Guest Editorial:

Consumer Technologies for Smart Healthcare

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The healthcare paradigm has evolved from traditional healthcare in various ways, such as electronic health (eHealth), connected health (cHealth), mobile health (mHealth), telemedicine, and smart health (sHealth). The sHealth or smart healthcare is the Cyber-Healthcare Cyber-Physical System (H-CPS) built on Internet-of-Medical-Things (IoMT). The elements of IoMT/H-CPS are essentially consumer electronics and consumer technology.

sHealth is one of the most important topics in the next generation of consumer electronics (CE) and consumer technology (CT) for mass healthcare as further evident from the ongoing pandemic. Some disruptive technologies are allowing the development of these new devices helping their deployment to the mass market. The expansion of new applications in the field of sHealth has created the new concept of IoMT/H-CPS where several medical devices and are interconnected allowing the improvement of the live style of individuals.

One of the most important advances in the technology that allow the deployment of this devices are the new generation of low-cost sensors. These new sensors allow the detection of vital signs and can be easily integrated in consumer electronic devices allowing the detection of anomalies.

The reduction in the energy consumption is other of the key elements in the adoption of these devices allowing the development of new battery-based products that could now imagined in the past.

Other important aspect in sHealth applications is the communications of the devices with the cloud. All new devices are connected to internet. It allows the storage of the information and the further analysis of the most important parameters. Moreover, conclusions about the population behavior can be obtained adding an extra value to the applications. Of course, the security and the confidence of the information is a challenge in order to guaranty the privacy of this personal information.

Another most disruptive technology in the sHealth field is the Artificial Intelligence (AI). The development of low-cost low-power processors specially designed to execute AI algorithms allow the new applications to go further and implement features that could not be imagined in the past.

The combination of all these technologies have allowed the irruption of mass market application in the framework of the sHealth.

With the above thoughts, we invited perspective authors to contribute to the current Special Section that presents state-of-art of sHealth solutions for consumer electronics and consumer technology. We briefly present the accepted article in the following paragraphs.

The article titled “An Artificial Intelligence Edge Computing-based Assistive System for Visually Impaired Pedestrian Safety at Zebra Crossings” proposes a wearable assistive system based on artificial intelligence (AI) edge computing techniques to help visually impaired consumers safely use marked crosswalks, or zebra crossings.

The article titled “Stress detection in Computer Users from Keyboard and Mouse Dynamics” describes a cost-effective, subject-independent systems that can be embedded in consumer devices and classify users’ stress in a reliable and unobtrusive fashion. The application uses the Multiple Instance Learning (MIL) to Random Forest (RF) classification algorithms to successfully distinguish 3 stress-level classes from keyboard and mouse data.

The article titled “SaYoPillow: Blockchain-Integrated Privacy-Assured IoMT Framework for Stress Management Considering Sleeping Habits”. Smart-Yoga Pillow (SaYoPillow) is proposed to help in understanding the relationship between stress and sleep and to fully materialize the idea of “Smart-Sleeping” by proposing an edge device. An edge processor analyzes the physiological changes that occur during sleep along with the sleeping habits.

The article titled “Stress Detection in Older Adults Using Wrist Worn Sensors and Cortisol as Stress Biomarker” designs, develops, and evaluates the effectiveness of a stress detection model for older adults using a system of wrist-worn sensors. The system uses four signals, EDA, BVP, IBI, and ST from EDA, PPG, and ST sensors, embedded in a smart wristband, to classify between stressed and not-stressed state. The stress reference is obtained from salivary cortisol measurement, which is a well-established clinical biomarker for measuring physiological stress.

The guest editors sincerely believe that this Special Section will be a good reading for Consumer Technology researchers around the globe. The guest editors would like to thank all the contributing authors for their excellent contributions. The guest editors also sincerely thank all the reviewers for their help in reviewing the manuscripts throughout the multiple revisions to have a rigorous selection of the works.

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