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Monday, October 15 9:00 - 10:30

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Chair: Tayeb Lemlouma (IRISA Lab and Rennes 1 University, France)

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Tuesday, October 16

Tuesday, October 16 9:30 - 10:30

Keynote1: Wireless Network Systems as Key Enabling Technology for Smart Homes and Cities and Samples of our Related Recent Works

Prof. Mohammad S. Obaidat, Monmouth University, USA

Room: Panorama

Chairs: Abderrahim Benslimane (University of Avignon & LIA/CERI, France), Maurizio Casoni (University of Modena and Reggio Emilia, Italy)

Abstract

Digital and smart homes and cities have become an important research and development area in the 21st century due mainly to their significance to national and international health, economy, safety, transportation, and security, among others. ICT Systems have played a vital role in the emergence and development of smart cities and homes. The impressive advances in areas of information and wired and wireless communications technology have brought with them the prospect of embedding different hierarchies of smartness and intelligence in the modern home and cities. Offering comfort and safe and healthy living with an intelligent form of collaboration with their residents has been the prime goal of smart and digital homes and cities. Contingent upon the settings, the communications may be multifaceted such as mobile agent based and context-aware services or they may be uncomplicated such as controlling the room temperature or its humidity level. Sophisticated situations include the delivery of position/location-aware info content of the resident of the digital home as well as his/her activities. The availability of inexpensive low-power sensors, the RF IC chips, and the embedded microprocessors/ microcontrollers have made tremendous impact on digital homes and cities; with large quantity of sensors, which jointly manage and make the inferences from the collected data on the state of the home and city as well as the actions and behavior of the inhabitants. As the worldwide life expectancy, especially in developed countries and newly industrialized counties is increasing, the percentage of senior/elderly citizens is increasing at an accelerated pace and most projections suggest that this increase worldwide will reach about 10 millions in the coming decade. Senior citizens usually live in care centers, hospitals or their own homes with some relative supervision/care. Smart homes and cities can be used efficiently and economically in order to accommodate the needs of this population. The increase of worldwide population, especially in populous countries and cities and the increase migration of citizens to cities have also brought with it challenges in transportation systems, health care, utility's supplies, learning & education, sensing city dynamics, computing with heterogeneous data sources, managing urban big data, and environmental protection including pollution and others. In this keynote, we will shed some light on the roles of Wireless Networks as a key enabling Information and Communications technology to smart cities and homes. We will also investigate the advances, current trends, challenges and future in the research and development in smart homes and cities. Some of our recent research results, especially the ones related to the use of wireless networks and security for smart and digital homes will be presented. Among these, fire detection schemes in forests. An intelligent system for fire prediction based on wireless sensor networks is presented. This system obtains the probability of fire and fire behavior in a particular area. This information allows firefighters to obtain escape paths and determine strategies to fight the fire. A firefighter can access this information with a portable device on every node of the network. Also, we will introduce an adaptive MAC protocol for distributed wireless LANs that is capable of operating efficiently under bursty traffic conditions. According to the proposed protocol, the mobile station that is granted permission to transmit is selected by means of a neural-based algorithm. Another new protocol for dynamically setting 802.11 wireless LAN waveforms and transmission power levels based on the wireless channel's signal to noise ratio will be introduced. Our method, known as Signal-to-Noise Ratio-Waveform Power Adaptation (SNR-WPA), changes the power in discrete steps matched to each of the 802.11 data rate-waveform steps. By matching the power to the spreading symbol rate, our technique maximizes the network throughput while minimizing MAC layer contention. We present other new schemes to authenticate and authorize 802.11 wireless nodes within a network. This new layer of security relies on a neural network decision engine that restricts network access to mobile nodes whose physical location is within a threshold distance from the wireless access point or the controller of the network. Other related wireless research efforts by our group will be presented.

Biography

Professor Mohammad S. Obaidat is an internationally known academic/researcher/scientist/scholar. He received his Ph.D. degree in Computer Engineering with a minor in Computer Science from the Electrical and Computer Engineering (ECE) Department, The Ohio State University, Columbus, USA. He has received extensive research funding and published over 840 refereed technical articles-About half of them are journal articles, over 60 books, and over 60 Book Chapters. He is Editor-in-Chief of 3 scholarly journals and an editor of many other international journals. He is the founding Editor-in Chief of Wiley Security and Privacy Journal. Among his previous positions are Advisor to the President of Philadelphia University for Research, Development and Information Technology, President of the Society for Molding and Simulation International, SCS, Senior Vice President of SCS, Dean of the College of Engineering at Prince Sultan University, Chair and tenured Professor at the Department of Computer and Information Science and Director of the MS Graduate Program in Data Analytics at Fordham university, Chair and tenured Professor of the Department of Computer Science and Director of the Graduate Program at Monmouth University. He is now a Full Professor at Nazarbayev University, Astana, Kazakhstan, a Full Professor at King Abdullah II School of Information Technology, University of Jordan, The PR of China Ministry of Education Distinguished Overseas Professor at the University of Science and Technology Beijing, China and an Honorary Distinguished Professor at the Amity University- A Global University. He has chaired numerous (Over 160) international conferences and has given numerous (Over 150) keynote speeches worldwide. He founded or co-founded four international conferences. He has served as ABET/CSAB evaluator and on IEEE CS Fellow Evaluation Committee. He has served as IEEE CS Distinguished Speaker/Lecturer and an ACM Distinguished Lecturer. Since 2004 has has been serving as an SCS Distinguished Lecturer. He received many best paper awards for his papers including ones from IEEE ICC and IEEE Globecom international conferences. He also received many worldwide awards for his technical contributions including: SCS prestigious McLeod Founder's Award , Presidential Service Award, SCS Hall of Fame -Lifetime Achievement Award for his technical contribution to modeling and simulation and for his outstanding visionary leadership and dedication to increasing the effectiveness and broadening the applications of modeling and simulation worldwide. He was awarded in 2017 the IEEE CITS Hall of Fame Distinguished and Eminent Award. He has been awarded with the Amity University Distinguished Honorary Professor Award. He also received the Distinguished Professor Award from University of Science and Technology-Beijing, China, and the SCS Outstanding Service Award. He is a Life Fellow of IEEE and a Fellow of SCS.

Tuesday, October 16 11:00 - 12:30

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Chair: Paschalis C. Sofotasios (Khalifa University & Tampere University of Technology, Finland)

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Room: Megaron B

Chair: Abderrahim Benslimane (University of Avignon & LIA/CERI, France)

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Tuesday, October 16 16:00 - 17:30

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Tilahun M. Getu (École de Technologie Supérieure (ETS), Canada); Wessam Ajib (Université du Québec à Montréal, Canada); Rene Jr. Landry (University of Quebec & Ecole de Technologie Supérieure, Canada)

Wednesday, October 17

Wednesday, October 17 9:30 - 10:30

Keynote2: 5G as an End-to-End Vision

Dr. Markus Gruber, Nokia Bell Labs, Germany

Room: Panorama

Chairs: Wessam Ajib (Université du Québec à Montréal, Canada), Samuel Pierre (Ecole Polytechnique de Montreal, Canada)

Abstract

This talk will discuss the Nokia end-to-end vision of how networks will evolve towards a new digital era. We will start with an introduction to the Nokia Future X architecture and how we create a cloud-integrated network. However, it is not only the evolving cloud infrastructure, but also the other additional degrees of freedom of 5G and their resulting daunting complexity that require dramatic improvements in network automation. In order to achieve seemingly infinite scalability in this environment, information and contextualization will play a pivotal role. From a business perspective, 5G will be the enabler platform for Industry 4.0 in which multiple dimensions of sensing and connectivity are embedded in billions of objects.

Biography

Markus Gruber manages the Radio Network Automation Department within the End-to-End Network & Service Automation Lab of Nokia Bell Labs. He received a diploma degree in electrical engineering and information technology from the University of Stuttgart and a diploma degree in telecommunications from the École Nationale Supérieure des Télécommunications, Paris, in 2002. Markus then joined the Max Planck Society and received a PhD in computer science from the University of Tübingen in 2006. Ever since he has been with Nokia (formerly Alcatel-Lucent) where he did research on self-organizing networks and their advancements in future networks. He contributed to 3GPP standardization, worked in various European projects, and is one of the organizers of the annual workshop IWSON.

Wednesday, October 17 11:00 - 12:30

HW1: Short Papers in wireless networks

Room: Megaron G

Chair: Wessam Ajib (Université du Québec à Montréal, Canada)

A New Method for Measuring Quality of Experience on Mobile OTT Streaming 593

Yekta Turk (Türk Telekom, Turkey); Engin Zeydan (CTTC, Spain); Ahmet Daglar (Turk Telekom, Turkey)

On-Demand TDMA for Energy Efficient Data Collection with LoRa and Wake-up Receiver 597
Rajeev Piyare (Fondazione Bruno Kessler & University of Trento, Italy); Amy L Murphy (Fondazione Bruno Kessler, Italy); Michele Magno (ETH Zurich and University of Bologna, Switzerland); Luca Benini (ETH Zurich, Switzerland)

A Security Aware Fuzzy Enhanced Ant Colony Optimization Routing in Mobile Ad hoc Networks 601
Hang Zhang, Arne Bochem, Xu Sun and Dieter Hogrefe (University of Goettingen, Germany)

Boston School Choice Mechanism for User Association in Heterogeneous Networks 607
Fouad Ismail (Egypt-Japan University of Science and Technology, Egypt); Ahmed Hassan Abd El-Malek (Egypt-Japan University for Science and Technology (E-JUST), Egypt); Maha Elsabrouty (Egypt Japan University for Science and Technology, Egypt)

SW2+NW4: Wireless and Mobile Networking

Room: Megaron B

Chair: Abderrahim Benslimane (University of Avignon & LIA/CERI, France)

PHY Security Enhancement of Threshold-Based User Selection in Co-Channel Interference Environment 611
Tonny Ssettumba (Egypt Japan University of Science and Technology, Egypt); Ahmed Hassan Abd El-Malek (Egypt-Japan University for Science and Technology (E-JUST), Egypt); Maha Elsabrouty (Egypt Japan University for Science and Technology, Egypt); Mohamed Abozahhad (Ejust, Egypt)

Towards a context-aware Wi-Fi-based Fog Node discovery scheme using cellular footprints 619
Zeineb Rejiba and Xavier Masip-Bruin (Universitat Politècnica de Catalunya (UPC) & Advanced Network Architectures Lab (CRAAX), Spain); Eva Marín-Tordera (Technical University of Catalonia UPC, Spain)

Reducing Spurious Handovers in Dense LTE Networks based on Signal Strength Look-ahead 625
Soumadip Biswas (Indian Institute of Technology Kharagpur, India); Sandip Chakraborty (Indian Institute of Technology Kharagpur & CSE, India); Arobinda Gupta (Indian Institute of Technology, Kharagpur, India)

SLOPE: A Self Learning Optimization and Prediction Ensembler for Task Scheduling 633
Lohit Kapoor (Thapar University, India); Anish Jindal (Lancaster University, United Kingdom (Great Britain)); Abderrahim Benslimane (University of Avignon & LIA/CERI, France); Gagangeet Singh Aujla (Chandigarh University, Mohali (Punjab), India); Rajat Chaudhary (Thapar University Patiala (Punjab), India); Neeraj Kumar (Thapar University Patiala, India); Albert Zomaya (The University of Sydney, Australia)

WW3: Channel Modeling and OFDM

Room: Atrium A

Chair: Tallal Elshabrawy (The German University in Cairo, Egypt)

On Application of the Correlation Vectors Subspace Method for 2-Dimensional Angle-Delay Estimation in Multipath OFDM Channels 640
Elpiniki Tsakalaki and Jörg Schäfer (Frankfurt University of Applied Sciences, Germany)

Massive Deployment Evaluation of Adaptive LPWA Networks Using Turbo-FSK 648
Arturo Guizar (CEA-LETI Minatec Campus & Inria, France); Luiz Henrique Suraty Filho and Mickael Maman (CEA-Leti Minatec Campus, France); Valérian Mannoni (CEA, France)

In-Band and Out-Of-Band Distortions Optimization for ATSC 3.0 Transmission: A Novel TR PAPR Reduction Algorithm 656
Naila Lahbabi and Jean-François Hélard (IETR, France); Matthieu Crussière (IETR - Electronics and Telecommunications Research Institute of Rennes (IETR) & INSA - National Institute of Applied Sciences, France)

Robust OFDM Diversity Receiver Under Co-channel Narrowband Interference 664
Sumit Kumar and Florian Kaltenberger (Eurecom, France); Bernhard Kloiber (Siemens AG, Corporate Technology, Germany); Alejandro Ramirez (Siemens Corporate Technology, Germany)

Wednesday, October 17 14:00 - 15:30

HW2: Short Papers in Comuting and Networking

Room: Megaron G

Chair: Samuel Pierre (Ecole Polytechnique de Montreal, Canada)

KRATOS: An Open Source Hardware-Software Platform for Rapid Research in LPWANs 672

Rajeev Piyare (Fondazione Bruno Kessler & University of Trento, Italy); Amy L Murphy (Fondazione Bruno Kessler, Italy); Michele Magno (ETH Zurich and University of Bologna, Switzerland); Luca Benini (ETH Zurich, Switzerland)

Intelligent Network Services enabling Industrial IoT Systems for Flexible Smart Manufacturing 676

Daniel Behnke and Marcel Müller (Weidmüller Group, Germany); Patrick-Benjamin Bök (Weidmueller Group, Germany); Jose Bonnet (Altice Labs, Portugal)

Massive MIMO Heterogeneous Networks: Downlink Sum Rate Maximization under Power Control 680

Betty Nagy (Ain Shams University, Egypt); Maha Elsabrouty (Egypt Japan University for Science and Technology, Egypt); Salwa Elramly (Ain Shams University, Egypt)

WW4: Cognitive Radio and LoRa Networks

Room: Atrium A

Chair: Mustafa ElNainay (Alexandria University & Virginia Tech, Egypt)

Interference Modelling in a Multi-Cell LoRa System 684

Luca Beltramelli, Aamir Mahmood, Mikael Gidlund, Patrik Osterberg and Ulf Jennehag (Mid Sweden University, Sweden)

Channel Coding for Better QoS in LoRa Networks 692

Ulysse Coutaud (SemTech and LIG UGA, France); Bernard Tourancheau (LIG CNRS UMR 5217 & Grenoble Alps University, France)

Enhancing LoRa Capacity using Non-Binary Single Parity Check Codes 701

Tallal Elshabrawy (The German University in Cairo, Egypt); Joerg Robert (Friedrich-Alexander Universität Erlangen-Nürnberg, Germany)

Genetic Algorithm-based Crowdsensing for Cognitive Radio Networks 708

Omar S Mossad (Alexandria University, Egypt); Mustafa ElNainay (Alexandria University & Virginia Tech, Egypt)