# **2020 International Computer** Symposium (ICS 2020)

Tainan, Taiwan 17 – 19 December 2020



IEEE Catalog Number: CFP2029K-POD **ISBN:** 

978-1-7281-9256-7

## Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

*Copyright and Reprint Permissions*: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

#### \*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP2029K-POD
ISBN (Print-On-Demand):	978-1-7281-9256-7
ISBN (Online):	978-1-7281-9255-0

#### Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



## 2020 International Computer Symposium (ICS) ICS 2020

## **Table of Contents**

Message from the General Chairs _xix
Message from the Program Chairs xx
Organizing Committee .xxii
Program Committee xxiv
Steering Committee xxy
Keynotes xxvi
Sponsors .xxx

## 5G Communications, Protocols, and Applications

A Novel Scheduling Algorithm Applied to the Component Carrier Selection for Femtocell in Wireless Communication .31..... Ying-Hong Wang (Department of Computer Science and Information Engineering, Tamkang University)

### Artificial Intelligence Learning Theory and Statistics

A Feature Fusion Approach for Multiple Signal Classification .37 Shih-Feng Huang (National University of Kaohsiung) and Yen-Wen Lin (National University of Kaohsiung)
HPCF: Hybrid Music Group Recommendation System Based on Item Popularity and Collaborative Filtering .43. Shih-Han Chen (National Cheng Kung University), Sok-Ian Sou (National
Cheng Kung University), and Hsun-Ping Hsieh (National Cheng Kung University)
Room-Based Playlist Arrangement System using Group Recommendation .50 Hsin-Wei Li (National Cheng Kung University), Sok-Ian Sou (National Cheng Kung University), and Hsun-Ping Hsieh (National Cheng Kung University)
The MuTube Dataset for Music Listening History Retrieval and Recommendation System .55 Yi-Chen Wang (National Cheng Kung University), Pei-Lin Yang (National Cheng Kung University), Sok-Ian Sou (National Cheng Kung University), and Hsun-Ping Hsieh (National Cheng Kung University)
One-Class Novelty Detection via Sparse Representation with Contrastive Deep Features .61 Kuang-Ting Lee (National Chung Hsing University), Chien-Yu Chiou (National Cheng Kung University), and Chun-Rong Huang (National Chung Hsing University)
Grid Structure Attention for Natural Language Interface to Bash Commands .67 Jia-Wei Kan (National Taiwan University), Wei-Chin Chien (National Taiwan University), and Sheng-De Wang (National Taiwan University)
AIoT Applications
A Speedup Simulation-Based Fire Prediction for Online Evacuation Planning .73 Hung-Yun Chen (National Cheng Kung University, Taiwan) and Pei-Hsuan Tsai (National Cheng Kung University, Taiwan)
Convolution Filter Pruning for Transfer Learning on Small Dataset .79 Ching-Ya Liao (Department of Computer Science and Information Engineering, National Taiwan University, Taiwan), Pangfeng Liu (Department of Computer Science and Information Engineering, National Taiwan University, Taiwan), and Jan-Jan Wu (Institute of Information Science, Academia Sinica, Taiwan)
Speak to Action: Offline and Hybrid Language Recognition on Embedded Board for Smart Control System .85
Aanand. P. Pant (National Chiao Tung University, Taiwan), Kun-Ru Wu (National Chiao Tung University, Taiwan), and Yu-Chee Tseng (National Chiao Tung University, Taiwan)

An AI-Based System for Monitoring Behavior and Growth of Pigs .91 You-Rong Chen (National Cheng Kung University, Taiwan), Chi-Ting Ni (National Cheng Kung University, Taiwan), Kiat-Siong Ng (National Cheng Kung University, Taiwan), Chia-Lun Hsu (National Cheng Kung University, Taiwan), Shen-Chang Chang (Council of Agriculture/Livestock Research Institute, Taiwan), Chin-Bin Hsu (Council of Agriculture/Livestock Research Institute, Taiwan), and Pei-Yin Chen (National Cheng Kung University, Taiwan)
Anomaly Detection with Autoencoder and Random Forest .96 Tzu-Hsuan Lin (National Central University, Taiwan) and Jehn-Ruey Jiang (National Central University, Taiwan)
Algorithms and Computation Theory
An Efficient Methodology for the Cross-Comparison of Text Documents .100 Shu-Kai Yang (National Chiao Tung University) and Chien Chou (National Chiao Tung University)
Text Mining over Curriculum Vitae of Peruvian Professionals using Official Scientific Site DINA .105 Josimar Chire (Institute of Mathematics and Computer Science (ICMC), University of São Paulo (USP)) and Honorio Apaza (Data Science Research Group - UNAM, Universidad Nacional de Moquegua (UNAM))
Sensor Activity Control Strategy for Random Access Wireless Sensor Network Systems .110 Rong-Guei Tsai (School of Information Engineering, Putian University), Guan-Rong Shih (Institute of Manufacturing Information and Systems, National Cheng Kung University), and Pei-Hsuan Tsai (Institute of Manufacturing Information and Systems, National Cheng Kung University)
A Parallel Algorithm for Constructing Two Edge-Disjoint Hamiltonian Cycles in Locally Twisted Cubes .116 Shun-Yu Li (National Taipei University of Business, Taiwan), Jou-Ming Chang (National Taipei University of Business, Taiwan), and Kung-Jui Pai (Ming Chi University of Technology, Taiwan)
On the Valuedness of Symbolic Finite Transducers .120 Di-De Yen (Department of Electrical Engineering National Taiwan University; Institute of Information Science Academia Sinica) and Hsu-Chun Yen (Department of Electrical Engineering National Taiwan University)
The Hardness and Approximation of the Densest k-Subgraph Problem in Parameterized Metric Graphs .126 Shih-Chia Chang (National Taipei University of Business), Li-Hsuan Chen (ProBrand Technology), Ling-Ju Hung (National Taipei University of Business), Shih-Shun Kao (CNRS, LaBRI, Université de Bordeaux; National Cheng Kung University), and Ralf Klasing (CNRS, LaBRI, Université de Bordeaux)
BitTorrent-Based P2P Locality-Awareness File Sharing over Software-Defined NG-PON2 .131 I-Shyan Hwang (Yuan Ze University), Ardian Rianto (Yuan Ze University), and Razat Kharga (Yuan Ze University)

## **Big Data**

DeepSafety: A Deep Learning Framework for Unsafe Behaviors Detection of Steel Activity in Construction Projects	135
Predicting the Japanese Yen to US Dollar Exchange Rate Based on Machine Learning Models Rung-Ching Chen (Chaoyang University of Technology), Yi Chen Shiao (Chaoyang University of Technology), Christine Dewi (Chaoyang University of Technology), and Qiao-En Liu (Chaoyang University of Technology)	141
An Effective and Efficient Algorithm for Detecting Exact Deletion Breakpoints from Viral Next-Generation Sequencing Data <i>Ji-Hong Cheng (National Cheng Kung University), Wen-Chun Liu (National Cheng Kung University), Ting-Tsung Chang (National Cheng Kung University), Sun-Yuan Hsieh (National Cheng Kung University), and Vincent S. Tseng (National Chiao Tung University)</i>	147

## Parallel, Distributed, and Cloud/Edge Computing

PerfNetRT: Platform-Aware Performance Modeling for Optimized Deep Neural Networks	3
<ul> <li>Resolving Automatic High Availability Operations and Users Commands to Virtual Machines on</li> <li>OpenStack</li></ul>	9
<ul> <li>Real-Time Transfers for Improving Efficiency of Ridesharing Services in the Environment</li> <li>with Connected and Self-Driving Vehicle</li></ul>	5
Performance Monitoring and Tracing of the Data Distribution Service with Dynamic Instrumentation	/A
An Efficient Data Structure for Distributed Ledger in Blockchain Systems	5

Design and Analysis of a Distributed Consensus Protocol for Real-Time Blockchain Systems .179... Tzu-Lun Huang (Department of Computer Science and Information Engineering, St. John University, New Taipei City, Taiwan, R.O.C.) and Jason Huang (Advanced Financial Engineering LLC, Palo Alto, CA, USA)

Enhanced OpenStack Cloud for Network Function Virtualization .185..... Ming-Huang Tsai (Chung Yuan Christian University, Taiwan), Han-Ting Liang (Chung Yuan Christian University, Taiwan), Yun-He Wang (Chung Yuan Christian University, Taiwan), and Wu-Chun Chung (Chung Yuan Christian University, Taiwan)

Performance Analysis and Optimization for Federated Learning Applications with PySyft-Based Secure Aggregation .191..... Po-Sheng Lin (National Taiwan University), Ming-Chang Kao (ADLINK Technology Inc., New Taipei, Taiwan), Wen-Yew Liang (ADLINK Technology Inc., New Taipei, Taiwan), and Shih-Hao Hung (National Taiwan University, Taipei, Taiwan)

#### Computer Architecture, Embedded Systems, SoC, and VLSI/EDA

The Brain Memory Architecture HW/SW Co-Design Platform with Adaptive CNN Algorithm .197. Jih-Ching Chiu (National Sun Yat-sen University), Yu-Yi Wang (National Sun Yat-sen University), and Wei-Yi Lin (National Sun Yat-sen University)
A Hybrid Computational Storage Architecture to Accelerate CNN Training .203 Chun-Zhang Zheng (National Taiwan University of Science and Technology) and Chin-Hsien Wu (National Taiwan University of Science and Technology)
A Novel VLSI Architecture for Barrel Distortion Correction .209. <i>Chi-Ting Ni (National Cheng Kung University, Taiwan), Chen-An Chang</i> <i>(National Cheng Kung University, Taiwan), Jia-Wei Liao (National Cheng</i> <i>Kung University), and Pei-Yin Chen (National Cheng Kung University)</i>
An Empirical Approach to Minimize Latency of Real-Time Multiprocessor Linux Kernel .214 Ching-Chun Huang (National Cheng Kung University, Taiwan) and Chung-Fan Yang (Department of Electrical Engineering, National Cheng Kung University, Taiwan (R.O.C.))
The Design and Implementation of a Power Management Solution for Smart Glasses .219 Jing Chen (National Cheng Kung University, Taiwan (ROC)) and Yi-Wei Chen (National Cheng Kung University, Taiwan (ROC))

#### AI for Healthcare and Bioinformatics

Using Multiclass Machine Learning Model to Improve Outcome Prediction of Acute Ischemic Stroke Patients After Reperfusion Therapy .225..... I-Min Chiu (Department of Computer Science and Engineering, National Sun Yat-sen University, Department of Emergency Medicine, Kaohsiung Chang Gung Memorial Hospital), Wun-Huei Zeng (Department of Computer Science and Engineering, National Sun Yat-sen University), and Chun-Hung Richard Lin (Department of Computer Science and Engineering, National Sun Yat-sen University)

Rectum Segmentation in Brachytherapy Dataset Using Recurrent Network .232 Kai-Hsiang Lin (Department of Computer Science and Information Engineering, National Cheng Kung University, Tainan, Taiwan), Jui-Hung Chang (Computer and Network Center, Department of Computer Science and Information Engineering, National Cheng Kung University, Tainan, Taiwan), Ti-Hao Wang (Department of Radiation Oncology, China Medical University Hospital, Taichung, Taiwan), Hoe-Yuan Ong (Department of Computer Science and Information Engineering, National Cheng Kung University, Tainan, Taiwan), and Pau-Choo Chung (Department of Electrical Engineering, National Cheng Kung University, Tainan, Taiwan)
Skin Cancer Dermoscopy Images Classification with Meta Data via Deep Learning Ensemble .237. Tsung-Chieh Lin (Department of Computer Science and Information Engineering, National Quemoy University, Kinmen County 892, Taiwan R.O.C.) and Hsi-Chieh Lee (Department of Computer Science and Information Engineering National Quemoy University)
Study of Coronavirus Impact on Parisian Population from April to June using Twitter and Text Mining Approach 242 Josimar Edinson Chire Saire (University of São Paulo) and Jimy Frank Oblitas Cruz (Universidad Privada del Norte)
Evaluation of Fatigue and Attention Levels in Multi-Target Scenario using CNN .247 Sandeep Vara Sankar D (National Chiao Tung University, Taiwan) and Li-Wei Ko (National Chiao Tung University, Taiwan)

## Intelligent Network

Design and Implement Robust Wireless Network Based on TCP Protocol .252 Jih Ching Chiu (National Sun Yat-sen University Republic of China), Jun-Jiang Chen (National Sun Yat-sen University Republic of China), and Kuan Lun Su (National Sun Yat-sen University Republic of China)
Deployment and Evaluation of LoRa Network Configuration Based on Random Forest .262 Zhi-Hao Wang (Chen-Fon-Wei Security Co., Ltd.), Sung-Tsun Shih (Cheng Shiu University), Hendrick Hendrick (State Polytechnic of Padang), Mao-Yuan Pai (National Pingtung University of Science and Technology), and Gwo-Jiun Horng (Southern Taiwan University of Science and Technology)
A Query-Based Routing Table Update Mechanism for Content-Centric Network .266 Pei-Hsuan Tsai (Institute of Manufacturing Information and Systems, National Cheng Kung University), Yu-Lin Tseng (Institute of Manufacturing Information and Systems, National Cheng Kung University), Jun-Bin Zhang (Department of Computer Science and Information Engineering, National Cheng Kung University), and Meng-Hsun Tsai (Department of Computer Science and Information

Engineering, National Cheng Kung University)

Car Sales Prediction System Based on Fuzzy Time Series and Adaptive Neuro Fuzzy Inference System 272
Abid Falih Zuhdi (Universitas Negeri Malang), Aripriharta A. (Universitas Negeri Malang), Agusta Rakhmat Taufani (Universitas Negeri Malang), Adim Firmansah (Universitas Negeri Malang), and Gwo Jiun Horng (Southern Taiwan University of Science and Technology)
Design and Implement Adaptive Tree Topology Mechanism For Wi-Fi Wireless Network .278 Jih-Ching Chiu (National Sun Yat-sen University, Republic of China), Cheng-Lin Tsai (National Sun Yat-sen University, Republic of China), and Zhi-Yu Lee (National Sun Yat-sen University, Republic of China)
Resource Allocation for Tactile Internet via Software-Defined FiWi Access Network .283 Elaiyasuriyan Ganesan (Yuan Ze University), I-Shyan Hwang (Yuan Ze University), and Andrew Tanny Liem (Universitas Klabat)
An Efficient Algorithm for Joint Power Allocation in NOMA-Based Diamond Relay Networks .288. Yinman Lee (National Chi Nan University), Bo-Ying Huang (National Cheng Kung Univeristy), and Sok-Ian Sou (National Cheng Kung Univeristy)
A Survey on Clustering Algorithms in Wireless Sensor Networks: Challenges, Research, and Trends 294 Mehdi Gheisari (Department of Computer Science and Engineering, Southern University of Science and Technology, Shenzhen, China), Aaqif Afzaal Abbasi (Department of Software Engineering Foundation University, Islamabad, Pakistan), Zahra Sayari (Deylaman Institute of Higher Education Lahijan, Iran), Qasim Rizvi (Department of Computer, Islamic Azad University, Damavand, Iran), Alia Asheralieva (Department of Computer Science and Engineering, Southern University of Science and Technology, Shenzhen, China), Sabitha Banu (Department of Computer, Islamic Azad University, Damavand, Iran), Feras M. Awaysheh (Institute of Computer Science, University of Tartu, Estonia), Syed Bilal Hussain Shah (School of Software Dalian University of Technology China), and Khuhawar Arif Raza (Department of Computer Science and Engineering Southern University of Science and Technology Shenzhen, China)
Usage Behavior Analysis of Intelligent Network Based Public Bicycle Rental System .300 Hao-En Chueh (Chung Yuan Christian University), Chang-Yi Kao (Soochow University), and Meng-Luen Wu (National Taiwan University of Science and Technology)
Finding Periodicity of Subflows in SDN-Based IoT .304 Lo-An Chen (National Cheng Kung University, R.O.C.), Jing-Zhao Zhuo (National Cheng Kung University, R.O.C.), Yun-Zhan Cai (National Cheng Kung University, R.O.C.), Yu-Ting Wang (National Cheng Kung University, R.O.C.), and Meng-Hsun Tsai (National Cheng Kung University, R.O.C.)

University, R.O.C.)

The Anomaly Detection Mechanism Using Extreme Learning Machine for Service Function

Chaining 310

Sheng-Tzong Cheng (Department of Computer Science and Information Engineering, National Cheng Kung University), Chong-Yi Zhu (Department of Computer Science and Information Engineering, National Cheng-Kung University), Chih-Wei Hsu (Chief Executive Officer, USAI Co., LTD), and Jia-Shing Shih (Department of Electrical Engineering, Southern Taiwan University of Science and Technology)

#### **Intelligent Manufacturing**

Key Factors for Suppliers of Gaming Notebook Keyboards with AHP .316 Hong-Tsuen Lei (Department of Business Administration, National Central University, Taiwan, (R.O.C.)), Ping-Yu Hsu (Department of Business Administration, National Central University, Taiwan, (R.O.C.)), and Ming Shien Cheng (Ming Chi University of Technology, Taiwan)
Constructing an Integrated Classifiers for Identifying Authenticity and Sentiment Analysis-A Case of Hotel Reviews .319 Ming Shien Cheng (Ming Chi University of Technology, Taiwan)
The Feature Extraction Modeling of Product Analysis in Injection Molding for Intelligent Manufacturing .325
Hao-Hsuan Tsou (National Kaohsiung University of Science and Technology), Kuang-Di Lee (National Kaohsiung University of Science and Technology), Zhi-Hao Wang (Chen-Fon-Wei Security Co., Ltd.), and Chung-Ching Huang (National Kaohsiung University of Science and Technology)
Maskless Lithography Laser Source Target Light Dose Reversed Mapping .330 Shau-Yin Tseng (Information & Communications Research Laboratories Industrial Technology Research Institute) and Jian-Wei Chen (Information & Communications Research Laboratories Industrial Technology Research Institute)
Nonlinear PCB Compensation Based on Intel® HD Graphics for Manufacturing Processing .335 Shau-Yin Tseng (Information & Communications Research Laboratories Industrial Technology Research Institute), Jin-Nan Liu (Information & Communications Research Laboratories Industrial Technology Research Institute), and Jian-Wei Chen (Information & Communications Research Laboratories Industrial Technology Research Institute)

#### Image Processing, Computer Graphics, and Multimedia Technologies

Design of Multidimension-Media Streaming Protocol Based on RTSP .341.... Jih-Ching Chiu (National Sun Yat-sen University, Republic of China), Hao-Yu Tseng (National Sun Yat-sen University, Republic of China), and Zhi-Yu Lee (National Sun Yat-sen University, Republic of China)

Implementation of Inverse Perspective Mapping for Camera-Vision Water-Level Measurements .348 Lung-Chih Kuo (National Cheng Kung University) and Cheng-Chi Tai (National Cheng Kung University)

Prediction of Hospital Readmission Combining Rule-Based and Machine Learning Model .352 Kareen Teo (University Malaya), Khin Wee Lai (University Malaya), Ching Wai Yong (University Malaya), Belinda Murphy-Pingguan (University Malaya), Joon Huang Chuah (University Malaya), and Clarence Augustine TH Tee (University Malaya)
A Study of Self Distillation for Mango Image Classification .356 Wei-Chi Chen (National Cheng Kung University) and Wei-Ta Chu (National Cheng Kung University)
Real-Time Human Violent Activity Recognition Using Complex Action Decomposition .360 Dylan Josh Coming Lopez (Computer Engineering Department, Adamson University, Manila, Philippines) and Cheng-Chang Lien (Dept. of CSIE, Chung Hua University, Hsinchu, Taiwan)
Disparity Map Estimation From Stereo Image Pair Using Deep Convolutional Network .365 Wen-Nung Lie (National Chung Cheng University), Hung-Ta Chiu (National Chung Cheng University), and Jui-Chiu Chiang (National Chung Cheng University)
A Low-Complexity Learning-Based Algorithm for Joint Application of Demosaicking and Up-Scaling .370 Kuan-Yu Huang (National Cheng Kung University), Pei-Yin Chen (National Cheng Kung University), and Ching-Ching Huang (National Cheng Kung University)
Marine Pollution Detection Based on Deep Learning and Optical Flow .376 Chih-Hsuan Wu (National Taiwan Ocean University, Taiwan), Jun-Wei Hsieh (National Chiao Tung University, Taiwan), Chia-Yu Wang (National Taiwan Ocean University, Taiwan), and Chih-Hsiang Ho (Institute for Information Industry, Taiwan)
<ul> <li>Smart Harvesting Based on Image Processing .382</li> <li>Joseph S.P (Sri Lanka Institute of Information Technology), Wijerathna</li> <li>L.L.M.C (Sri Lanka Institute of Information Technology), Epa K.G.R.D</li> <li>(Sri Lanka Institute of Information Technology), Egalla E.K.W.A.P.K</li> <li>(Sri Lanka Institute of Information Technology), Abeygunawardhana</li> <li>P.W.K (Sri Lanka Institute of Information Technology), and De Silva R</li> <li>(Sri Lanka Institute of Information Technology)</li> </ul>
Detection of The Erosion Area of Lotus Leaf Using Hyperspectral Imaging .387 Tzu-Wei Chiu Huang (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan), Keng-Hao Liu (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan), Pai Chih-Cheng (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan), Pai Chih-Cheng (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan), Chinsu Lin (Department of Forestry and Natural Resources National Chiayi University, Chiayi, Taiwan), and Chen Yang-Chu (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan)

Pork Tissue Recognition Using Visible and Near Infrared Hyperspectral Imaging .392..... *Chih-Cheng Pai (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan), Yang-Chu Chen (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan), Keng-Hao Liu (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan), Keng-Hao Liu (Department of Mechanical and Electro-mechanical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan), Yuan-Hsun Tsai (Metal Industries Research and Development Centre, Kaohsiung, Taiwan), Po-Chi Hu (Metal Industries Research and Development Centre, Kaohsiung, Taiwan), and Zong-Hsin Liu (Metal Industries Research and Development Centre, Kaohsiung, Taiwan)* 

#### **Cyber Security**

SandboxNet: An Online Malicious SDN Application Detection Framework for SDN Networking .397 Po-Wen Chi (National Taiwan Normal University), Ming-Hung Wang (Feng Chia University), and Yu Zheng (National Taiwan Normal University)
Cryptanalysis on Two Pairing-Free Ciphertext-Policy Attribute-Based Encryption Schemes .403 Yi-Fan Tseng (Department of Computer Science, National Chengchi University, Taipei, Taiwan) and Jheng-Jia Huang (Department of Information Management, National Taiwan University of Science and Technology, Taipei, Taiwan)
Android Malware Detection System Integrating Block Feature Extraction and Multi-Head Attention Mechanism .408 <i>Yi-Ming Chen (National Central University, Taiwan), An-Chi He</i>
(National Central University, Taiwan), Guo-Chung Chen (National Central University, Taiwan), and Yu-Chi Liu (National Central University, Taiwan)
Feature Selection for Malicious Traffic Detection with Machine Learning .414 Sying-Jyan Wang (National Chung Hsing University, Taiwan), Cheng Xuan Cai (National Chung Hsing University, Taiwan), Yen-Wen Tseng (National Chung Hsing University, Taiwan), and Katherine Shu-Min Li (National Sun Yat-sen University, Taiwan)
A Context-Policy-Based Approach to Access Control for Healthcare Data Protection .420 M. Fahim Ferdous Khan (Toyo University, Japan) and Ken Sakamura (Toyo University, Japan)
Machine Learning-Based IP Camera Identification System .426 Cheng-Wei Huang (National Cheng Kung University, R.O.C.), Tien-Yi Wu (National Cheng Kung University, R.O.C.), Yuan Tai (National Cheng Kung University, R.O.C.), Ching-Hsuan Shao (National Cheng Kung University, R.O.C.), Lo-An Chen (National Cheng Kung University, R.O.C.), and Meng-Hsun Tsai (National Cheng Kung University, R.O.C.)
Publicly Verifiable Proofs of Data Replication and Retrievability for Cloud Storage .431 Clementine Gritti (University of Canterbury)

SSOV: A Single Sign-on Protocol for Accessing Vehicular Application Services with the	
Support of Secret Credential Management System .437	
You-Wei Chang (Department of Computer Science and Information	
Engineering, National Chung Cheng University) and Po-Ching Lin	
(Department of Computer Science and Information Engineering, National	
Chung Cheng University)	
The Risk of Industrial Control System: Programmable Logic Controller Default	
Configurations .443	
Kuan-Ming Su (Institute of Computer and Communication Engineering,	
Department of Electrical Engineering, National Cheng Kung University),	
I-Hsien Liu (Institute of Computer and Communication Engineering,	
Department of Electrical Engineering, National Cheng Kung University),	
and Jung-Shian Li (Institute of Computer and Communication	
Engineering, Department of Electrical Engineering, National Cheng Kung	
University)	
RNN-Based DDoS Detection in IoT Scenario .448	
Chun-Yu Chen (National Cheng Kung University, R.O.C), Lo-An Chen	
(National Cheng Kung University, R.O.C), Yun-Zhan Cai (National Cheng	
Kung University, R.O.C.), and Meng-Hsun Tsai (National Cheng Kung	
University, R.O.C.)	

#### **Autonomous Driving**

Autonomous Vehicle Simulation for Asia Urban Areas with a Perspective from Education .454...... Shao-Hua Wang (Dept. of Computer Science and Information Engineering, National Cheng Kung University), Chen-Xuan Lin (Dept. of Computer Science and Information Engineering, National Cheng Kung University), Chia-Heng Tu (Dept. of Computer Science and Information Engineering, National Cheng Kung University), Ching-Chun Huang (Dept. of Computer Science and Information Engineering, National Cheng Kung University), and Information Engineering, National Cheng Kung University), and Jyh-Ching Juang (Dept. of Electrical Engineering, National Cheng Kung University)

Development of a Prototype EV Autonomous Vehicle for Systematic Research .459..... Prasad B.V.P. (Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan City, Taiwan.), Qing Yuan Huang (Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan City, Taiwan.), and Jing-Jou Tang (Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan City, Taiwan.)

#### Software Engineering and Programming Languages

User-Managed Access Delegation for Blockchain-Driven IoT Services .462..... Chun-An Lin (National Chengchi University) and Chun-Feng Liao (National Chengchi University)

A Case Study on Experiment Site Selection for PV Energy Generation Forecast
Measure Students' Contribution in Web Programming Projects by Exploring Source Code         Repository       473         Bao-An Nguyen (Department of Information Engineering and Computer         Science, Feng Chia University, Taiwan), Kuan-Yu Ho (Department of         Information Engineering and Computer Science, Feng Chia University,         Taiwan), and Hsi-Min Chen (Department of Information Engineering and         Computer Science, Feng Chia University, Taiwan)
<ul> <li>Smart Human Resource Management System to Maximize Productivity</li></ul>
<ul> <li>Exploiting Third-Party SDK Sensitive Data Leakage</li></ul>
Revealing Coordination Needs from Task Allocation for Team Performance Estimation
Analysis of the Working Patterns During the COVID-19 Pandemic - an Industrial Case Study N/A Paolo Ciancarini (University of Bologna, Innopolis University), Sergey Masyagin (Innopolis University), Victoria Rotaru (Innopolis University), and Giancarlo Succi (Innopolis University)
<ul> <li>Study of Automatic Programs Quality Analysis and Correction</li></ul>
The Study of Programming Debugging and Intelligent Feedback System

Chia-Yu Li (Department of Computer Science and Engineering, National Taiwan Ocean University, Keelung, Taiwan), Shang-Pin Ma (National Taiwan Ocean University), and Tsung-Wen Lu (Department of Computer Science and Engineering, National Taiwan Ocean University, Keelung, Taiwan)

#### **Advanced Computer Vision Technology**

A Cross-Lingual Patent Topics Model for Trend Analysis .525..... Yu Tsou (National Pingtung University of Science and Technology), Deng-Neng Chen (National Pingtung University of Science and Technology), and Chia-Yu Lai (National Pingtung University of Science and Technology)

#### **Emerging Applications in Artificial Intelligence**

Approaches for Representing Software as Graphs for Machine Learning Applications .529...... Vitaly Romanov (Innopolis University), Vladimir Ivanov (Innopolis University), and Giancarlo Succi (Innopolis University)

Semantic Segmentation of Lotus Leaves in UAV Aerial Images via U-net and Deeplab-Based Networks .535.....

Wen-Tse Chiu (National Chung Cheng University, Taiwan), Cheng-Hsuan Lin (National Chung Cheng University, Taiwan), Ci-Lin Chu (National Chung Cheng University, Taiwan), Chinsu Lin (National Chiayi University, Taiwan), Ying-Cheng Chen (Tainan District Agricultural Research and Extension Station, Taiwan), Mei-Jing Huang (Tainan District Agricultural Research and Extension Station, Taiwan), and Wei-Min Liu (National Chung Cheng University, Taiwan)

#### Web Intelligence and Social Network

Application of Social Analytics to Credit Rating in Financial Technology .541..... Ching-Ming Chao (EMBA of Business School, Soochow University) and Wei-Tien Chang (Dept. of Computer Science & Information Management, Soochow University, Taiwan)

EventGo! Exploring Event Dynamics from Social-Media Posts .548 Chia-Hui Chang (National Central University), Yuan-Hao Lin (National Central University), and Hsiu-Min Chuang (National Defense University)
Automatic Spelling Correction for ASR Corpus in Traditional Chinese Language using Seq2Seq Models .553
(National Central University, Taiwan) Spatiotemporal Multi-Dimensional Modeling of Data Warehouse for Event Tracing Applications.559 Frank S.C. Tseng (National Kaohsiung University of Science and Technology) and Annie Y.H. Chou (ROC Military Academy)
TideFC: Learning Temporal Interaction for Dynamic Embedding via Feature Crossing .565 Chang-Ming Tsai (National Cheng Kung University, Taiwan) and Cheng-Te Li (National Cheng Kung University, Taiwan)
Pandemic Response and Crisis Informatics: An Imperative for Public Health Messaging .57.0 Chun-Ming Lai (Tunghai University), Yi-Chen Liu (Tunghai University), Rong-Ching Chang (Tunghai University), Jon Chapman (University of California, Davis), and Chu-Hsing Lin (Tunghai University)
An Algorithm Based on Efficient Influence Maximization Applied to Social Network .57.6 Ying-Hong Wang (Department of Computer Science and Information Engineering, Tamkang University), Lin Hui (Department of Innovative Information and Technology, Tamkang University), Yi-Cheng Chen (Department of Information Management, National Central University), and Meng-Shiu Chaung (Department of Computer Science and Information Engineering, Tamkang University)

Author Index 583