

GUEST EDITORIAL PREFACE

Special Issue on 2013 IEEE International Conference on Electro/Information Technology (EIT 2013)

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The themes of the IEEE International Conference on Electro/Information Technology (IEEE EIT) are on electrical and computer engineering related to IT and its applications; for example, the following topics are usually included: biomedical engineering, computing and information technology, micro-nano systems, information technology education, power and controls, and signal processing. The EIT 2013 Conference was held on May 9-11, 2013 on the campus of South Dakota School of Mines and Technology, located in beautiful Rapid City, South Dakota, the home of Mt. Rushmore and the statues of the four presidents of the United States. The Conference showcased the basic and applied research results in the fields of electrical engineering, computer engineering, computer science, and informatics. Additionally, it provides a forum for

academic researchers, industrial scientists, and IT professionals to share principles, practices, concepts, and experiences, exchange ideas, and discuss developments. The EIT 2013 was a huge success. A total of 160 papers in a diversity of topics from authors all over the world were submitted to this conference and over 100 experts participated in the review process. Among the accepted papers, three outstanding papers related to handheld computing were selected from the conference for this special issue. This issue includes five articles. The last two papers of this issue are regular papers submitted to the journal. A brief introduction of each of the five articles is given next.

Article 1 - Interference modeling and analysis in cognitive radio networks. Cognitive radio networks (CRNs) are a kind of smart networks that is able to identify not used spectrum and to

tune to that frequency to transmit and/or receive signals. The major difference between cognitive radio networks and traditional wireless networks is that secondary users are allowed to access the channel if they pose no harmful interference to primary users. This paper tackles the estimation of interference at the primary receiver due to concurrently active secondary. With the spectrum sensing, secondary users are refrained from transmitting once an active user falls into their sensing range. Therefore, the maximum number of simultaneously interfering secondary users is bounded from 1 to 4. The result could be used to simplify interference modeling in CRNs.

Article 2 - LTE cellular network planning for urban area. LTE (Long Term Evolution) is a 4G wireless communications standard to provide high-speed data transmission for mobile devices. The 3rd Generation Partnership Project (3GPP) works on the Long Term Evolution (LTE) and proposes a system which has larger bandwidths (up to 20 MHz), low latency and packet optimized radio access technology having peak data rates of 100 Mbps in downlink and 50 Mbps in the uplink. Offering a greater coverage by providing higher data rates over wider areas and flexibility of use at existing and new frequency bands plan is a major challenge. This paper analyzes practical coverage scenario in an urban area (i.e. Kolkata) in terms of received signal levels, total noise, interference, throughput, and quality factor for downlink signal level.

Article 3 - GSM-based positioning technique using relative received signal strength. GSM is a standard set which describes the protocols for 2G digital cellular networks used by mobile phones and Database Correlation Method (DCM) is a positioning technology that based on a database of a premeasured location dependent variable such as Received Signal Strength (RSS). DCM has shown superior in terms of accuracy. Absolute RSS values received from a base station change with time, but the relative RSS (RRSS) values which refer to the relations of the RSS val-

ues between different base stations are more stable. This study proposes and implements a robust RRSS GSM-based technique for both positioning and traffic estimation. The study was tested and analyzed in Egypt roads using realistic data and Android smart phones. The performance evaluation showed good results. Mean positioning accuracy was about 29m in urban areas and velocity estimation was about 1 km/h in rural areas.

Article 4 - Using communication frequency and recency context to facilitate mobile contact list retrieval. As mobile contact lists get bigger and bigger the cognitive load on the user increases while trying to retrieve the next contact to start a communication session. This paper is focused on the task of retrieving a contact when the purpose is to start a phone call, examining mobile users' call logs and showing that it is possible to accurately predict the next contact to be called using relatively simple heuristics and algorithms that describe usage context. The authors present and discuss the results of the proposed method applied on a dataset collected from an experiment they organized involving 25 mobile users.

Article 5 - Toward an RFID scheme for secure material flow tracing and verification in supply chains. The RFID (Radio Frequency Identification) device, consisting of a small chip and an antenna, serves the same purpose as a bar code. Other than providing a unique identifier for that object, it is able to carry more data, 2,000 bytes, than a bar code or magnetic strip does. This paper presents a scheme for securely tracing material flow in supply chains using the inherent RFID authentication and data logging capability. The scheme provides not only an overall path tracing and verification through the entire supply chain, but also the product identification within the scope of a supply chain partner. RFID tags and readers are deployed to ensure that only authorized supply chain partners can identify the tagged items in a secure and private way. Their approach avoids the single point failure of the supply chain server—there is no need for each supply

chain partner to communicate with the server for every material flow. Therefore, it minimizes the risks caused by system interruptions due to network failures or server unavailability.

The five articles cover important topics of handheld applications, services, and technologies including (i) cognitive radio networks, (ii) LTE cellular networks, (iii) a GSM-based positioning method, (iv) mobile retrieval, and (v) an RFID application. The first three papers were selected by the Journal's committee members based on their topics and quality. Additionally, only papers orally presented at the Conference were considered and the selected three papers

received positive responses when they were presented at the EIT 2013 Conference. The editors thank the reviewers and authors for their great help and contributions. Without them, this special issue would not be possible. We trust you will enjoy reading this issue.

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Kazem Sohraby has served as professor and head of academic departments for over 12 years, and as a scientist with Bell Labs/AT&T for over 15 year. He served as Professor and Head of Department of Electrical and Computer Engineering, South Dakota School of Mines and Technology and at University of Arkansas; as professor and head of Computer Science and Computer Engineering departments at University of Arkansas – Fayetteville; as the chair of Telecommunications Management department at Stevens Institute of Technology. He was with the Mathematical Sciences Research Center, Mathematics of Networks and Systems and with the Performance Analysis Departments (Advanced Communications Technologies) at Bell Labs. His areas of research interest include computer and communications networks, wireless systems, signaling and optical communication. He is a principal consultant with private industry and on the Defense Information Systems Agency projects; a fellow of IET in Britain; served on the educational committee of IEEE COMSOC; served on the editorial board of IEEE publications, and as Director of its online programs. Currently in addition to his department head responsibilities, he works on research grants from NSF and NASA. He received PhD (New York University – Polytechnic Division), MS, and BS (high honors) all in Electrical Engineering, and his MBA from the Wharton School, University of Pennsylvania.

S. Hossein Mousavinezhad received his Ph.D. in Electrical Engineering from Michigan State University, East Lansing, Michigan. He is currently a professor and the chair of the Department of Electrical Engineering Computer Science (EECS), Idaho State University, Pocatello, Idaho. His research interests include digital signal processing, bioelectromagnetics, and communication systems. Dr. Mousavinezhad is a recipient of the Institute of Electrical and Electronics Engineers (IEEE) Third Millennium Medal. He received American Society for Engineering Education (ASEE) Electrical and Computer Engineering Division's Meritorious Service Award in June 2007. Professor Mousavinezhad is a program evaluator for the Accreditation Board for Engineering and Technology (ABET).

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 more than 10 books and conference proceedings, and solely authored a book entitled 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).