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Multimodality Integration and Intelligent Reality for Healthcare: From Pandemic to Epidemic

Abstract:

The 21st century has witnessed major challenges caused by both COVID19 pandemic and aging epidemic. Biomedical big data, AI, and extended reality have all played roles in addressing these challenges. In this talk, I will present advances in intelligent reality (IR) and multimodality big data analysis using examples of COVID19 and Alzheimer's Disease (AD). On COVID19, metaverse style intelligent reality (IR) has grown rapidly in healthcare because traditional medical services are disrupted due to quarantine and social distancing. As part of digital health technologies, IR revolutionizes healthcare with improved service accessibility and quality. On AD epidemic, without effective treatment, early intervention is a key. Thus, how to integrally analyze huge volume of imaging, genetic, and clinical test data to classify patients into proper progression stages is critically important. In this talk, I will present the progresses made in both pandemic using IR and AD epidemic using advanced AI techniques. I will show example results including applying advanced AI such as stacked denoising auto-encoders for EHR and genetic data, 3D-CNNs for imaging data, and explainable AI for identifying features in hippocampus, amygdala brain areas, and the Rey Auditory Verbal Learning Test (RAVLT).