

Advances in Intelligent Systems and Computing

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Leonard Barolli · Fatos Xhafa ·
Omar K. Hussain
Editors

Innovative Mobile and Internet Services in Ubiquitous Computing

Proceedings of the 13th International
Conference on Innovative Mobile and Internet
Services in Ubiquitous Computing
(IMIS-2019)

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Welcome Message of IMIS-2019 International Conference Organizers

Welcome to the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019), which will be held from July 3 to July 5, 2019, at University of Technology Sydney (UTS), Sydney, Australia in conjunction with the 13th International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2019).

This International Conference focuses on the challenges and solutions for Ubiquitous and Pervasive Computing (UPC) with an emphasis on innovative, mobile and internet services. With the proliferation of wireless technologies and electronic devices, there is a fast growing interest in UPC. UPC enables to create a human-oriented computing environment where computer chips are embedded in everyday objects and interact with physical world. Through UPC, people can get online even while moving around, thus having almost permanent access to their preferred services. With a great potential to revolutionize our lives, UPC also poses new research challenges. The conference provides an opportunity for academic and industry professionals to discuss the latest issues and progress in the area of UPC.

For IMIS-2019, we received many paper submissions from all over the world. The papers included in the proceedings cover important aspects from UPC research domain. This year, we received 147 submissions and after a careful review process of 3 independent reviews per submission, 40 papers were accepted (about 27% acceptance rate).

It is impossible to organize such a successful program without the help of many individuals. We would like to express our great appreciation to the authors of the submitted papers, the program committee members, who provided timely and significant reviews, and special session chairs for their great efforts. We are grateful to Honorary Co-chairs: Prof. Makoto Takizawa, Hosei University, Japan and Prof. Jie Lu, University of Technology Sydney, Australia for their advices and support.

This year in conjunction with IMIS-2019 we have 8 International Workshops that complemented IMIS-2019 program with contributions for specific topics. We would like to thank the Workshops Co-chairs and all workshop organizers for organizing these workshops.

Finally, we would like to thank Web Administrator Co-chairs and Local Arrangement Co-chairs for their excellent and timely work.

We hope that all of you enjoy IMIS-2019 and find this a productive opportunity to learn, exchange ideas and make new contacts.

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Welcome Message from IMIS-2019 Workshops Co-chairs

Welcome to the Workshops of the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019), which will be held from July 3 to July 5, 2019 at University of Technology Sydney (UTS), Sydney, Australia.

This year we have 8 workshops, which will be held together with IMIS-2019. The objective was to complement as much as possible the main themes of IMIS-2019 with the specific topics of the different workshops to cover many topics of Ubiquitous and Pervasive Computing (UPC).

The list of workshops follows below:

1. The 13th International Workshop on Advances in Information Security (WAIS-2019)
2. The 9th International Workshop on Mobile Commerce, Cloud Computing, Network and Communication Security (MCNCS-2019)
3. The 9th International Workshop on Intelligent Techniques and Algorithms for Ubiquitous Computing (ITAUC-2019)
4. The 9th international workshop on Future Internet and Next Generation Networks (FINGNet-2019)
5. The 8th International Workshop on Frontiers in Innovative Mobile and Internet Services (FIMIS-2019)
6. The 8th International Workshop on Sustainability Management of e-Business and Ubiquitous Commerce Engineering (SMEUCE-2019)
7. The 7th International Workshop on Practical Issues on Security in Public Internet Services (PISPIS-2019)
8. The 1st International Workshop on Optical Communication and Computing (OCC-2019)

We would like to thank IMIS-2019 International Conference Organizers for their help and support. We are grateful to the workshop organizers for their great efforts and hard work in proposing the workshops, selecting the papers, organizing interesting programs, and for the arrangements of the workshops during the conference days.

We are grateful to Web Administrator Co-chairs for their excellent work and support. We hope you enjoy the workshops programs and proceedings.

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Welcome Message from WAIS-2019 International Workshop Organizers

It is our great pleasure to welcome you for the 13th International Workshop on Advances in Information Security (WAIS-2019). The workshop is held in conjunction with 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019) from July 3 to July 5, 2019 at University Technology of Sydney (UTS), Sydney, Australia.

As computing systems have begun to pervade every aspect of daily life, people need to be able to trust them—so much of their lives depend on them. Today, many of these systems are far too vulnerable to cyber attacks that can inhibit their operation, corrupt valuable data, or expose private information. Future systems will include sensors and computers everywhere, exacerbating the attainment of security and privacy. Current security practices largely address current and known threats, but there is a need for research to take account future threats too.

The goal of WAIS-2019 is to bring together computer scientists, industrial engineers and researchers to discuss and exchange experimental or theoretical results, novel designs, work-in-progress, experience, case studies, and trend-setting ideas in the area of Information Security.

We would like to thank all authors for submitting their research works to the workshop and the PC Members for checking carefully the papers.

We look forward to meet all of you in Sydney, Australia.

WAIS-2019 Workshop Co-chairs

Leonard Barolli	Fukuoka Institute of Technology (FIT), Japan
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Welcome Message from MCNCS-2019 International Workshop Chair

Welcome to the 9th International Workshop on Mobile Commerce, Cloud Computing, Network and Communication and their Securities (MCNCS-2019) which will be in conjunction with the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019) from July 3 to July 5, 2019 at University Technology of Sydney (UTS), Sydney, Australia.

Computer network and communication have been a part of our everyday life. People use them to contact others almost anytime anywhere. On the other hand, hackers due to business benefits, enjoying their skill/professional achievement or some other reasons very often attack, intrude or penetrate our systems. This is the key reason why computer/network and their securities has been the important issues in computer research. Many researchers have tried to do their best to develop system network, security techniques and the methods to protect a system. But system attacks still occur worldwide every day. In fact, current network techniques and system security technology are still far away from convenient to use and completely secure, and should be further improved.

This workshop aims to present the innovative researches, methods for mobile commerce, cloud computing, network and communication and their securities. The workshop contains high quality research papers, which were selected carefully by Program Committee Members.

It is impossible to organize such a successful program without the help of many individuals. We would like to express our appreciation to the authors of the submitted papers and to the program committee members, who provided timely and significant reviews.

We hope all of you will enjoy MCNCS-2019 and find this a productive opportunity to exchange ideas with many researchers.

MCNCS-2019 International Workshop Organizers

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Welcome Message from ITACU-2019 International Workshop Co-chairs

Welcome to the 9th International Workshop on Intelligent Techniques and Algorithms for Ubiquitous Computing (ITAUC-2019) which will be held in conjunction with the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019) from July 3 to July 5, 2019 at University Technology of Sydney (UTS), Sydney, Australia.

The aim of this workshop is to present the innovative researches, methods and algorithms for wireless networks, sensor networks and ubiquitous computing. It is intended to facilitate exchange of ideas and collaborations among researchers from computer science, network computing, mathematics, statistics, intelligent computing and such related sciences, to discuss various aspects of innovative intelligent algorithms and networks security, intelligent techniques for sensor networks and radio networks, and their applications.

Many people have kindly helped us to prepare and organize the ITAUC-2019 workshop. First, we highly thank the authors who submitted high quality papers and reviewers who carefully evaluated these submissions. We thank Honorary Co-chairs, General Co-chairs, PC Co-chairs and Workshops Co-chairs of IMIS-2019 for their advices and support to make possible organization of ITAUC-2019.

We hope you will enjoy the conference and have a great time in Sydney, Australia.

ITAUC-2019 Co-chairs

Leonard Barolli	Fukuoka Institute of Technology, Japan
Hsing-Chung Chen	Asia University, Taiwan
Tzu-Liang Kung	Asia University, Taiwan

ITAUC-2019 Organizing Committee

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Tzu-Liang Kung	Asia University, Taiwan

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Donald Elmazi	Fukuoka Institute of Technology, Japan
Miralda Cuka	Fukuoka Institute of Technology, Japan

Welcome Message from FINGNet-2019 International Workshop Organizers

Welcome to the 9th International Workshop on Future Internet and Next Generation Networks (FINGNet-2019), which is held in conjunction with the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019) from July 3 to July 5, 2019 at University Technology of Sydney (UTS), Sydney, Australia.

Over the last years, new paradigms and concepts have emerged in telecommunication networks that are currently being realized in the Internet. Among those are the social networking, the peer-to-peer, and the quality of experience paradigms. Nevertheless, it is difficult or even impossible to predict, how the network of the future will emerge. However, it is quite clear that some major issues have to be addressed for the future Internet or next generation networks. This includes solutions, e.g. for security and privacy issues, such as spam or service-oriented approaches to enable flexible networking. In addition, new applications or services emerge such as social media networks or crowdsourcing platforms enabling collaborative networking of Internet users. To address these issues, there is an increased interest in the scientific community to propose and design new algorithms and methodologies as well as to understand and model new applications and services.

The aim of this workshop is to present such innovative research, methods and numerical analysis related to advanced Internet and network technologies. The workshop contains high quality research papers, which were carefully selected by the technical program committee members.

It is impossible to organize such a successful program without the help of many authors, program committee members and organizers. We also would like to deeply express our appreciation to the authors of the submitted papers, and to the program committee members, who provided timely and significant reviews.

We hope all of you will enjoy FINGNet-2019 and find this a productive opportunity to exchange ideas with many researchers. Finally, we would like to thank everyone for participating in FINGNet-2019 workshop. We hope that you will find the workshop along with other joint workshops and conferences stimulating.

FINGNet-2019 Workshop Co-chairs

Akihiro Nakao	University of Tokyo, Japan
Inshil Do	Ewha Womans University, Korea
Hae-Duck Joshua Jeong	Korean Bible University, Korea
Hyunhee Park	Korean Bible University, Korea

FINGNet-2019 Workshop Advisory Co-chairs

Kijoon Chae	Ewha Womans University, Korea
Jiyoung Lim	Korean Bible University, Korea

FINGNet-2019 Organizing Committee

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Hyunhee Park	Korean Bible University, Korea

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Xiaohui Wei	Jilin University, China
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Kun-Ming Yu	Chung Hua University, Taiwan

Welcome Message from FIMIS-2019 International Workshop Chair

It is our great pleasure to welcome you the 8th International Workshop on Frontiers in Innovative Mobile and Internet Services (FIMIS-2019), which will be held in conjunction with the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019) from July 3 to July 5, 2019 at University Technology of Sydney (UTS), Sydney, Australia.

The workshop focuses on challenges and solutions for Ubiquitous and Pervasive Computing (UPC) with an emphasis on innovative, mobile and internet services. Especially, the main goal of FIMIS-2019 is to bring together researchers, practitioners and decision-makers to demonstrate the state-of-the-art as well as future directions for UPC.

The organization of a workshop needs the help of many people. We would like to express our special thanks to the authors and reviewers whose contribution makes this workshop a reality.

Hopefully you will enjoy the workshop and have a great time in Sydney, Australia.

FIMIS-2019 Workshop Chair

Leonard Barolli Fukuoka Institute of Technology, Japan

FIMIS-2019 Organizing Committee

Workshop Co-chairs

Leonard Barolli Fukuoka Institute of Technology, Japan

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Web Administrator

Donald Elmazi Fukuoka Institute of Technology, Japan

Welcome Message from SMEUCE-2019 International Workshop Co-chairs

We welcome you to the 8th International Workshop on Sustainability Management of e-Business and Ubiquitous Commerce Engineering (SMEUCE-2019), which will be held in conjunction with the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019) from July 3 to July 5, 2019 at University Technology of Sydney (UTS), Sydney, Australia.

The aim objective of SMEUCE-2019 is to provide a platform for academics, business leaders, consultants and other professionals from all over the world to exchange the latest research findings in the field of Sustainability Management of e-Business, e-Business and u-Business (Ubiquitous Business) Engineering, Cloud Commerce and their relative applications. This conference provides opportunities for the delegates to exchange new ideas and application experiences face to face, to establish business or research relations and to find global partners for future collaboration.

Many people have kindly helped us to prepare and organize the SMEUCE-2019 workshop. First, we highly thank the authors who submitted high quality papers and reviewers who carefully evaluated these submissions. We are thankful to Honorary Co-chairs, General Co-chairs, PC Co-chairs and Workshops Co-chairs of IMIS-2019 for their strong encouragement and guidance to organize this workshop.

We hope you will enjoy the conference and have a great time in Sydney, Australia.

SMEUCE-2019 Co-chairs

Kuei-Yuan Wang	Asia University, Taiwan
Ying-Li Lin	Asia University, Taiwan
Mei-Hua Liao	Asia University, Taiwan
Hsing-Chung Chen	Asia University, Taiwan
Hidekazu Sone	Shizuoka University of Art and Culture, Japan

SMEUCE-2019 Organizing Committee

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Ying-Li Lin	Asia University, Taiwan
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Young-Long Chen	National Taichung University of Science and Technology, Taiwan

Web Administrator Chair

Donald Elmazi	Fukuoka Institute of Technology, Japan
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Welcome Message from PISPIS-2019 International Workshop Co-chairs

Welcome to the 7th International Workshop for Practical Issues on Security in Public Internet Services (PISPIS-2019), which will be held in conjunction with the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019) from July 3 to July 5, 2019 at University Technology of Sydney (UTS), Sydney, Australia.

This workshop is intended to facilitate exchange of new ideas and stimulate collaborations among researchers and governors from information security engineering, Internet services and such related sciences to discuss various aspects of practical security issues in the public Internet services and their environments.

Many people have kindly helped us to prepare and organize this workshop. First, we would like to thank the authors who submitted high quality papers. We also thank the reviewers who carefully evaluated the submitted papers. We would like to especially thank IMIS-2019 Honorary Co-chairs, General Co-chairs, PC Co-chairs and Workshops Co-chairs for their advices and support to make possible organization of PISPIS-2019.

We hope you enjoy the conference and the workshops and have a great time in Sydney, Australia.

PISPIS-2019 Workshop Co-chairs

Kangbin Yim	Soonchunhyang University, Korea
Nan Guo	Northeastern University, China
Dongwan Shin	New Mexico Tech, USA

PISPIS-2019 Organizing Committee

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Welcome Message from OCC-2019 International Workshop Co-chairs

Welcome to the 1st International Workshop on Optical Communication and Computing (OCC-2019), which is held in conjunction with the 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019), from July 3 to July 5, 2019 at University Technology of Sydney (UTS), Sydney, Australia.

The aim and objective of OCC-2019 is to provide a platform for academics and professionals to exchange the latest research findings in the field of Optical Communication and Computing. This workshop provides opportunities for the delegates to exchange new ideas and application experiences face to face, to establish research relations and to find global partners for future collaboration.

Many people have kindly helped us to prepare and organize the OCC-2019 workshop. First, we would like to thank the authors who submitted high quality papers and reviewers who carefully evaluated the submitted papers.

We would like to give our special thanks to Dr. Farookh Khader Hussain for his strong encouragement and guidance to organize this workshop. We would like to thank General Co-chairs, PC Co-chairs and Workshops Co-chairs of IMIS-2019 for their kind support.

We hope you will enjoy the conference and have a great time in Sydney, Australia.

OCC-2019 Co-chairs

Indumathi T. S.	Visvesvaraya Technological University, Bangalore, India
T. Srinivas	Indian Institute of Science, Bangalore, India

OCC-2019 Organizing Committee

Workshop Co-chairs

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T. Srinivas	Indian Institute of Science, Bangalore, India

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Kaustav Bhowmick	Amrita University, Bangalore, India

Trust, Security and Privacy in Low-Cost RFID Systems

(IMIS-2019 Keynote Talk I)

Wanlei Zhou

University of Technology Sydney, Sydney, Australia

Abstract. Radio Frequency Identification (RFID) enables the automatic identification of objects using radio waves without the need for physical contact with the objects. RFID has been widely used in various fields such as logistics, manufacturing, pharmaceutical, supply chain management, healthcare, defense, aerospace and many other areas, apart from touching our everyday lives through RFID enabled car keys, ePassports, clothing, electronic items and others. However, the wide adoptions of RFID technologies also introduce serious security and privacy risks as the information stored in RFID tags can easily be retrieved by any malicious party with a compatible reader. In this talk, we will introduce some trust, security and privacy challenges in RFID technologies, and based on our research, we will outline a number of schemes for authentication, ownership transfer, secure search and grouping proof in Low-cost RFID systems.

Intelligent Context Awareness in Internet of Agricultural Things (IMIS-2019 Keynote Talk II)

Nadeem Javaid

COMSATS University Islamabad, Islamabad, Pakistan

Abstract. Variability in climate and recession in water reservoirs, diminishing the agrarian sector ecosystem production day by day. There is an imperative requirement to restore robustness and ensure high production rate with the use of smart communication infrastructure. Moreover, the farmers will be able to make resource efficient decisions with the availability of modern monitoring systems like Internet of agricultural things (IoAT). However, the data generated through IoAT devices is disparate which needs to be handled intelligently to bring artificial intelligence (AI), machine learning (ML) and data analytic (DA) techniques into play. In this talk, we will recommend the intensive use of coordination between AI, ML and DA at middleware to optimize the performance of IoAT system along with context awareness. Additionally, it will enable horizontal functionality for diverse services to mitigate the problem of inter-operability. An analysis is carried out using TOWS matrix to consider the effects of internal and external factors on the performance of automation techniques collaboration. This analysis points out various opportunities to innovate the livelihood of agrarian society around the globe.

Contents

The 13th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2019)

Modified Algorithm for Enhancing the Performance of Grid Systems in Task Scheduling 3
Osama AlFarraj, Ahmad Ali AlZubi, Salem Alkhalaf, Thamer Alhussain, and Asma AlKhalaf

A Fuzzy-Based System for Actor Node Selection in WSANS: Simulation and Experimental Results 11
Donald Elmazi, Miralda Cuka, Makoto Ikeda, Keita Matsuo, and Leonard Barolli

Performance Analysis of WMNs by WMN-PSODGA Simulation System Considering Load Balancing and Client Uniform Distribution 25
Seiji Ohara, Admir Barolli, Shinji Sakamoto, and Leonard Barolli

Performance Evaluation of WMNs by WMN-PSOHC System Considering Random Inertia Weight and Linearly Decreasing Inertia Weight Replacement Methods 39
Shinji Sakamoto, Seiji Ohara, Leonard Barolli, and Shusuke Okamoto

An Innovative Model Based on FCRBM for Load Forecasting in the Smart Grid 49
Ghulam Hafeez, Nadeem Javaid, Muhammad Riaz, Khalid Umar, Zafar Iqbal, and Ammar Ali

Capability-Based Information Flow Control Model in the IoT 63
Shigenari Nakamura, Tomoya Enokido, Leonard Barolli, and Makoto Takizawa

Evaluation of a Two-Way Tree-Based Fog Computing (TWTBFC) Model 72
Yinzhe Guo, Ryuji Oma, Shigenari Nakamura, Dilawaer Duolikun, Tomoya Enokido, and Makoto Takizawa

A Balanced Energy Efficient (BEE) Routing Scheme for Underwater WSNs 82
Wahab Khan, Wang Hua, Muhammad Ayaz, M. Shahid Anwar, and Sadique Ahmad

The Improved Energy Consumption Laxity Based (IECLB) Algorithm to Perform Computation Processes 94
Tomoya Enokido, Dilawaer Duolikun, and Makoto Takizawa

Effects of Sharing Information for Available Routes by Ad-Hoc Communication on a Disaster Stricken Area 106
Tetsuya Shigeyasu

Design and Implementation of a Weather Measurement System Using Agile-Kanban 114
Takeru Kurita, Keita Matsuo, and Leonard Barolli

Real-Time Ray Tracing Algorithm for Dynamic Scene 125
Tianhan Gao and Ying Li

TensorFlow: A Vegetable Classification System and Its Performance Evaluation 132
Natwadee Ruedeeniraman, Makoto Ikeda, and Leonard Barolli

Image Recognition Based Adaptive Array Antenna Controls for Winter Road Surveillance System in Local Mountain Area 142
Noriki Uchida, Goshi Sato, and Yoshitaka Shibata

Impact of Mobile Network Operators’ Incentive for Public Health: A Study Based on Saudi 2030 Vision 152
Hamad Balhareth and Alsaleh Saad

Cyber Security Situation Prediction Model Based on GWO-SVM 162
Hongxia Lu, Guidong Zhang, and Yongjun Shen

Half Hourly Electricity Load Forecasting Using Convolutional Neural Network 172
Abdul Basit Majeed Khan, Sajjad Khan, Sayeda Aimal, Muddassar Khan, Bibi Ruqia, and Nadeem Javaid

Hourly Electricity Load Forecasting in Smart Grid Using Deep Learning Techniques 185
Abdul Basit Majeed Khan, Nadeem Javaid, Orooj Nazeer, Maheen Zahid, Mariam Akbar, and Majid Hameed Khan

Blockchain-Based Public Auditing Scheme for Shared Data	197
Han Wang, Xu An Wang, Shuai Xiao, and Zichen Zhou	
Classifying Serious Depression Based on Blood Test: A Machine Learning Approach	207
Hyunhee Park	
A Technical Survey on Methods for Detecting Rogue Access Points . . .	215
Myoungsu Kim, Soonhong Kwon, Donald Elmazi, Jong-Hyouk Lee, Leonard Barolli, and Kangbin Yim	
An Implementation of LTE MAC-Layer Channel Multiplexing and Scheduling Mechanism Porting Upon an FPGA Embedded System Platform to Support Massive NB-IoT Devices Accesses	227
Wen-Chung Tsai, Nien-Ting Huang, Song-Hao Huang, and Ting-Ming Tsai	
Improved SM4 Encryption Algorithm Based on Mixed Congruence Method	236
Jingling Zhao, Qingyang Bao, and Yunze Ni	
Key Technologies of Anomaly Detection Using PCA-LSTM.	246
Zhong-shi Gao, Yang Su, Yi Ding, Yu-dong Liu, Xu-an Wang, and Jun-wei Shen	
Electricity Load and Price Forecasting Using Enhanced Machine Learning Techniques	255
Hamida Bano, Aroosa Tahir, Ishtiaq Ali, Raja Jalees ul Hussien Khan, Abdul Haseeb, and Nadeem Javaid	
RobotFarm: A Smart and Sustainable Hydroponic Appliance for Meeting Individual and Collective Needs	268
Silvia Angeloni and Giorgia Pontetti	
A Fuzzy-Based System for Decision of Sightseeing Spots Considering Different Conditions	281
Yi Liu and Leonard Barolli	
Large-Scale Electronic Voting Based on Conflux Consensus Mechanism	291
Shuai Xiao, Xu An Wang, and Han Wang	
An Image Denosing Algorithm for Strong Noise Image Based on Structural Similarity of Contourlet Domain via Grey Relational Analysis	300
Lili Jiao	
Construction of a Historical Information Visualization System by Superposition of Old Map	310
Tomoyuki Ishida and Hayato Ito	

Study on Resistance Parameter Setting of Acupuncture Treatment Training System 319
Meguru Yamashita, Shingo Sasaki, Akio Doi, Kiwamu Satoh, and Hajime Ogawa

Bidirectional LSTM: An Innovative Approach for Phishing URL Identification 326
Yuchen Liang, Jiangdong Deng, and Baojiang Cui

Security Evaluation of Ring Oscillator PUF Against Genetic Algorithm Based Modeling Attack 338
Yusuke Nozaki and Masaya Yoshikawa

Secure Kubernetes Networking Design Based on Zero Trust Model: A Case Study of Financial Service Enterprise in Indonesia 348
Nico Surantha and Felix Ivan

State-Based Fuzzing for SIAP 362
Weiqi Li, Qian Wu, and Baojiang Cui

Service-Aware Resource Allocation Based on RAN Slicing for Smart Grid 373
Sachula Meng, Zhihui Wang, Huixia Ding, Lili Sun, DeLong Yang, Sai Wu, Xinzhi Cao, Xue Wang, Ying Wang, and Yuanbin Chen

A Dynamic Scene Recognition Method for Event-Based Social Network 385
Haidong Kang, Tianhan Gao, and Nan Guo

A Static Instrumentation Method for ELF Binary 393
Wenchuan Yang, Yifei Wang, Baojiang Cui, and Chen Chen

Personalized Topic Graph Generation Method Using Image Labels in Image-Sharing SNS 404
Kunyoung Kim, Minhwan Kim, Jongmo Kim, and Mye Sohn

Wireless Sensor Network to Collect Training Data from Cycling 416
Cristian Alberoni, Ernesto Leon, Miguel A. Wister, and Jose A. Hernandez-Nolasco

The 13th International Workshop on Advances in Information Security (WAIS-2019)

The Impact of Patients’ Trust and Privacy on Use of Medical Mobile Applications 429
Alsaleh Saad, Hassan Kasim Haridi, Alzabin Sulaiman, and Talal Alzabni

**Conceptual Security System Design for Mobile Platforms
Based on Human Nervous System** 437
Nanda Kumar Thanigaivelan, Ethiopia Nigussie, Seppo Virtanen,
and Jouni Isoaho

Development of a Cyber Incident Information Crawler 447
Kazuki Ikegami, Michihiro Yamada, Hiroaki Kikuchi, and Koji Inui

**A Review of General Data Protection Regulation for Supply
Chain Ecosystem** 456
Avirup Dasgupta, Asif Qumer Gill, and Farookh Hussain

**Implementation of a Digital Signature in Backward-Compatible
QR Codes Using Subcell Division and Double Encoding** 466
Nobuyuki Teraura, Isao Echizen, and Keiichi Iwamura

**Examination and Comparison of Countermeasures
Against Web Tracking Technologies** 477
Takamichi Saito and Rikita Koshiba

**The 9th International Workshop on Mobile Commerce, Cloud
Computing, Network and Communication Security (MCNCS-2019)**

A LoRaWAN Based Energy Efficient Data Encryption Method 493
Kun-Lin Tsai, Fang-Yie Leu, Shuo-Wen Chang, Jiun-Yi Lin,
and Huei-Tang Luo

**Firewall Services Provided by Edge Computers Under AMF
and gNB in 5G** 503
Sheng-Zheng Lin and Fang-Yie Leu

**Air Pollution Source Identification by Using Neural Network
with Bayesian Optimization** 514
Fang-Yie Leu and Jia-Sheng Ho

MIH and CRRM Handover in Trusted or Untrusted Environments ... 525
Mei-Yu Wu and Fang-Yie Leu

**Applicable Dynamic Forensics Investigation via Client-Server
Architecture with MYANFOSIS** 537
Tin Maung Maung and Mie Mie Su Thwin

**The 9th International Workshop on Intelligent Techniques
and Algorithms for Ubiquitous Computing (ITAUC-2019)**

**Influential Reasonable Robust Virtual Machine Placement
for Efficient Utilization and Saving Energy** 549
Bibi Ruqia, Nadeem Javaid, Altaf Husain, Najeeba Muhammad Hassan,
Hafiza Ghulam Hassan, and Yumna Memon

The Hot Security Topics Analysis for the Announcements in ICANN Website by Using Web Crawler and Association Rule Technology 562
Hsing-Chung Chen, Tzu-Ya Chen, Shian-Shyong Tseng, Kang-Ming Chang, Fengming Chang, and Mei-He Jiang

Using CBR Approach to Enhance Collaborative Design Ability 572
Shian-Shyong Tseng, Shih-Nung Chen, Tsung-Yu Yang, and Edgar Chia-Han Lin

Performance Evaluations of Packet Encapsulation Using Scatter-Gather Direct Memory Access to Support Massive Devices Accesses for NB-IoT Small Cell 587
Wen-Chung Tsai, Nien-Ting Huang, Ting-Ming Tsai, and Te-Jen Wang

Road Junction Identification in High Resolution Urban SAR Images Based on SVM 597
Jianghua Cheng, Tong Liu, Yueyong Zhou, and Yanye Xiong

The 9th International Workshop on Future Internet and Next Generation Networks (FINGNet-2019)

Malicious Adware Detection on Android Platform using Dynamic Random Forest 609
Kyungmin Lee and Hyunhee Park

A Smart Contract to Facilitate Goods Purchasing Based on Online Haggle 618
Hsing-Chung Chen, Bambang Irawan, Chieh-Yang Shih, Cahya Damarjati, Zon-Yin Shae, and Fengming Chang

Object Detection and Tracking Based on Deep Learning 629
Yong-Hwan Lee and Wan-Bum Lee

Serendipity-Based Recommendation Framework for SNS Users Using Tie Strength and Relation Clustering 636
Daeun Park, Jongmo Kim, and Mye Sohn

The 8th International Workshop on Frontiers in Innovative Mobile and Internet Services (FIMIS-2019)

Proposal of QoS Controls by Using OpenFlow for Heterogeneous Wireless Networks Considered with the IoT Traffic Performance 649
Kanji Nakano and Noriki Uchida

Emotion Recognition Scheme via EEG Signal Analysis 658
Tianhan Gao and Song Zhou

A Review of Applying Blockchain Technology for Privacy Protection	664
Haoyu Ji and He Xu	
Side Information Generation Algorithm Based on Weighted KSVD Dictionary	675
Zhao Jingmei and Chen Rui	
Controlled Quantum Dialogue Based on Logical Qubits	682
Hong-Mei Huang	
The 8th International Workshop on Sustainability Management of e-Business and Ubiquitous Commerce Engineering (SMEUCE-2019)	
Residual Reversal Strategy: Empirical Evidence in the Taiwan Stock Market	693
Shyh-Weir Tzang, Chun-Ping Chang, Yong Zulina Zubairi, and Yung-Shun Tsai	
Free Cash Flow and Firm Value	708
Chun-Ping Chang, Yung-Shun Tsai, Sheena Kaur, and Shyh-Weir Tzang	
Social Impact Bonds (SIBs): Introduction and Cases Review	717
Shyh-Weir Tzang, Munkhzaya Usukhjargal, and Chun-Ping Chang	
Demographic Structure, Business Fluctuations, Tax Shock and Housing Bubbles	727
Yung-Shun Tsai, Chun-Ping Chang, and Shyh-Weir Tzang	
The Causes and Influences of Institutional Investors Herding Behavior in the Taiwan Stock Market	738
Kuei-Yuan Wang, Ying-Li Lin, Chien-Kuo Han, and Yu-Sin Huang	
International Students' Career Intention-Resource Based View	749
Mei-Hua Huang, Onnavia Laura, Bae-Ling Chen, and Chiung-Yen Chen	
Do Institutional Investors like Local Longevity Companies?	758
Mei-Hua Liao and Hidekazu Sone	
Key Success Factors of Online Learning Website A—Balanced Scorecard Perspective	762
Ying-Li Lin, Kuei-Yuan Wang, and Mei-Lien Chen	
Exploring the Design of Forestry Experience Activities by IPA	771
Chai-Ju Lu and Chiou-Shya Torgn	
A Model of Chain Restaurant Organizational Achievement in Taiwan: A Structural Equation Modeling Approach	781
Shu-Chuan Linliu and Chung-Hao Chen	

A Deterministic Multi-item Inventory Model with Limited Warehouse Capacity	791
Ya-Lan Chan	
Innovation Strategy of Productive Farm—A Case on Taiwan Mushroom Industry	803
Lin Shao-Chieh, Cheng Jen-Son, Chen Shieh-Liang, and Lu Chia-Ju	
The 7th International Workshop for Practical Issues on Security in Public Internet Services (PISPIS-2019)	
Novel Encryption Method of GPS Information in Image File Using Format-Preserving Encryption	815
Changhyun Lee, Yeonju Choi, Hyeongmin Park, Kangbin Yim, and Sun-Young Lee	
Improvement of QR Code Access Control System Based on Lamport Hash Chain	824
Hyeongmin Park, Taeun Kim, Gaoul Kim, Wonyoung Jang, Kyungroul Lee, and Sun-Young Lee	
A Survey on Attack Cases Exploiting Computer Architectural Vulnerabilities	834
Kwangjun Kim, HeeDong Yang, Byeonggeun Son, Hanjae Yoon, Kangbin Yim, and Manhee Lee	
Unintended Certificate Installation into Remote IoT Nodes	845
Junghoon Park, Byeonggeun Son, Junyoung Park, Myoungsu Kim, and Kangbin Yim	
The 1st International Workshop on Optical Communication and Computing (OCC-2019)	
Optimizing the Placement of Wavelength Converters in WDM	857
S. Ramya and T. S. Indumathi	
Analysis of Fiber Bragg Grating Spectral Characteristics Using Couple Mode Theory for Sensor Applications	868
Somesh Nandi, T. S. Indumathi, R. V. Sai Priya, and Aparna Kori	
A Study on Fiber Bragg Gratings and Its Recent Applications	880
Tejasrikumar Kori, Amogh Kori, Akshata Kori, and Somesh Nandi	
Maximizing the Placement of Wavelength Converters in WDM Optical Networks Using Adaptive Equal Opportunity Genetic Algorithm	890
P. C. Shruthi, T. S. Indumathi, and K. C. Jagadeesh	

Contents	xlix
Interpretation of Photonic Crystals with Hexagonal Symmetry	902
Harshada J. Patil, T. S. Indumathi, Preeta Sharan, and Somesh Nandi	
Author Index.	913