

Towards Wearable Augmented Reality in Healthcare: A Comparative Survey and Analysis of Head-Mounted Displays

ABSTRACT

Head-mounted displays (HMDs) have the potential to greatly impact the surgical field by maintaining sterile conditions in healthcare environments. Google Glass (GG) and Microsoft HoloLens (MH) are examples of optical HMDs. In this comparative survey related to wearable augmented reality (AR) technology in the medical field, we examine the current developments in wearable AR technology, as well as the medical aspects, with a specific emphasis on smart glasses and HoloLens. The authors searched recent articles (between 2017 and 2022) in the PubMed, Web of Science, Scopus, and ScienceDirect databases and a total of 37 relevant studies were considered for this analysis. The selected studies were divided into two main groups; 15 of the studies (around 41%) focused on smart glasses (e.g., Google Glass) and 22 (59%) focused on Microsoft HoloLens. Google Glass was used in various surgical specialities and preoperative settings, namely dermatology visits and nursing skill training. Moreover, Microsoft HoloLens was used in telepresence applications and holographic navigation of shoulder and gait impairment rehabilitation, among others. However, some limitations were associated with their use, such as low battery life, limited memory size, and possible ocular pain. Promising results were obtained by different studies regarding the feasibility, usability, and acceptability of using both Google Glass and Microsoft HoloLens in patient-centric settings as well as medical education and training. Further work and development of rigorous research designs are required to evaluate the efficacy and cost-effectiveness of wearable AR devices in the future.