From VR to Telexistence

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ABSTRACT:

According to the American Heritage Dictionary (3rd edition), “virtual” is defined as existing in essence or effect though not in actual fact or form. Thus, virtual reality (VR) is an entity which contains the essence of reality and is effectively real. It can provide a basis for technology which enables humans to experience events and act in a computer-generated virtual world just as if they were in the real word.

Initially, VR was aimed at computer-generated worlds, while augmented realty (AR) seamlessly integrates virtual worlds into the real world to enhance it. As augmented VR (AVR) that captures the real world into the computer-generated virtual world was born, it has come to be called Mixed Reality including AR and AVR. VR, AR, MR, etc. are also named XR, but they may be collectively called VR in a broad sense, even if they are not called XR.

Although the computer-generated virtual world targeted by VR was initially dedicated to individuals, it has evolved into a metaverse in which many people use the virtual world simultaneously and users are connected to each other through networks, and various human activities are carried out in the metaverse.

Furthermore, the world targeted by VR is expanding to the real world. The real world is reproduced with satellite images and street corner photographs that have already been recorded, and you can walk down to the past world. Also, if it is only communication, it can be done freely in real time in the real world. In other words, VR is beginning to become telexistence.

The essence of VR and the metaverse is to have one's own body in the virtual world. Using that body, we see, hear, speak, and perform various actions with that body. When we try to act in the real world using VR and the metaverse, we notice that the current VR and metaverse do not provide a body for that purpose. If there is, there are only cameras, microphones, and speakers. Only by making the robot your body, you can act freely and perform various actions in the real world. There is no other way than to make it possible to act freely by using a robot avatar or physical avatar as one's own body, which is nothing short of telexistence.

Telexistence is a concept that denotes an extension of human existence, wherein a person exists wholly in a location, other than his or her actual current location, and can perform tasks freely there. Telexistence allows human beings to experience real-time sensation of being in a place different from their actual location and interact with such remote environment, which can be real, virtual, or a combination of both. Telexistence in the real environment through a virtual environment is also possible. With telexistence, one can move seamlessly between virtual worlds or metaverses and the real world, and act freely with the avatars of these worlds as one's own body.

This keynote reviews the past and present of VR, AR, MR, metaverse, and telexistence to study the mutual relations and the future of these technologies. Further, it introduces the recent advancements and future prospects of these technologies toward the telexistence society.