

SMART COMMUNITY NETWORKS AND SYSTEMS



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Community networks and systems were started as non-profitable last-mile access networks that were operated within local communities, sometimes even without access to the public Internet. They are established and maintained by communities to enhance community life quality rather than for business purposes. Many projects have been carried out to develop various community networks and systems worldwide, such as in Asian-Pacific, South Africa, Argentina, Tibet, USA, Canada, Netherlands, Italy, Spain, and many others.

The recent fast-growing innovations of ICT technologies create exciting opportunities which meanwhile raise new technology issues for community networks and systems. Smart communities are, therefore, proposed to leverage advanced ICT technologies so that community residents, businesses, organisations, and visitors can benefit in terms of economic growth, social equality, and environmental sustainability. Emerging smart communities refer to urban cities, rural communities, or combined regions in which advanced yet specially tailored networks are deployed to support a wide range of modern services and applications. This Special Issue (SI) features the latest advanced research efforts on several important issues regarding smart community networks and systems.

In order to develop and deploy the most appropriate community networks and systems, it is crucial to understand existing and emerging technologies and have a clear vision of future potentialities. The article, "Toward Smart Community Networks," co-authored by Gabriele Gemmi, Llorenç Cerda-Alabern, Leandro Navarro, and Leonardo Maccari summarizes the evolution of community networks (including key technologies and achievable performance), and provides information regarding the development cases of community networks. Interestingly, the article demonstrates the feasibility of applying communications via high-frequency bands (e.g., mmWave, Terahertz) in underserved rural communities.

Dynamic network conditions form a classic issue that needs to be addressed in modern community networks, due to the wide varieties in application types, network users, connected devices. The article, "Protocol-Adaptive Strategies for Wireless Mesh Smart City Networks," co-authored by Lefteris Mamatas, Vassilis Demiroglou, Sarantis Kalafatis, Sotiris Skaperas, and Vassilis Tsaoussidis argues that a protocol-adaptive solution may be a new idea to handle highly dynamic community network conditions. The article presents a software-defined networking scheme to deploy and configure the most appropriate protocol strategy in an on-demand fashion.

Smart community network applications and infrastructures may be explored to support actions in order to respond to critical situations for communities. The article, "Using Network as a

Sensor for Crowd Analysis and Service Improvement," authored by Mu Mu, demonstrates how to use community network infrastructure to monitor heterogeneous crowd movement. This study sheds light on how policy makers may use WiFi-based community networks to inform and quickly response to community events or incidents (e.g., energy and facility planning situations caused by infectious disease).

Overall, this SI gathers freshly achieved study outcomes that tackle several important issues for smart community networks and systems. Other challenges, such as understanding and enhancing the impact of application correlations and communication entity interactivity on community networks and systems, integrating multiple disciplines to support critical social issues (e.g., climate changes), are still open for more research efforts.

Finally, we would like to thank all the reviewers for their great support in reviewing manuscripts submitted to this SI. We also extend our thanks to the Editor-in-Chief, Dr. Chonggang Wang, for his supportive guidance during the entire process.

BIOGRAPHIES

WANQING TU (wanqing.tu@durham.ac.uk) is an Associate Professor at Durham University. She received her Ph.D. from CityU, HK. She was an IRCSET Embark Initiative Research Fellow. She served several international conferences as a TPC co-chair, an organization committee member, etc. Her research focuses on networks, future multimedia communications, and performance analysis.

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