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Additional Information

IEEE Communications Magazine

ENABLING MOBILE AND WIRELESS TECHNOLOGIES FOR SMART CITIES: PART 3

Due to advancements in communication and computing technologies, smart cities have become the main innovation agenda of research organizations, technology vendors, and governments. To make a city smart, a strong communications infrastructure is required for connecting smart objects, people, and sensors. Smart cities rely on wireless and mobile technologies for providing services such as healthcare assistance, security and safety, real-time traffic monitoring, and managing the environment, to name a few. Such applications have been a main driving force in the development of smart cities. Without the appropriate communication networks, it is really difficult for a city to facilitate its citizens in a sustainable, efficient, and safer manner/environment. Considering the significance of mobile and wireless technologies for realizing the vision of smart cities, there is a need to conduct research to further investigate the standardization efforts and explore different issues/challenges in wireless technologies, mobile computing, and smart environments.

In this IEEE Communications Magazine Feature Topic (FT), we invited researchers from academia, industry, and government to discuss challenging ideas, novel research contributions, demonstration results, and standardization efforts on enabling mobile and wireless technologies for smart cities. After a rigorous review process, 18 papers were selected to be published in this FT of IEEE Communications Magazine. Five of the 18 are published here in Part 3 of the FT.

To investigate and verify the data validity in urban transportation system, the authors in “Exploring Data Validity in Transportation Systems for Smart Cities” used the records of vehicle location and transaction logs of smart card. The authors proposed a mechanism to find the time discrepancies by investigating the signal patterns of origin inference success rate. An investigation is made by using the results of data mining to find that a small amount of missing records causes severe bias on passenger flow data mining.

A broad impact of various applications on operational flow of market is studied in “Smarter Markets for Smarter Life: Applications, Challenges and Deployment Experiences”. The authors also identified challenges of embedded wireless system that should be addressed when targeting market deployments. Further, the impact of daily market activities on the wireless networks has also been investigated. Based on the findings, a prototype IoT system has been designed to enable the realization of a smart market environment.

The WiFi networks deployment and their utilization in the smart cities are the key concerns in the smart cities. The authors in “WiFi Networks in Metropolises: From Access Point and User Perspectives” tried to answer the questions related to WiFi deployment in the smart cities. Based on the study, four key observations have been made: a) WiFi networks have dense deployment in urban areas, b) public and business WiFi networks have more concentration, 3) the access pattern for a majority of the WiFi

users is regular with either ultra short connections or quite long connections, and 4) the WiFi users form a well structured network.

Transmission reliability is crucial in vehicular social networks for realizing the vision of smart cities. The authors in “Vehicular Social Networks: Enabling Smart Mobility” have emphasized the significance of reliable transmission in vehicular social networks of smart cities. The case of traffic anomaly detection for vehicular social networks is studied by trajectory data analysis.

The energy efficiency is the key concern in the smart cities. The authors in “Towards Eco-Friendly Smart Mobile Devices for Smart Cities” proposed a solution that is based on the distributed shared time access algorithm. The algorithm ameliorates the energy efficiency of the mobile users in terms of battery life. It forms eco-friendly mobile networks for the future smart cities. The simulation results validated the solution and showed the supremacy of the proposed solution compared to other access mechanisms.

The Guest Editors would like to thank all the involved people, including the contributing authors for their high-quality submissions, the anonymous reviewers for their timely and insightful comments, and the IEEE Communications Magazine staff for their continuous support. We believe that the presented contributions in this FT will captivate and spark novel research directions for mobile and wireless technologies for smart cities.

Biographies



Ejaz Ahmed has worked as a researcher at C4MCCR, University of Malaya, Malaysia, CogNet Lab, NUST, and CoReNet, Maju, Pakistan. He is an Associate Technical Editor of IEEE Communications Magazine, IEEE Access, Springer MJCS, and Elsevier JNCA. He has also served as a Lead Guest Editor for the Elsevier FGCS Journal, IEEE Access, Elsevier Computers & Electrical Engineering, IEEE Communications Magazine, Elsevier Information Systems, and Transactions on Emerging Telecommunications Technologies.



Muhammad Imran is currently working at King Saud University and is a visiting scientist at Iowa State University. His research interests include MANETs, WSNs, WBANs, M2M/IoT, SDN, and security and privacy. He has published a number of research papers in refereed international conferences and journals. He serves as a Co-Editor-in-Chief for EAI Transactions and Associate/Guest Editor for IEEE Access, IEEE Communications Magazine, Computer Networks, Sensors, IJDSN, JIT, WCMC, AHSWN, IET WSS, IJAACS, and IJITEE.



Mohsen Guizani [S'85, M'89, SM'99, F'09] received his B.S., M.S., and Ph.D. from Syracuse University. He is currently a professor and the ECE Department Chair at the University of Idaho. His research interests include wireless communications/mobile cloud computing, computer networks, security, and smart grid. He is the author of nine books and 400+ publications. He was the Chair of the IEEE Communications Society Wireless Technical Committee. He served as an IEEE Computer Society Distinguished Speaker.



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Jaime Llorca [M'07, SM'10] received his M.Sc. in physics in 1997, his M.Sc. in electronic engineering in 2003, and his Ph.D. in telecommunication engineering in 2006. He is the head of the Communications and Networks research group of the Research Institute IGIC. He is Editor-in-Chief of Ad Hoc and Sensor Wireless Networks and Network Protocols and Algorithms. He has been General Chair of 36 international workshops and conferences. He is an IARIA Fellow.



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Wael Guibeneh has been a research scientist at Intel Labs since June 2015. He was awarded his Ph.D. from Telecom ParisTech in July 2013. He also holds an M.Eng. and a Master's degree in telecommunications obtained in 2009 and 2010, respectively. He worked at Eurecom as a research engineer from 2010 to November 2013, and then joined

Semtech to work on LoRa systems from 2013 to June 2015. His research activities include IoT, 5G, and wireless communications.