Consumer Technologies build Smart Homes

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Happy New year 2020. I welcome the readers to the first issue of year 2020, the January 2020 issue, of the IEEE Consumer Electronics magazine. With the year 2019 over, MCE completes 8 years and 2 years with 6 issues per year. I would like to thank all the members of the editorial board and enthusiastic authors who have contributed to MCE and made it interesting reading. I am hopeful that MCE will further excel in all aspects including quality of articles, and broadening author/reader base.

The current issue of IEEE CE magazine has a theme of smart home. I have discussed the concept of smart city in many of editorials in the past. At a difference level of granularity, smart village, smart state, and smart nation have been envisioned. A smaller level of granularity is the smart home. I think every citizen in a smart city can play a crucial role in making their homes smart homes, thus contributing to bigger entities like smart cities, and smart state. In this context several questions include the following arise:
  (1) What is a smart home?
  (2) What are building blocks of smart home?

The smart home and intelligent home refer to the home in which different components have been automated, e.g. home appliances, sprinkler system, or heating, ventilation, and air conditioning (HVAC) system. A smart home offers its residences to automatically control home environment for efficient and comfortable manner to save energy bills, to improve quality of life, to provide security and safety. The smart homes or intelligent homes automatically optimize comfort of the residences by using context awareness as well as predefined constraints based on the conditions of the inside home and outdoor environment.

Like other smart systems, Internet-of-Things (IoT) including Internet-of-Medical-Things (IoMT) can make smart homes. Thus, sensors, actuators, network technology, Internet, microcontrollers, and software becomes the building blocks of smart home including its physical components. The building blocks of smart home are essentially consumer electronics or a bigger domain consumer technology. The different components of smart home include: (1) remote access and control, (2) energy management, (3) healthcare, and (4) security and safety. Remote access and control allows an user to control smart home remotely from a smart phone of web interface. Energy management units allows automatic control of appliances, lights, and air-conditioning temperate to reduce energy bills while providing maximum comfort. Healthcare unit can provide healthcare facilities to residences in various forms including monitoring of health conditions, activity tracking, and provide assistive living. Security and safety unit can allow keyless entry for the user and monitor surroundings of home using appropriate cameras. The first issue of 2020, i.e. January 2020 issue includes many articles which deal with technology or components of smart homes.

FEATURE ARTICLES

Design and Implementation on Intelligent Homecare Appliance System: This article presents design of a smart home to handle safety of residences. Specifically, computer vision (CV) based method has been integrated in video technology to automatically detect and prevent potentially dangerous events.

IoT-Connect: An Interoperability Framework for Smart Home Communication Protocols: This article presents an a solution for communication technology issue in smart homes. Specifically, this article presents

an interoperability framework called IoT-Connect so that various home appliance with different protocols can talk to each other in smart homes.

Diabetes Care in Motion: This article presents a photoplethysmogram (PPG) based wearable for non-invasive blood-glucose estimation to avoid finger-pricking and can be useful in healthcare in smart homes.

iGLU: An Intelligent Device for Accurate Non-Invasive Blood Glucose-Level Monitoring in Smart Healthcare: This article presents a near-infrared (NIR) based device for non-invasive blood-glucose monitoring that avoids painful finger-pricking and can be useful in healthcare in smart homes.

A Study of User Interface with Wearable Devices Based on Computer Vision: This article discusses several approaches for human-computer interaction (HCI) using hand gestures and computer vision (CV).

Quality of Experience of Smart-Wearables: From Fitness-Bands to Smartwatches: This article introduces Quality-of-Experience (QoE) for fitness trackers based on the end-user perception.

Controlled Tactile and Vibration Feedback Embedded in a Smart Knee Brace: This article presents a device to record muscle activity and sends warnings for any abnormalities.

Power Management Strategies for Medical Information Transmission in Wireless Body Sensor Networks: This article presents a brief survey of power management strategies for Wireless Body Sensor Networks.

SuperVoxel Graph Cuts: An Effective Method for GGO Candidate Regions Extraction on CT Images: This article presents an approach for reducing artifacts on temporal difference images in Computed Tomography.

COLUMNS

Bits Versus Electrons -- What I want for CES: This article presents perspectives of the columnist on the Consume Electronics Show (CES).

The Art of Storage -- AI Inference and Storage: This article presents storage perspectives when handling large data in AI based applications.

SPECIAL SECTION

This special section titled "Cognitive Science and Artificial Intelligence for Human Cognition and Communication" presents selected articles to cover the scope. I would like to thank the Guest Editors Arun Kumar Sangaiah, Huimin Lu, and Qing Hu for all their hard work for this strong special section which will be a good reading for CE community around the globe.

LOOKING FORWARD

I wish all the readers of MCE a wonderful year 2020 ahead. I hope this issue dedicated to smart home becomes a good reading for a wider set of CE community to advance their knowledge. CE magazine will continue the trend of covering more themes for our enthusiastic readers in future issues on the latest hot topics with the help of editorial board and authors around the globe.

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