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Additional Information

Imminent Communication Technologies for Smart Communities

Editorial for Part I

In the 21st century, we have witnessed a rapid and revolutionary growth in ICT industry. Also, we can easily identify a variety of challenges that today's cities around the world are facing. In developing countries, with rapid population and economic growth, energy demand in urban areas is increasing. In developed countries, challenges are due to declining birth rates, aging societies demanding better health care services, and deterioration of physical infrastructure such as buildings, roads, water supply and sewage systems, and power grid. Moreover, internationally, global warming caused by increasing carbon dioxide emissions and frequent natural disasters are urgent issues. In our FT, we would like to see that how the communication technologies can play a vital role in assisting or solving some of the aforementioned issues.

The first paper entitled "SecSVA: Secure Storage, Verification, and Auditing of Big Data in Cloud Environment" presents a mechanism that allows secure storage, verification, and auditing of big data on a cloud environment. Furthermore, users can access the encrypted data stored on the cloud using a proposed ABE-based scheme. The authors also included comparisons with various types of attacks on the Data stored in Cloud. On the other hand, the authors in the second paper entitled "A Community-Aware Data Propagation with Small World for Internet of Vehicles" present a novel scheme that combines community-aware mechanism to propagate data packets based on smartphones and vehicles. Also, small world feature is added to IoV by building communication relationships between smartphones. When a vehicle fails to forward messages, the proposed scheme can quickly find another vehicle to replace it. Thus, the robustness of IoV is improved. The simulation results show that the proposed work outperforms existing protocols.

The third article "A Hierarchical Jammed-Area Mapping Service for Ubiquitous Communication in Smart Communities" presents prepared knowledge of neighborhood (which is easily available for sensor networks) and proposes three-layer network architecture organizes smart nodes into one-hop of clusters. When the network runs normally, cluster-based routing substantially reduces the traffic overhead and avoids broadcast-storm in the network. When jamming occurs in the network, each one-hop cluster is used as basic mapping unit to identify and measure jammed regions. Such schemes are beneficial especially in case of a disaster or emergency where battery operated devices need energy efficient communications.

Likewise, security and privacy are major concerns of communication technologies and in smart communities. Therefore, the fourth paper entitled "Imminent Communication Security for Smart Communities", where the authors have shown that it is relatively easy to create a low-cost GPS signal emulator using cheap, off-the-shelf components and open source code. The GPS receiver does not recognize any of the attacks and could not send a warning signal to alert the user. This may be harmless with a human driven cars. But with unmanned ground vehicles becoming more popular in the near future, the implications will be more serious. The authors discussed anti spoofing techniques and provide a great research road map to follow.

The fifth paper entitled “RF Energy Harvesting and Transfer in Cognitive Radio Sensor Networks: Opportunities and Challenges” introduces a novel architecture of RF powered cognitive radio sensor networks to show that the opportunistic channel access could be jointly controlled with energy management of sensor nodes to achieve near-optimal network utility while guaranteeing the network stability and sustainability. Also, some future research directions have been envisioned to nurture continuous improvements in this field of study. The last paper in this editorial is entitled “5G for Vehicular Communications”. In this article, authors provide an overview of the relevant 5G building blocks in the context of vehicular communication and its contributions in building smarter communities.

Finally, we would like to thank all of those who have made significant contributions to this FT, including the contributing authors, the anonymous reviewers, and the IEEE Communications Magazine publications staff, in particular the Editor-in-Chief. We believe that the research results presented in this FT will further stimulate research and development ideas in building Smarter Communities.



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