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Recent Researches in Communications, Electrical & Computer Engineering

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Preface

This year the 10th WSEAS International Conference on APPLICATIONS of ELECTRICAL ENGINEERING (AEE '11), the 10th WSEAS International Conference on APPLICATIONS of COMPUTER ENGINEERING (ACE '11) and the 9th WSEAS International Conference on APPLIED ELECTROMAGNETICS, WIRELESS and OPTICAL COMMUNICATIONS (ELECTROSCIENCE '11) were held in Playa Meloneras, Gran Canaria, Canary Islands, Spain, March 24-26, 2011. The conferences remain faithful to their original idea of providing a platform to discuss software engineering, computational intelligence, numerical methods, antennas, channel modeling, indoor propagation, optical networking technologies, signal processing for communications, satellite systems, internet technologies etc. with participants from all over the world, both from academia and from industry.

Their success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of these conferences are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

Conferences such as these can only succeed as a team effort, so the Editors want to thank the International Scientific Committees and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Applications of Playware: Intelligent Technology that Creates Playful Experiences

Professor Henrik Hautop Lund
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Abstract: This talk will present playware for creating playful technological applications, and how playware technology can be generalised for a vast variety of people, e.g. for play, education, cardiac patients, stroke patients, hospitalised children, home care, autistic children, dementia patients, and handicapped. The approach builds upon the development of modular robotics to create a kind of playware, which is flexible in both set-up and activity building for anybody and anywhere. Key features of this design approach are modularity, flexibility, and construction, immediate feedback to stimulate engagement, activity design by end-users, and creative exploration of play activities. I will illustrate the design approach by a system composed of different modular playware devices that by its modularity is used for creating playful experiences in a vast variety of application areas, e.g. music, sport, play and rehabilitation, e.g. most recently for the FIFA World Cup 2010 in South Africa. The system composed of the modular devices engages the user in physical activities, and I will show how it motivates to perform physical activities by providing immediate feedback based upon playful physical interaction with the system. The modularity, ease of use and the functionality of the devices such as modular robotic tiles and cubic I-BLOCKS suit well into these kinds of scenarios, because they can provide feedback in a generic way. It is therefore possible to create applications with different stimuli and to dynamically change parameters to provide immediate feedback to the users. The modularity allows to investigate adaptivity both as changes in the physical structure and in the processing of the modules (e.g. by neural networks).
This gives ample room for the development of playware, i.e. intelligent hardware and software that creates play and playful experiences amongst users of all ages. Indeed, design principles from modular robotics, embodied AI, interaction design and cultural studies allow us to create playware for diverse application fields such as welfare robotics (e.g. home care, physiotherapy, autism therapy, dementia therapy), sport, music, playground play and fitness training. In the presentation, I will show numerous examples from DJ remix music, rock music, physical rehabilitation, playgrounds, soccer, and use in Africa.

Brief Biography of the Speaker: Professor Henrik Hautop Lund, Center for Playware at Technical University of Denmark, is known internationally for his work in bringing robotics to use in novel ways. His approach is to combine modular robotics and modern artificial intelligence to create novel solutions to problems that occupy the citizens of the World, e.g. obesity, rehabilitation, and 3rd World development. He has recently founded the Center for Playware to focus even further on how playful aspects of robotics may provide motivation for any citizen to perform different kinds of interaction with the robots of our future daily life. He chaired the Robots at Play festivals in the open city areas where researchers, artists, entertainers, and citizens meet through playful hands-on experience with robotics in the daily life of the citizens. In all cases, Lund has shown how the combination of a modern artificial intelligence, modular robotics and entertainment may provide novel opportunities in play, rehabilitation, sport, music, teaching, third World development, etc., because the approach provides non-expert users easy access to the technology in a playful and motivating way.
Professor Henrik Hautop Lund has published more than 140 scientific articles in the field of robotics, he has been a member of the Danish Research Council, and he has been invited to present his robotic work in numerous occasions, for instance for the Emperor of Japan at Akasaka Palace in Tokyo. He has been keynote speaker at the major conferences in the field, such as IROS and Ro-Man. He founded and headed the LEGO Lab in 1997-2000. He founded the RoboCluster industrial promotion organization. He invented the RoboCup Junior robot football game for

children, and his Adaptronics group won the RoboCup Humanoids Free Style World Championship 2002 in front of 120.000 spectators. Also, he developed the Laudrup, Hogh & Lund RoboSoccer, which was used at the FIFA World Cup 2010 in South Africa. Further, he developed the RoboMusic in collaboration with World Music Award winner, remix musician Funkstar De Luxe. Professor Lund's work has received world-wide interest from news media, e.g. CNN, BBC and WIRED to name a few, and he was nominated for the award for the best entertainment robots and systems research over the last 20 years at the IEEE International Conference on Intelligent Robots and Systems (IROS).

Plenary Lecture 2

EMC Fundamentals and Mitigation Techniques

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Abstract: Due to technological progress in the digital and RF electronics, Electromagnetic Compatibility has become a major issue for telecommunications engineers and designers.
In fact, in our RF crowded environment the amount of transmitting equipments is ever-increasing (RF transmitters, Radio_TV transmitters, mobile radio equipments, radio remote controls, power lines,…) whilst electronics products are becoming smaller and smaller not only in size but also in power consumption.
Electromagnetic interferences caused by various electronic devices are becoming wild and result in disastrous effects (service interruption, occasional nuisance, vital effects...).
To address EMC issues, engineers and researchers have carried out investigations in several fields solving theoretical and practical problems.
From modeling Electromagnetic Environments, devices and components to experimental characterization and measurements many topics cover this multidisciplinary area.
This presentation is based on the author extensive experience in teaching, modeling, RF measurements, and EMC mitigation techniques.
After outlining the fundamentals coupling mechanisms, transmission lines and antennas, the behavior of Circuit components and design practices of Printed Circuit Boards are addressed.
This aims to provide insight into good design rules before building prototypes, making measurements, or performing mitigation remedies.

Brief Biography of the Speaker: Fethi CHOUBANI was born in Mahdia(Tunisia) in 1961. He received the electrical engineering diploma from Ecole Nationale d'Ingenieurs de Tunis, Tunisia in 1987 and the M. Eng and PhD degrees from ENSEEIHT, Institut National Polytechnique de Toulouse, Toulouse, France in 1988 and 19993 respectively.
Since 1993, he has been with Sup'Com , Ecole superieure des Communications de Tunis as an Assistant, Associate and the Professor of Radiofrequency components and devices, and ElectroMagnetic Compatibility.
His main interests are focused on oscillators and their applications to electromagnetic sensors, EMC, nonlinear devices, Modelling of passive, active components and RF techniques and measurements.
He has been offered a position of visiting Research Professor in the Department of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign in 1999 during 3 months, and in Laplace laboratory in ENSEEIHT for one month.
He was Head of the Telecommunications Department, ESPTT (Tunisia) from 1995 to 1996 and Director of Strategic studies, Tunisia Telecom (Tunisian operator in Telecommunications during 1999-2001.
He has published more than 70 journal and international conference papers.

Plenary Lecture 3

Vulnerabilities in Satellite based Tracking Systems

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Abstract: Satellite-based navigation and tracking have become a routine feature of modern society and everyday life and their use is still growing, with the EU's new satellite system Galileo expected to be operational in 2013. Positioning, navigation and tracking are used to decrease risks especially in logistics and to optimize work flow, but it is questionable whether this is always the case in international legislation about tracking, or the lack of it, cause problems when doing tracking abroad? From a technical standpoint is a tracking system likely to increase the security of a valuable consignment or would these merely provide an additional resource to potential thieves?

Brief Biography of the Speaker: Dr Jyri K. Rajamaki received his M.Sc. (Tech.) degree in electrical engineering from Helsinki University of Technology, Finland in 1991, and Lic.Sc. (Tech.) and D.Sc. (Tech.) degrees in electrical and communications engineering from Helsinki University of Technology in 2000 and 2002 respectively. From 1986 to 1996 he works for Telecom Finland (Telia-Sonera today) being e.g. Development Manager. From 1996 to 2006 he was with the Safety Technology Authority of Finland where his main assignment was to make the Finnish market ready for the European EMC Directive. Since 2006 he has been a Principal Lecturer at Laurea University of Applied Sciences, Espoo, Finland, where he also serves as a Head of Laurea's Data Networks Laboratory /SIDLabs Networks/. His research interests are electromagnetic compatibility (EMC) as well as ICT systems for private and public safety and security services. He has authored more than 40 scientific publications. Dr. Rajamaki has been an active actor in the field of electrotechnical standardization. He was 17 years the secretary or a member of Finnish national committee NC 77 on EMC, ten years a member of NC CISPR and he represented 15 years Finland at IEC, CISPR, CENELEC and ETSI EMC meetings. He was also the Chairman of Finnish Advisory Committee on EMC from 1996 to 2006. Dr. Rajamaki has been the scientist in charge for several research projects funded by EURESCOM and Tekes – the Finnish Funding Agency for Technology and Innovation, industry. He is currently the Scientific Supervisor of three Tekes projects (RIESCA, SATERISK and MOBI).