

Recent Advances in Smart Cities

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■ **SMART CITY PROJECTS** have undergone around the world, with the primary aim of using advanced Information and Communications Technology (ICT) to improve people's quality of life and efficiency of business operations.

Major ICT companies have been rolling out related products for smart cities. Government leaders have rolled out masterplans and roadmaps, detailing how they will implement their smart cities for the next decade.

The standardization bodies are working to standardize smart city architectures and development processes.^{1, 2} There are efforts in defining smart city indicators—introducing metrics to help governments to measure and quantify the performance of smart cities. Some organizations are ranking cities around the globe using these metrics.³

IEEE Consumer Electronics Magazine has covered smart cities topic in the past.^{4, 5} This special issue is an attempt to make the Consumer Technology community aware of the latest developments in smart cities.

In this special issue, we have accepted five papers after rigorous reviews. They are as follows.

- 1) Smart home integration with external IoT device platforms and services.
- 2) Decentralized video input authentication as an edge service for smart cities.
- 3) Smart water-meter wireless transmission system for smart cities.
- 4) WATERSensing: A smart warning system for natural disasters in Spain.
- 5) A smart energy hub for smart cities: Enabling peer-to-peer energy sharing and trading.

The first paper introduces the concepts of virtual devices and physical device twins to Smart Homes. Using these concepts exposes smart homes users to the external services and device platforms. This circumvents the standardization gap in Smart City—Smart Homes and enables independent evolution and subsequent integration once standards are fully developed.

The second paper addresses authentication of video streams through blockchain technologies enhanced with environmental fingerprinting. This way authors substantially improve video streams security and robustness. This is of ultimate benefit to Smart City administrations, policy makers, and emergency responders.

The third paper presents a design of an automatic system for real-time water-flow monitoring and water resource management. This system

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enables water-meter reading with high accuracy. It effectively prevents water leakages in short amount of time improving overall efficiency of water management for smart cities.

The fourth paper presents WATERSensing, an application for the prevention of flooding. WATER-Sensing is based on participation of individuals through social networks, such as Twitter and Telegram. The feeds from these networks are analyzed using natural language processing techniques.

Finally, the fifth paper presents a peer-to-peer based architecture for smart energy hub. Smart energy hub enables energy sharing and trading for Smart Cities by leveraging energy generation and consumption profiles of residential, commercial, industrial, and community services.

Smart city applications cover a wide spectrum of verticals from transportation, health, environment to living, retail, agriculture, and tourism as well as technologies, such as data analytics, sensors, artificial intelligence (AI), blockchain, 5G networks, and IoT.

Smart city security is important topic to be addressed by researchers. Given the current pandemic situation, a virus threat to the city can be considered as a security issue and a smart city must be prepared and equipped to handle it. Recent work by researchers has identified multiple ways to respond to a virus crisis.^{6–10}

We would like to thank the many reviewers for their effort in reviewing the manuscripts. We hope this special section will stimulate more interests from researchers and engineers to work on this multidisciplinary field of smart cities.

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