

Advances in Intelligent Systems and Computing

Volume 533

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Proceedings of the International Conference on Advanced Intelligent Systems and Informatics 2016

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Preface

The 2nd International Conference on Advanced Intelligent Systems and Informatics (AISI2016), which took place in Cairo, Egypt, during October 24–26, 2016, is an international interdisciplinary conference covering research and development in the field of informatics and intelligent systems. The 2nd edition of AISI2016 is organized by the Scientific Research Group in Egypt (SRGE) and technically sponsored by the IEEE Computational Intelligence Society (Egypt chapter) and the IEEE Robotics and Automation Society (Egypt Chapter). AISI is organized to provide an international forum that brings together those who are actively involved in the areas of interest, to report on up-to-the-minute innovations and developments, to summarize the state of the art, to exchange ideas and advances in all aspects of informatics and intelligent systems, technologies and applications. The conference has four major tracks:

- Intelligent Language Processing
- Intelligent Systems
- Intelligent Robotics Systems
- Informatics

We received nearly 168 papers submissions for all research tracks, Informatics track has 28 papers out from 61 papers; Intelligent Language Processing track has 19 out of 30 papers; Intelligent systems track has 34 papers out of 51; and the Intelligent Robotics Systems has 3 papers out of 12, all submitted papers came from 28 countries, of which 98 have been accepted. All submissions were reviewed by five reviewers in average, with no distinction between papers submitted for all conference tracks. We are convinced that the quality and diversity of the topics covered will satisfy both the attendees and the readers of these conference proceedings.

We express our sincere thanks to the plenary speakers, special session chairs, workshop chairs and international program committee members for helping us to formulate a rich technical program. We would like to extend our sincere appreciation for the outstanding work contributed over many months by the Organizing Committee: Local Organization Chair, and Publicity Chair. We also wish to express

our appreciation to the SRGE members for their assistance. We would like to emphasize that the success of AISI 2016 would not have been possible without the support of many committed volunteers who generously contributed their time, expertise, and resources toward making the conference an unqualified success.

Finally, thanks to Springer team for their supporting in all stages of the production of the proceedings.

We hope that you will enjoy the conference program.

Aboul Ella Hassanien
AISI 2016 General chair
Khaled Shaalan
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Aboul Ella Hassanien
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Plenary Speakers

The Story and Future of WiFi

Prof. Hatim Zaghoul
Calgary University, Canada

Abstract. This keynote will focus on the following points: The story behind its invention and inventors and some vision into the future and how a WiFi variant could be the basis of 6G.

Biography



Dr. Hatim Zaghoul is recognized as a visionary leader in the Canadian hi-tech community. In 1992, Dr. Zaghoul co-founded Wi-LAN Inc., and under his direction, the technology he co-invented with *Dr. Michel Fattouche* became the heart of many wireless communications standards. *Dr. Zaghoul* holds a B.Sc. in Electrical Engineering from Cairo University as well as a M.Sc. and a Ph.D. in Physics from the University of Calgary. *Dr. Zaghoul* has published extensively in technical journals and holds over ten patents. *Dr. Zaghoul* envisioned in 1991 how WOFDM technology can become the main driver for all wideband wireless communications applications including wireless local area networking, wide area networking and cellular telephony. *Dr. Zaghoul* has served as director on a variety of boards, specifically in the high-technology arena including *Wi-LAN Inc.* (www.wi-lan.com) *Cell-Loc Inc* (www.cell-loc.com); *DTS Inc.* (www.dtsx.com); *Imaging Dynamics Corp.* (www.imagingdynamics.com); *Wireless Inc.* (www.wire-less-inc.com); *QCC Technologies Inc.* (www.qcc.ca), *NTG Clarity Networks Inc.* (www.ntgclarity.com), *Solutrea Corp.* as well as other private entities. Dr. Zaghoul is currently the CEO and Chairman of *IPL Media Inc. for Technology*. *Dr. Zaghoul* co-founded *Wi-LAN Inc.*, *Cell-Loc Inc.*, *NTG Clarity*, *QCC Technologies Inc.*, *Wireless Inc.*, *IPL Media Inc.*, *IPL Media Inc. for Technology*, *Innovative Products for Life Inc.*, the *Solutrea* group of companies. Dr. Zaghoul has been awarded many awards: Named one of 10 Great Canadians by *MacLeans' Magazine* in July 2000; Calgarian of the Year 2000 with *Dr. Fattouche* by magazine; Entrepreneur of the Year finalist for 2 consecutive years; First Broadband Wireless Hall of Fame inductee; 2000 Pinnacle Award by Fraser Milner law firm. *Dr. Zaghoul* led *Wi-LAN Inc.* from its inception in 1993 till 2008.

A Look at the Working World of Tomorrow's Digital Society

Prof. Thea Radüntz
Federal Institute for Occupational Safety and Health, Germany

Abstract. Advanced information and communication technology has fundamentally changed the working environment. Complex and highly automated systems impose high demands on employees with respect to cognitive capacity and the ability to cope with inappropriate levels of workload. Although the main goal of automation is to simplify work, employees are complaining more frequently not only about high mental workload and stress but also about monotonous tasks. The long-term negative consequences of inappropriate workload on employee health constitute a serious problem for a digitalized society. Hence, this keynote will focus on the following points:

- Brief overview of changes in the working environment
- Opportunities and risks in the context of work and health
- Research on mental health and cognitive capacity at the Federal Institute of Occupational Safety and Health in Berlin

Biography



Thea Radüntz studied computer science with a minor in psychology. The emphasis of her education was on biosignal processing and pattern recognition. She holds a Dr. rer. nat. and a Master of Science degree from the Humboldt-Universität zu Berlin. During her studies she worked as a research assistant at the Centre for Human-Machine Systems (ZMMS) on a project financed by Volkswagen and focused on biosignal processing for driver fatigue detection. Following an enriching time employed at the European Commission in Luxembourg, she came back to Berlin to work for an IT consulting company, where she served as project management assistant on a contract with the Bundesdruckerei (Government Printing Office). After working at the Berlin University of Technology on 3D TOF face recognition and the implementation of image processing algorithms on FPGA, she returned to the research field of biosignal processing and neuro-physiological research. Since 2011 she has been working in that field at the department of Mental Health and Cognitive Capacity of the Federal Institute of Occupational Safety and Health in Berlin.

Tutorial

Pattern Recognition in Intelligent Systems

Prof. Ibrahima Faye
Universiti Teknologi Petronas, Malaysia

Abstract. Pattern recognition has been playing a fundamental role in many intelligent systems. For most cases, the primary stage consists in differentiating various possible patterns of an input data. The efficacy of this primary stage highly impacts the final intelligent system. The tutorial will present various examples of implementation of pattern recognition techniques in different contexts which include industrial applications (e.g. product defect inspection), biomedical applications (e.g. computer aided diagnosis systems, protein classification), psychology (e.g. emotion recognition) etc. The tutorial builds upon a short course that has been offered from 2014. It will review fundamental steps of pattern recognition: feature extraction, dimension reduction, classification and clustering. It will highlight some recent developments, some exciting possible future applications and related challenges.

Biography



Ibrahima Faye is Associate Professor at Universiti Teknologi Petronas. His BSc, MSc and PhD degrees in Mathematics are from the University of Toulouse, France, while his MS degree in Engineering of Medical and Biotechnological data is from Ecole Centrale Paris, France. His research interests include engineering mathematics, signal and image processing, pattern recognition, and dynamical systems. He is currently leading the intelligent Medical imaging group in the Centre for Intelligent Signal and Imaging Research (CISIR) a national High Centre of Excellence (HiCoE) in Malaysia.

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