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Innovative Mobile and Internet Services in Ubiquitous Computing

Proceedings of the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018)

Springer

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Welcome Message of IMIS-2018 International Conference Organizers

Welcome to the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018), which will be held from July 4th to July 6th, 2018, at Kunibiki Messe, Matsue, Japan, in conjunction with the 12th International Conference on Complex, Intelligent and Software Intensive System*s* (CISIS-2018).

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-2018, we received many paper submissions from all over the world. The papers included in the proceedings cover important aspects of UPC research domain. This year, we received 168 submissions and after a careful review process of 3 independent reviews per submission, 47 papers were accepted (about 28% 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 Chair: Prof. Makoto Takizawa, Hosei University, Japan, for his advice and support.

This year in conjunction with IMIS-2018 we have 7 International Workshops that complemented IMIS-2018 program with contributions for specific topics. We would like to thank the Workshop Co-chairs and all workshop organizers for organizing these workshops.

We thank Donald Elmazi, Yi Liu, Miralda Cuka, and Kosuke Ozera, Fukuoka Institute of Technology, Japan, for their excellent work and support as Web Administrators.

Finally, we would like to thank: Matsue City, Shimane Prefecture, Support Center for Advanced Telecommunications Technology Research (SCAT), Foundation, Japan, for their support.

We hope that all of you enjoy IMIS-2018 and find this a productive opportunity to learn, exchange ideas, and make new contacts.

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Welcome to the Workshops of the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018), which will be held from July 4th to July 6th, 2018 at Kunibiki Messe, Matsue, Japan.

This year we have 7 workshops, which will be held together with IMIS-2018. The objective was to complement as much as possible the main themes of IMIS-2018 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 12th International Workshop on Advances in Information Security (**WAIS-2018**)
2. The 8th International Workshop on Mobile Commerce, Cloud Computing, Network and Communication Security (**MCNCS-2018**)
3. The 8th International Workshop on Intelligent Techniques and Algorithms for Ubiquitous Computing (**ITAUC-2018**)
4. The 8th international workshop on Future Internet and Next Generation Networks (**FINGNet-2018**)
5. The 7th International Workshop on Frontiers in Innovative Mobile and Internet Services (**FIMIS-2018**)
6. The 7th International Workshop on Sustainability Management of e-Business and Ubiquitous Commerce Engineering (**SMEUCE-2018**)
7. The 4th International Workshop on Big Data and IoT Security (**BDITS-2018**)

We would like to thank IMIS-2018 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 Donald Elmazi, Yi Liu, Miralda Cuka, and Kosuke Ozera, Fukuoka Institute of Technology, Japan, for their excellent work and support as Web Administrators.

We hope you enjoy the workshops programs and proceedings.

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Welcome Message from WAIS-2018 International Workshop Organizers

It is our great pleasure to welcome you to the 12th International Workshop on Advances in Information Security (WAIS-2018). The workshop is held in conjunction with 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018) from July 4th to July 6th, 2018, at Kunibiki Messe, Matsue, Japan.

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 of future threats too.

The goal of WAIS-2018 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 Matsue, Japan.

WAIS-2018 Workshop Co-chairs

Leonard Barolli	Fukuoka Institute of Technology (FIT), Japan
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Welcome Message from MCNCS-2018 International Workshop Chair

Welcome to the 8th International Workshop on Mobile Commerce, Cloud Computing, Network and Communication and their Securities (MCNCS-2018) which will be in conjunction with the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018) from July 4th to July 6th, 2018, at Kunibiki Messe, Matsue, Japan.

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 have 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 and 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-2018 and find this a productive opportunity to exchange ideas with many researchers.

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Tzung-HerChen	National Chiayi University, Taiwan
Ugo Fiore	University of Naples, Italy
Heru Susanto	University of Brunei, Brunei

Welcome Message from ITACU 2018 International Workshop Co-chairs

Welcome to the 8th International Workshop on Intelligent Techniques and Algorithms for Ubiquitous Computing (ITAUC-2018) which will be held in conjunction with the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018) at Kunibiki Messe, Matsue, Japan, from July 4th to July 6th, 2018.

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-2018 workshop. First, we highly thank the authors who submitted high-quality papers and reviewers who carefully evaluated these submissions. We thank Honorary Co-chair, General Co-chairs, PC Co-chairs, and Workshops Co-chairs of IMIS-2018 for their advice and support to make possible organization of ITAUC-2018.

We hope you will enjoy the conference and have a great time in Torino, Italy.

ITAUC-2018 Co-chairs

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

ITAUC-2018 Organizing Committee

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Hsing-Chung Chen	Asia University, Taiwan
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Young-Long Chen	National Taichung University of Science and Technology, Taiwan

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

Welcome Message from FINGNet-2018 International Workshop Organizers

Welcome to the 8th International Workshop on Future Internet and Next Generation Networks (FINGNet-2018), which is held in conjunction with the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018) from July 4th to July 6th, 2018, at Kunibiki Messe, Matsue, Japan.

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-2018 and find this a productive opportunity to exchange ideas with many researchers. Finally, we would like to thank everyone for participating in FINGNet-2018 workshop. We hope that you will find the workshop along with other joint workshops and conferences stimulating.

FINGNet-2018 Workshop Co-chairs

Tobias Hossfeld	University of Wuerzburg, Germany
Inshil Do	Ewha Womans University, Korea
Hae-Duck Joshua Jeong	Korean Bible University, Korea

FINGNet-2018 Workshop Advisory Co-chairs

Kijoon Chae	Ewha Womans University, Korea
Akihiro Nakao	University of Tokyo, Japan
Jiyoung Lim	Korean Bible University, Korea

FINGNet-2018 Organizing Committee

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Inshil Do	Ewha Womans University, Korea
Hae-Duck Joshua Jeong	Korean Bible University, Korea

Advisory Co-chairs

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Akihiro Nakao	University of Tokyo, Japan
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Zhuzhong Qian	Nanjing University, China

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Putchong Uthayopas	Kasetsart University, Thailand
Xiaohui Wei	Jilin University, China
Lawrence WC Wong	National University of Singapore, Singapore
Kun-Ming Yu	Chung Hua University, Taiwan

Welcome Message from FIMIS-2018 International Workshop Chair

It is our great pleasure to welcome you the 7th International Workshop on Frontiers in Innovative Mobile and Internet Services (FIMIS-2018), which will be held in conjunction with the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018) from July 4th to July 6th, 2018, at Kunibiki Messe, Matsue, Japan.

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-2018 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 Matsue, Japan.

FIMIS-2018 Workshop Chair

Leonard Barolli Fukuoka Institute of Technology, Japan

FIMIS-2018 Organizing Committee

Workshop Co-chairs

Leonard Barolli	Fukuoka Institute of Technology, Japan

Program Committee Members

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Arjan Durresi	IUPUI, USA
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Hiroaki Kikuchi	Meiji University, Japan
Chu-Hsing Lin	Tunghai University, Taiwan
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Web Administrator

Donald Elmazi	Fukuoka Institute of Technology, Japan

Welcome Message from SMEUCE-2018 International Workshop Co-chairs

We welcome you to the 7th International Workshop on Sustainability Management of e-Business and Ubiquitous Commerce Engineering (SMEUCE-2018), which will be held in conjunction with the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018) at Kunibiki Messe, Matsue, Japan, from July 4th to July 6th, 2018.

The aim objective of SMEUCE-2018 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-2018 workshop. First, we highly thank the authors who submitted high-quality papers and reviewers who carefully evaluated these submissions. We are thankful to Prof. Makoto Takizawa, Hosei University, Japan, as Honorary Chair of IMIS-2018. We would like to give our special thanks to Prof. Leonard Barolli as General Chair of IMIS-2018 for their strong encouragement and guidance to organize this workshop. We would like to thank the PC Co-chairs and Workshops Co-chairs for their advice and support to make possible organization of SMEUCE-2018.

We hope you will enjoy the conference and have a great time in Matsue, Japan.

SMEUCE-2018 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-2018 Organizing Committee

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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

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Chung-Wen Hung	National Yunlin University of Science & Technology 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

Welcome Message from BDITS-2018 International Workshop Co-chairs

Welcome to the 4th International Workshop on Big Data and IoT Security (BDITS-2018), which is held in conjunction with the 12th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2018), from July 4th to July 6th, 2018, at Kunibiki Messe, Matsue, Japan.

The aim objective of BDITS-2018 is to provide a platform for academics, the leaders of network security, consultants and other professionals from all over the world to exchange the latest research findings in the field of Security Technologies of Big Data and Internet of Things (IoT), cloud and ubiquitous computing and their applications. 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 BDITS-2018 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 Prof. Leonard Barolli for his strong encouragement and guidance to organize this workshop. We would like to thank PC Co-chairs and Workshop Co-chairs of IMIS-2018 for their kind support. We would like to thank all PC members for their serious review works in order to make successful organization of BDITS-2018.

We hope you will enjoy the conference and have a great time in Matsue, Japan.

BDITS-2018 Co-chairs

Baojiang Cui	Beijing University of Posts and Telecommunications, China
Zheli Liu	Nankai University, China
Tainhan Gao	National Pilot Software College, China
Hsing-Chung Chen	Asia University, Taiwan

BDITS-2018 Organizing Committee

Workshop Co-chairs

Baojiang Cui	Beijing University of Posts and Telecommunications, China
Zheli Liu	Nankai University, China
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Ho-Lung Hung	Chienkuo Technology University, Taiwan
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Li-Shan Ma	Chienkuo Technology University, Taiwan
Chung-Wen Hung	National Yunlin University of Science & Technology University, Taiwan
Jui-Chi Chen	Asia University, Taiwan

Web Administrator

Donald Elmazi	Fukuoka Institute of Technology, Japan

CISIS-2018 Keynote Talks

SNS as Social Sensors: Technologies for Extracting Knowledge from SNSs

Takahiro Hara
Osaka University, Osaka, Japan

Abstract. Due to surprisingly rapid popularization of smartphones and Social Network Services (SNSs), ordinary people generate and share a large amount of data using SNSs on smartphones. Recent studies have revealed that messages posted on SNSs such as Twitter can be used for detecting various kinds of facts in the real world such as events, trends, and user sentiment, which can be considered as kinds of social sensor data. Social sensor data are very useful for Big Data analysis because these tell many things representing the real world, which cannot be known by only analyzing traditional Big Data.

In this talk, I will present our recent studies on social sensing based on data mining on SNSs such as Twitter. We will start with our approaches for knowledge extraction from Twitter and then move on to some fundamental techniques which can be used commonly for such knowledge extraction. I will also present our ongoing work for building a framework to share not only social sensor data (i.e., SNS analytical results) but also definitions of social sensor data and analytical procedures. I will conclude this talk with some discussion on future research opportunities for social sensing.

Fog Computing: A New Research Direction in Distributed Computing—Applications, Issues and Challenges

Farookh Khadeer Hussain
University of Technology Sydney (UTS), Sydney, Australia

Abstract. The objective of this talk is to introduce the emerging research area of 'Fog Computing' or 'Edge Computing' and discuss the research opportunities and research challenges in this area. In order to do so, firstly, this talk presents the transition in the discipline of Distributed Computing from 'Grid Computing' to 'Cloud Computing' to 'Cloud-of-Things' and then to a 'Fog computing' environment. It then highlights clearly the role of 'Internet of Things' and 'Cloud Computing' in realizing 'Fog Computing.' Secondly, it briefly discusses some research issues and challenges associated with realizing and developing practical Fog Computing-driven solutions. Finally, it outlines and discusses the future role of 'Cloud-of-Things' in achieving business efficiencies in both developed and developing economies.

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