysis Technique for Optical-Based Fingerprint on Display (FoD) Applications**

*Xiu-Zhi Chen, Hung-Chi Lai and Yen-Lin Chen (National Taipei University of Technology, Taiwan)*

#### PC-07

##### **Depth Information based Image Restoration Method for Rotors**

*Yi-Hao Chung, Chao-Wei Yu, Bo-Rui Wen and Yen-Lin Chen (National Taipei University of Technology, Taiwan)*

#### PC-08

##### **High Voltage a-IGZO Thin Film Transistor for 3D IC Application**

*Hsin-Hui Hu, Tsung-Han Lu and Ching-Fan Meng (National Taipei University of Technology, Taiwan)*

#### PC-09

##### **Image Enhancement Based on Generative Adversarial Neural Network**

*Hao-Wen Cheng and Yu-Cheng Fan (National Taipei University of Technology, Taiwan)*

#### PC-10

##### **Implementation of a Novel Intelligent Drowsiness Detection Warning System**

*Robert Chen-Hao Chang, Chia-Yu Wang and Yu-Ya Kao (National Chung Hsing University, Taiwan)*

# PC

## Poster Session C

Chairs: Yen-Lin Chen (National Taipei University of Technology, Taiwan), Yu-Cheng Fan (National Taipei University of Technology, Taiwan)

### PC-11

#### **Q-learning based Tracking Control and Slope Climbing Strategy Design of Autonomous Mobile Robot and Flatbed Vehicle**

*Kuan-Yu Chou, Yu-Ting Chen, Jing-Kai Lin, Shi-Lin Ho and Yon-Ping Chen (National Yang Ming Chiao Tung University, Taiwan)*

### PC-12

#### **Vehicle Turning Intention Prediction Based on Data-Driven Method with Roadside Radar and Vision Sensor**

*Jyun-Hong He, Yen-Lin Chen and Xiu-Zhi Chen (National Taipei University of Technology, Taiwan); Hsin-Han Chiang (National Taiwan Normal University, Taiwan)*

### PC-13

#### **Use subsequent neural network to analyze ICEMI**

*Shu-Yao Hsuan and Shih-Yi Yuan (Feng Chia University, Taiwan)*

### PC-14

#### **Meticulous Alignment for On-Display Fingerprint Sensor on Smartphone**

*Yung-Zhe Wu, Huei-Ming Wu and Pei-Yung Hsiao (National University of Kaohsiung, Taiwan)*

**PD**

**Poster Session D**

Chairs: Ching-Chun Huang (National Yang Ming Chiao Tung University, Taiwan)

**PD-01**

**Optimization and realization of Network Time Protocol on IIOT**

*Lin-Hung Liu and Yi-Ting Chen, Yuan-Sun Chu and Ting-Chao Hou (National Chung Cheng University, Taiwan)*

**PD-02**

**Design and Implement a Smart Umbrella Stand System with Instant Message Application**

*Yi-Shiun Lee, Yong-Yi Fanjiang, Chi-Huang Hung and Chiu-Yen Huang (Fu Jen Catholic University, Taiwan)*

**PD-03**

**Anti-multipath near-field localization in multi-path underwater acoustic channel**

*Haiyan Song (Heilongjiang Institute of Technology, China); Chang-Yi Yang (National Penghu University of Science and Technology, Taiwan)*

**PD-04**

**Robust Source Localization in Shallow Sea Used SOCP**

*Haiyan Song (Heilongjiang Institute of Technology, China); Chang-Yi Yang (National Penghu University of Science and Technology, Taiwan)*

**PD-05**

**A 0.5V True-Single-Phase 16T Flip-Flop in 180-nm CMOS for IoT Applications**

*Zhi-Zhong Wang (Chaoyang University of Technology, Taiwan); Yi-Hsuan Hung (National Yunlin University of Science and Technology, Taiwan); Jun-Ting Wu (Chaoyang University of Technology, Taiwan); Zheng-Jie Hong (National Chung Hsing University, Taiwan); Jin-Fa Lin (Chaoyang University of Technology, Taiwan)*

**PD-06**

**A New Approach of RoF System Using Optoelectronic Oscillator and Discrete Mode Laser**

*Jyun-Wei Li, Yu-Chien Yu, Zhi-Qi Yang, Yibeltal Chanie Manie and Peng-Chun Peng (National Taipei University of Technology, Taiwan)*

**PD-07**

**Markov-chain Analysis Model based Active Period Adaptation Scheme for IEEE 802.15.4 Network**

*Ryota Horiuchi and Nobuyoshi Komuro (Chiba University, Japan)*

**PD-08**

**On the Simulation Analysis for a Wideband Common-mode Filter with Defected Corrugated Reference Plane Structure**

*Ding-Bing Lin (National Taiwan University of Science and Technology, Taiwan); Chung-Ke Yu (National Taipei University of Technology, Taiwan); Chang-Keng Lin (National Taiwan University of Science and Technology, Taiwan); Hsin-Piao Lin (National Taipei University of Technology, Taiwan)*

# PD

## Poster Session D

Chairs: Ching-Chun Huang (National Yang Ming Chiao Tung University, Taiwan)

### PD-09

#### **Applying Neural Network Algorithm of MIMO Log-normal Channel for OFDM/OCDMA System**

*Chih-Ta Yen (National Taiwan Ocean University, Taiwan); Hsin-Han Tsai (National Formosa University, Taiwan)*

### PD-10

#### **Combined ZnO nanorod humidity sensors and DSCs for IOTs application**

*Sheng-Joue Young and Yu-Jhih Chu (National United University, Taiwan)*

### PD-11

#### **Performance Evaluations of Hand Number Gesture Recognition by Convolution-Based Deep Neural Networks**

*Ing-Jr Ding, Meng-Chuan Hsieh, Xue-Lin Mo, Sheng-Qi Wang and Dai-Ru Wu (National Formosa University, Taiwan)*

### PD-12

#### **Eye Movement Analysis for Consumer Devices**

*Marvin Yen, Hao-Wei Li, Chun-Wei Shen, Ren-Xiang Ying and Wen-Chung Kao (National Taiwan Normal University, Taiwan)*

### PD-13

#### **Binary- and Multi-class Network Intrusion Detection with Adaptive Synthetic Sampling and Deep Learning**

*Jehn-Ruey Jiang and Chia-Lin Li (National Central University, Taiwan)*

### PD-14

#### **Identifying IoT Devices with SMTP**

*Jyun-Shao Wu, Fu-Hau Hsu and Chia-Hao Lee (National Central University, Taiwan)*

## PE

### Poster Session E

#### PE-01

##### **Design of e-Health System for Heart Rate and Lung Sound Monitoring with AI-based Analysis**

*Kuei-Chung Chang, Jun-Wei Huang and Yi-Fong Wu (Feng Chia University, Taiwan)*

#### PE-02

##### **Automated Detection System for Acoustic Signal of Breath**

*Hsiu-Ting Hsu, Kai-Lin Chen, Po-Yen Huang and Yuan-Sun Chu (National Chung Cheng University, Taiwan)*

#### PE-03

##### **A Mirror-based Personal Health Monitoring System Integrating Wearable Devices and Non-contact Measurements**

*Li-Wei Chang, Hong-Lin Liu, Cheng-You Ying, Wei-You Tsai and Yuan-Yu Tsai (Asia University, Taiwan)*

#### PE-04

##### **Optical Comb Generator-based Microwave Photonic Filter Performance Improvement Using Multilayer Perceptron (MLP) Neural Network**

*Jyun-Wei Li, Yibeltal Chanie Manie, Po-Han Chiu, Amare Mulatie Dehnaw and Peng-Chun Peng (National Taipei University of Technology, Taiwan)*

#### PE-05

##### **A Deep Metric Learning Method with Combined Loss of Triplet Network and Autoencoder**

*Po-Hsuan Yen and Chien-Cheng Tseng (National Kaohsiung University of Science and Technology, Taiwan); Su-Ling Lee (Chang Jung Christian University, Taiwan)*

#### PE-06

##### **Modeling of Convolutional Neural Network Circuits for Human Activity Recognition**

*Chia-Yu Kuo, Yu-Hao Huang, Bing-Jun Hou and Syang-Ywan Jeng (Chung Yuan Christian University, Taiwan); Shang-Wei Chou (Silicon Jazz Ltd., Taiwan); Hao-Wei Weng (Chung Yuan Christian University, Taiwan)*

#### PE-07

##### **Circuit Implementation of Convolutional Neural Network for Human Activity Recognition**

*Shang-Wei Chou (Silicon Jazz Ltd., Taiwan); Chia-Yu Kuo, Yu-Hao Huang, Bing-Jun Hou, Syang-Ywan Jeng and Yueh-Lin Chiang (Chung Yuan Christian University, Taiwan)*

#### PE-08

##### **Development of AI-based Recycling Bins Using MobileNet-SSD Networks**

*Wei-Chen Zheng and Jin-Shyan Lee (National Taipei University of Technology, Taiwan); Yuan-Heng Sun (Industrial Technology Research Institute, Taiwan)*

#### PE-09

##### **Robust Remote Sensing FBG Sensor System Using Bidirectional-EDFA Techniques**

*Jyun-Wei Li, Meng-Hsien Chan, Zhi-Qi Yang, Yibeltal Chanie Manie and Peng-Chun Peng (National Taipei University of Technology, Taiwan)*

### PE-10

#### **A Study of Development an English Vocabulary Learning Companion Robot Based on Progressive Prompting**

*Ah-Fur Lai and YU-Chia Lin (University of Taipei, Taiwan); Horng-Yih Lai (National Taiwan University, Taiwan)*

### PE-11

#### **Automatic Deployment Mechanism for Smart Communication Service Based on Container Technology**

*Shang-Liang Chen and Hsiang-Yu Chuang (National Cheng Kung University, Taiwan)*

### PE-12

#### **Application of Whale Optimization Algorithm in the Optimization of Lithium Battery Parameters**

*En-Jui Liu, Ting-Chen Pan, Wei-Lun Yu and Che-Wun Hong (National Tsing Hua University, Taiwan)*

### PE-13

#### **Is Wearable Input Devices Better for 3D Modeling on Tablet? A Case study**

*Hung-Hsiang Wang and Chih-Ping Chen (National Taipei University of Technology, Taiwan)*