Special Issue on Internet of Digital and Cognitive Reality: Applications and Key Challenges

Péter Baranyi

The recent co-evolution of human society and technology has led to a new digital era, represented by a variety of technologies including Virtual Reality, Augmented Reality, Digital Twins, Artificial Intelligence, 5G networks, besides the "classical" Web 2.0. As these technologies begin to merge together via unified applications and digital environments characterized by the disappearance of the borders between the physical / natural and the digital, as well as between representation and simulation. This leads to highly contextual and dynamic entanglement with humans, hence, a qualitatively new kind of reality can be expected to emerge. This reality, referred to as Digital Reality is characterized by the blended combination of artificial and natural cognitive systems to cover the specific requirements of the environment. Thus, the Digital & Cognitive Reality emphasizes the goal-oriented unification of the physical and digital realms as a context-driven whole. At the same time, the networked transmission and sharing of physical-digital contexts can be expected to become a key area of interest, leading to the notion of Internet of Digital & Cognitve Reality.

Based on the above, Digital Reality (DR) and Internet of Digital Reality (IoD) can be defined as follows:

"A Digital Reality (DR) is a high-level integration of virtual reality (including augmented reality, virtual and digital simulations and twins), artificial intelligence and 2D digital environments which creates a highly contextual reality for humans in which previously disparate realms of human experience are brought together. DR encompasses not only industrial applications but also helps increase productivity in all corners of life (both physical and digital), thereby enabling the development of new social entities and structures, such as 3D digital universities, 3D businesses, 3D governance, 3D web-based digital entertainment, 3D collaborative sites and marketplaces. The Internet of Digital Reality (IoD) is a set of technologies that enables digital realities to be managed, transmitted and harmonized in networked environments (both public and private), focusing on a higher level of user accessibility, immersiveness and experience with the help of virtual reality and artificial intelligence."

Péter Baranyi established the Cognitive Infocommunications concept around 2010. It is a scientific discipline today focusing on the new cognitive capabilities of the blended combination of human and informatics. It has an annual IEEE International Conference and a number of scientific journal special issues. He invented the TP model transformation which is a higher-order singular value decomposition of continuous functions. It has a crucial role in nonlinear control design theories and opens new ways for optimization. He is the inventor of MaxWhere which is the first 3D platform including 3D web, 3D browser, 3D store, and 3D Cloud. His research group published a number of journal papers firstly reporting that users get 40-50% better effectiveness in 3D digital environments. These results got a very high international impact within a few years.