From the Editor's Desk

Unleashing the Potential of Digital Twins: The Fusion of VR With IoT

Norbert Herencsar
Brno University of Technology

I WELCOME THE readers to the last issue of the year 2023, the November/December issue of the IEEE Consumer Electronics Magazine (*MCE*).

In the domain of consumer technologies, a few relevant innovations have captured the imagination and transformed everyday life, such as virtual reality (VR) and the Internet of Things (IoT). Independently, each of these advancements has already left a lasting impact, reshaping how we interact with the digital world and enhancing our daily experiences. However, the intersection of these two remarkable technologies promises to unleash a consumer tech revolution—the advent of Digital Twins.

At its core, Digital Twins represent a fusion of VR and IoT with immense promise and exciting possibilities for consumers. Gone are the days of passive interactions with digital content; the convergence of IoT's data-gathering prowess with VR's immersive experiences opens up a world of interactive opportunities like never before. Imagine stepping into a favorite video game or movie, not just as an observer, but as an active participant. Digital Twins enable consumers to become a part of virtual worlds, allowing them to touch, feel, and interact with digital objects as if they were real. By seamlessly merging the physical and digital realms, this technology brings a level of realism that was once confined to science fiction.

In the entertainment domain, Digital Twins will be a game changer. Virtual concerts can transport users to the front row of a live performance, giving an almost tangible connection with their favorite artists. For movie enthusiasts, digital replicas of actors and characters can be brought to life, offering immersive experiences that blur the boundaries between fiction and reality. Furthermore, Digital Twins can revolutionize the retail experience. With virtual shopping environments, consumers can browse through a virtual store, interact with products, try them out, and even experience their functionalities before making a purchase decision. This level of immersion can bridge the gap between online and offline shopping, providing consumers with a unique and engaging retail journey.

The fusion of VR and IoT also extends into smart homes. Imagine a home environment where a digital assistant not only responds to voice commands, but also moves around the physical space, seamlessly integrating with your daily routines. Digital Twins of smart devices can be synchronized with real-world counterparts, allowing control of them in virtual space, offering a novel and intuitive approach to managing connected ecosystems. As with any

Digital Object Identifier 10.1109/MCE.2023.3302708
Date of current version 8 September 2023.

 2162-2248 © 2023 IEEE

transformative technology, consumer trust and data privacy are critical considerations. While the possibilities of Digital Twins are exciting, it is essential for the industry to prioritize user data security and responsible use of personal information to foster consumer confidence in this novel realm of consumer tech.

Digital Twins present a captivating glimpse into the future of consumer technologies. By merging VR and the IoT, these immersive and interactive experiences have the potential to redefine entertainment, smart homes, and beyond. Therefore, the current issue of *MCE* aims to explore the significance of these new frontier consumer technologies and the potential benefits they can bring. Therefore, it is my pleasure to provide practitioners and researchers with high quality, state-of-the-art articles dedicated to various consumer technology applications.

COLUMN

Chatting Up a Program: This column explores a rapidly developing field of large language models (LLM). The author investigates the ChatGPT for advice on how to be used for programming. One of the significant benefits of utilizing LLMs for writing programs is that the hard edges and limitations are exposed, unlike prose, where meaning can be inferred.

FEATURE ARTICLE

Opportunities and Challenges of Tangible XR Applications for 5G Networks and Beyond: The increasing popularity of VR and Augmented Reality applications has unveiled the need for boosting the efforts of implementing Extended Reality (XR) to users. In this article, an analogous high interest from both academia and industry is being shown for Tactile Internet. The ever-increasing use of virtualization technologies makes the usage of haptic communication even more important to create robust, tangible systems and achieve an optimal and faster balance among the interaction modalities and between humans and machines. A simplified tangible XR system is proposed, accompanied by the opportunities and challenges of such an implementation.

Personality is to a Conversational Agent What Perfume is to a Flower: Although there has been a growing interest in Conversational Artificial Intelligence (CAI) agents in the consumer electronics community, how these agents are personified by humans has been an unexplored area. Creating personality traits for CAI agents is important as it will enable providing more personalized services. Accordingly, this article explores a multidimensional approach involving two distinct phases and three different experiments for generating the CAI personality by integrating concepts from human, brand, and website personality frameworks. Eight unique personality types have been identified, three of which are proposed for the first time.

SPECIAL SECTION

This Special Section on Digital Twins: The Confluence of Virtual Reality with IoT presents the selected set of articles to cover the scope. I would like to thank the Guest Editors, Professors Zhihan Lv, Jaime Lloret Mauri, Houbing Song, and Jingyan Wang, for all their sincere effort and hard work for this strong Special Section which will be excellent reading for the readers of the *MCE* as well as the researchers around the globe.

LOOKING FORWARD

I hope that the current issue becomes a good read for a broader set of the Consumer Technology community to advance their knowledge. *MCE* will continue the trend of covering more themes for enthusiastic and dedicated readers in future issues on the current and emerging topics with the active support from the editorial board members, reviewers, and authors worldwide.

Norbert Herencsar is currently an associate professor with the Brno University of Technology, Brno, Czech Republic. He received the Ph.D. degree in teleinformatics from the Brno University of Technology, Czech Republic, in 2010. He is a senior member of IEEE. Contact him at herencsn@ieee.org.