

GUEST EDITORIAL PREFACE

Special Issue on Next Generation Mobile Applications, Services and Technologies (NGMAST) (Part 2)

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The number of worldwide smartphone sales was 472.7 million in 2011. For the first three quarters of 2012, the number already reached to 467.3 million. It is expected the number of smartphone sales will exceed the one of feature phone sales (1,775 million in 2011) in the near future. The immense popularity of smartphones increases the needs of mobile applications, services and technologies. The 5th International Conference on Next Generation Mobile Applications, Service and Technologies (NGMAST 2011) held in September 14-16, 2011, Cardiff, Wales, UK aimed to meet the needs. This is the Part II of the special issue dedicated to the NGMAST 2011. Eight outstanding papers were selected from the Conference. Five of them were published in the previous issue (Part I) and the rest three are the first three articles in this issue. The last two are regular papers submitted to the Journal.

A brief introduction of each of the five articles is given next.

Article 1. “Analysis of the Realistic Resolution with Angle of Arrival for Indoor Positioning”: An IPS (an indoor positioning system) is a network of devices used to locate and track objects in buildings. This paper focuses on the maximum achievable resolution for Angle of Arrival as a means to position objects inside rooms using equipment within the field of wireless sensor networks, thus dealing with restricted resources. A clear view on beamforming using antenna arrays is represented and is proven to be useful in Angle of Arrival measurements. A detailed overview of a dedicated algorithm, leads the authors to draw conclusions concerning the resolution. A reference value is defined, which allows the authors to calculate the realistic resolution for all room dimensions. In order to

verify these theoretical outcomes with practical results, the development of a quadrature demodulation based antenna array architecture, operating at 2.4 GHz, is presented.

Article 2. “A Hybrid Network Emergency Communication Model”: A hybrid network (e.g., star ring network and star bus network) combines two or more topologies (such as bus, star, and ring), so the resulting network includes the advantages from the standard topologies used. This paper studies the hybrid network disaster recovery (HNDR) systems and classifies its communication scenarios and requirements. The authors propose a new networking protocol for the hybrid network, with ability to forward sessions and messages through different transport protocols, and copes with node mobility and node failure. This research considers heterogeneous network disaster recovery scenario and proposes a cost effective and easy to deploy hybrid network emergency communication protocol (HNEC). This internetwork protocol is a specific model of the inter-domain messaging (IDM) protocol for emergency communications. The routing protocol procedure is similar to the reactive AODV procedure but is different in maintaining routes from unpredicted link breaks or node failure.

Article 3. “Mobility Adaptive Energy Efficient and Low Latency MAC for Wireless Sensor Networks: Medium Access Control (MAC) data communication protocol is a sub-layer of the data link layer of the seven-layer OSI model of computer networking. It allows several network nodes to communicate within a multiple access network that incorporates a shared medium such as Ethernet. This research proposes a high throughput, low latency, mobility adaptive and energy efficient MAC called Mobility Adaptive (MA) for wireless sensor networks. The MA-MAC ensures that transmissions incur no collisions, and allows nodes to undergo sleep mode whenever they are not transmitting or receiving. It uses delay allocation scheme based on traffic priority at each node and avoids allocating same backoff delay for more than one node unless they are

in separate clusters. It also allows nodes to determine when they can switch to sleep mode during operation. MA-MAC for mobile nodes provides fast association between the mobile node and the cluster coordinator.

Article 4. “Characterizing User Behavior in a European Academic WiFi Network”: A wireless network uses radio waves instead of wires to communicate among computers. Examples of wireless networks include wireless LAN (local area networks) and mobile/cellular networks. WiFi is a kind of WLAN products that are based on the IEEE 802.11 standards. This work studies the library in the main campus of the Technical University of Catalonia (UPC) in Barcelona. Daily and weekly patterns of the WLAN connections are shown. The population accessing the network is mostly composed of infrequent users: half of the population accesses the WLAN once during each month. Many users associate to only one of the twelve possible access points, which means that, despite the widespread use of lightweight devices, many users are static. The results of this analysis provide general tools for characterizing campus-wide WLAN and a better understanding of usage and performance issues in a mature wireless network.

Article 5. “An Overview of the Capabilities and Limitations of Smartphone Sensors”: Smartphone sensors are the components of smartphones that measure a physical quantity (such as temperature) and converts it into a signal (such as a number). Examples of smartphone sensors are accelerometers, microphones, and infrared transmitters and receivers. Since the physical and electromagnetic aspects of the sensors’ operation can significantly affect the analysis and use of their data, it is essential for those who rely on these data to understand these details. As such, the authors provide a simplified and yet technically precise explanation of some of the sensors found on Motorola Droid, which are representative of sensors found in most smartphones. They specifically explain its proximity sensor, Hall effect magnetometer, capacitive accelerometer, orientation sensor, and light sensor. Each sensor is described using

illustrations and experiments that are provided to demonstrate some unexpected behaviors.

The five articles cover important topics of mobile applications, services and technologies including (i) indoor positioning, (ii) an emergency communication model, (iii) medium access control, (iv) a WiFi study, and (v) smartphone sensors. They are critical, contemporary issues of mobile/handheld computing and readers will benefit from the authors' great insights. Once more, the editors thank the reviewers and authors

for their great help and contributions and special thanks go to Chitra Balakrishna, Andrew Scott and Nidal Albeiruti for the effort in the selection of the papers for this special issue. We trust you will enjoy reading this issue.

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Guest Editor

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Khalid Al-Begain is a Professor of Mobile Computing and Networking and the Director of the Integrated Communications Research Centre (ICRC) at the University of Glamorgan, UK. He received his PhD in Communications engineering in 1989 from Budapest University of Technology, Hungary. He has been working in different universities and research centres in Jordan, Hungary, Germany and the UK. He has led and is leading several projects in mobile Computing, wireless networking, multimedia multicasting and performance evaluation. He is the President of the European Council for Modelling and Simulation, UNESCO Expert in networking, Senior Member of the IEEE and IEEE Communications and Computer Societies, British Computer Society Fellow and Chartered IT Professional, member of the UK EPSRC College (2006-2009), Wales Representative to the IEEE UK&RI Computer Chapter management committee, and UK representative to the COST290 Action management committee. Prof. Al-Begain has been also appointed as Adjunct Professor at the Department of Computing and Engineering at Edith Cowen University, Australia, and as a member of the Governing Board of the West Australia Centre of Excellence on Microphotonic Systems since 2005. So far, Al-Begain has been the General Chair of twelve international conferences including two in 2009. He has been the General Chair of the International Conference of Analytical and Stochastic Modelling Techniques and Applications (ASMTA) since 2003 but, in particular, he is the Founder and General Chair of the IEEE International Conference and Exhibition on Next Generation Mobile Applications, Services and Technologies founded in 2007 with the third to be held in Cardiff in September 2009. He has co-authored two books; the recent one is titled: "IMS: Deployment and Development Perspective" by John Wiley & Sons. He also edited 12 books, and authored more than 150 papers in refereed journals and conferences. He is member of the editorial board of several journals and acted as Guest Editor for 4 journal special issues. Among many projects, he is currently leading the project on the IMS based next generation service and applications creation environment at ICRC supported by major industries. This facility is one of very few in universities worldwide. He is also leading a project on developing innovative platform for smart care systems to help people at risk of Dementia. Additionally, Prof. Al-Begain has been the founder and CEO of Glamex Security Ltd. He is also the Chief Scientist of Omniplug Technologies Ltd.

Wen-Chen Hu received a BE, an ME, an MS, and a PhD, all in Computer Science, from Tamkang University, Taiwan, the National Central University, Taiwan, the University of Iowa, Iowa City, and the University of Florida, Gainesville, in 1984, 1986, 1993, and 1998, respectively. He is currently an associate professor in the Department of Computer Science of the University of North Dakota, Grand Forks. He was an assistant professor in the Department of Computer Science and Software Engineering at the Auburn University, Alabama, for years. He is the Editor-in-Chief of the International Journal of Handheld Computing Research (IJHCR) and an associate editor of the Journal of Information Technology Research (JITR), and has acted as editors and editorial advisory/review board members for over 30 international journals/books and served more than 30 tracks/sessions and program committees for international conferences. He has also won a couple of awards of best papers, best reviewers, and community services. Dr. Hu has been teaching more than 10 years at the US universities and over 10 different computer/IT-related courses, and advising more than 50 graduate students. He has published over 100 articles in refereed journals, conference proceedings, books, and encyclopedias, edited seven books and conference proceedings, and solely authored a book titled Internet-enabled handheld devices, computing, and programming: mobile commerce and personal data applications. His current research interests include handheld/mobile/smartphone/tablet computing, location-based services, Web-enabled information system such as search engines and Web mining, electronic and mobile commerce systems, and Web technologies. He is a member of the IEEE Computer Society and ACM (Association for Computing Machinery).