Smart Technologies: The Key for Sustainable Smart Cities

By Saraju P. Mohanty

I remember the kind help I received from Emeritus Editor-in-Chief (EiC) Dr. Peter Corcoran, who featured the smart-cities article I authored (and which appeared as the cover article) in the July 2016 issue of *IEEE Consumer Electronics Magazine*. I became the EiC with the October 2016 issue and began driving the magazine to the next level, after it was given a strong start by Dr. Corcoran. The smart-cities article, "Everything You Wanted to Know About Smart Cities," has been very influential in the global community, evident by the 5,500 downloads to date in IEEE *Xplore*. That motivated me to deliver my IEEE Distinguished Lecture [broadcast as an IEEE Consumer Electronics (CE) Society webinar] on smart cities, which I made available on LinkedIn and has since been viewed 2,500 times.

Based on this experience, I have dedicated this issue's theme to the smart technologies required to realize sustainable smart cities. I sincerely hope the January 2018 issue, which focused on smart health care, an important component of smart cities, was informative for our readers. As discussed in the smart-cities article, the Internet of Things (IoT) is the backbone of smart cities. The IoT provides instrumentation, interconnection, and intelligence capabilities to smart cities. While the IoT is the technology that

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makes smart cities possible, the associated or related technologies, such as physical infrastructure, electrical infrastructure, electronics, communication infrastructure, information technology infrastructure, and software, make smart cities happen. It is a matter of design and operation cost tradeoffs to have a proper mix of smart technologies so that smart cities are not overly smart but rather sufficiently smart to be sustainable for years to come.

IN THIS ISSUE

SOCIETY NEWS

IEEE BRAIN INITIATIVE 2017 CHALLENGES
This article presents the details of the first IEEE Brain Initiative 2017 Challenge, which was held in St. Petersburg, Russia.

HONG KONG CHAPTER ORGANIZES SUCCESSFUL SMART-CITY WORKSHOP
A one-day workshop on smart cities that was conducted by the IEEE CE Society Hong Kong Chapter is discussed in this article.

CONSUMER-CENTRIC INTERNET OF THINGS
The author reports on the invited lecture session of the CE Society Malaysia Chapter held at Manipal International University, Malaysia.

YOUNG PROFESSIONALS EVENT AT GCCE 2017
This article presents the Young Professionals event at the sixth Global Conference on Consumer Electronics, held in October in Nagoya, Japan.

CONFERENCE REPORTS

2017 IEEE INTERNATIONAL CONFERENCE ON CONSUMER ELECTRONICS–TAIWAN
The IEEE International Conference on Consumer Electronics–Taiwan, held at the National Taipei University of Technology in June 2017, is discussed in this article. The conference theme was VR/AR Consumer Electronics: From Dreams to Reality.

FUTURE DIRECTIONS

THE BLOCKCHAIN AS A DECENTRALIZED SECURITY FRAMEWORK
The authors present a simplified, brief introduction of the blockchain, which has been receiving much attention for its various applications in smart cities.

FEATURE ARTICLES

SENSING A CITY'S STATE OF HEALTH

The authors present an IoT-based framework for structural health monitoring in smart cities, which is an important part of making smart infrastructure a reality.

A SMARTER METHOD FOR SELF-SUSTAINABLE BUILDINGS

A method for energy management in smart buildings, which is a component of smart cities, is presented in this article.

BUILDING A SUSTAINABLE INTERNET OF THINGS

It is desirable that the IoT framework deployed in smart cities consumes minimal energy to reduce the operational cost of the cities. The authors propose such an IoT framework for sustainability.

PROCESSING DATA ACQUIRED BY A DRONE USING A GIS

An efficient method to automatically visualize, analyze, and measure through an unmanned aerial vehicle is the focus of this feature. This has diverse applications for smart cities, including smart agriculture and emergency response systems.

PUSHING THE AI ENVELOPE

Artificial intelligence techniques encompassing machine learning and deep learning are drivers of the IoT and smart cities. These techniques can collect better information, or intelligence, from the generated data and facilitate better responses in smart cities. This article presents the details of a deep neural network with selected examples for better understanding.

SPECIAL SECTION

This special section, "Advanced Interaction and Virtual/Augmented Reality," presents selected articles in this area. I would like to thank the guest editors, Fabrizio Lamberti and Fernando Pescador,

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for all of their hard work toward putting together this section, which will surely be a pleasure to read. It may be noted that this technology can be used in various smart-city applications, including smart health care for therapy and surgery, tourism for recreating history, and in making movies.

CE IMPACTS

THEY SOW, THEY REAP

This article presents a perspective of how human-generated data is used for business purposes.

WHAT CAN WE LEARN ABOUT VACUUM CLEANERS FROM VAMPIRES?

Privacy issues of CE appliances with the specific example of vacuum cleaners are presented in the "CE Impacts" section's second article.

COLUMNS

BITS VERSUS ELECTRONS

Bob Frankston discusses progressive web apps or installable web apps, which use both HTML5 and JavaScript, and can have an impact on IoT technology.

THE ART OF STORAGE

The memory used in smartphones and wearables is discussed by Tom Coughlin in this column.

HARDWARE MATTERS

Deepak Kachave and Anirban Sengupta discuss a method to prevent reverse-engineering, thus discouraging fake hardware that is potentially unsafe.

MARKET-BASED ANALYSES

David Alan Grier suggests that both design and packaging are important for a product.

PRODUCT SAFETY PERSPECTIVES

Tim VanGoethem explores the road to self-driving cars. He says that automakers and CE technologists need to look beyond connected services and take a thoughtful approach to the holistic self-driving user experience inside the car.

LOOKING FORWARD

I sincerely hope that this issue dedicated to smart technologies in smart cities will find a wider set of readers and can help to drive new research in this vital area. This research is a necessity to sustain urban population growth, which is expected to cover 70% of the total population by 2050.

CE

Errata

In the feature article "Software-Defined Radio for Modular Audio Mixers" in the October 2017 issue of *IEEE Consumer Electronics Magazine*, the author's e-mail address was incorrectly listed. Samer Jaloudi can be reached at sgalodi@qou.edu. We apologize for the error.