J-BHI Special Issue on "Metaverse for Healthcare: Trends, Challenges, and Solutions"

Metaverse, just like the technology that carries people's imagination in science fiction movies, is coming to us step by step. It brought people an immersive experience by combining virtual reality (VR) and augmented reality (AR) technologies to closely integrate the physical and cyber worlds. Through AR or VR device access, people can perform rich activities in the virtual world, including games, entertainment, work, creation, and medical treatment. Metaverse technology has been attracting extensive attention from industry and academia. Related research topics are growing, and leading enterprises are showing great interest, such as Facebook's parent company renamed Meta, among others. All these trends show that the metaverse has great potential and may lead the next generation of information technology.

As an emerging thing, the potential contributions of the metaverse in healthcare are yet to be studied. With the development of smart terminal devices and artificial intelligence, the medical field has been gradually digitized. Online diagnosis, health monitoring, etc. have become the direction to pursue in the current digital era. With the development of the metaverse, healthcare could see a dramatic change in nature. People's biological information will be captured in large quantities for metaverse system interaction and so on. And this valuable information in turn can be scientifically utilized and fed back to users in the form of healthcare services, such as combined with machine learning to train diagnostic models or through real-time monitoring to assess users' health performance and fuel real-world physical health maintenance. Imagine a scenario where a remote diagnosis is achieved through virtual characters, combined with AR and VR devices, simulating medical conditions and even physical interaction (touch, smell, etc.) without exposing personal private information. Combined with the latest communication technologies, people would not have to travel long distances to see a doctor, or delay diagnosis and treatment for various reasons.

The associated opportunities and challenges come with it. What are the application scenarios of metaverse in healthcare? Which ones are easy to land and implement, and which ones seem fantastical but are possible? Artificial intelligence has been widely used. How can AI technology be used to empower healthcare in the metaverse? In terms of hardware, there are also many directions worth studying, such as physical simulation devices and body-conditioning monitoring devices. In addition, security is an ongoing challenge in the digital world. In the metaverse world, how to ensure the security of user data is yet to be researched. How can blockchain technology, secure computing technology, and others enable privacy enhancement of metaverse healthcare? The related research is still in its initial stage, and later chapters are waiting to be written by us. Therefore, we call upon our colleagues from academia and industry to present their latest research results in metaverse in healthcare and to exchange and discuss future research directions and challenges.

Our topics include but are not limited to the following:
- Blockchain-empowered metaverse healthcare systems and applications;
- AI-empowered metaverse healthcare systems and applications;
- Digital disease diagnosis in metaverse;
- Metaverse-based healthcare monitoring system;
- Data security techniques for metaverse healthcare;
- Privacy protection of metaverse healthcare data;
- Applications and case studies of metaverse healthcare;
- Decentralized healthcare systems in metaverse;
- Immersive experiences in metaverse healthcare;
- Cloud and edge computing-empowered metaverse healthcare;
- Metaverse healthcare experimentation platform.

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Key Dates

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