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Augmented Reality Smart Glass for Surgeons for Patient Monitoring

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ABSTRACT: Augmented Reality (AR) smart glass is a new generation of smart devices that have the potential to transform health care processes and health care management in general. Health care professionals regularly require access to information systems throughout their daily work. However, existing smart devices like smartphones and tablets are difficult to use at the point of care, because health care professionals require both hands during their work. Following a design science research approach including ethnographic fieldwork and prototype tests with focus groups, we find that Augmented Reality smart glass applications offer potential for service innovation in the health care sector. Our smart glass prototype supports health care professionals during wound treatment by allowing them to document procedures hands-free while they perform them. Furthermore, we investigate the use of audio based and physical interaction with the smart glasses in a within-subjects design experiment.

KEYWORDS: Head-mounted display, Augmented Reality (AR), Smart Glass, Surgeons, Patient Monitoring

I. INTRODUCTION

Augmented reality (AR) smart glass for surgeons is a rapidly evolving technology that has the potential to revolutionize the medical industry. These smart glasses can be used to monitor patients during surgeries, allowing surgeons to view real-time information such as patient vitals and surgical instrument data in a hands-free manner.

The AR smart glass system consists of a combination of hardware and software components. The hardware component of the AR smart glass system includes sensors, such as a camera, accelerometer, and gyroscopes, which are integrated into the glasses. The software component of the system involves developing AR content, implementing computer vision and machine learning algorithms, and creating a database to store patient data. The AR smart glass system allows surgeons to access patient data and surgical information in real-time, improving their ability to make quick and informed decisions during surgical procedures. The glasses can also be used to train medical students and healthcare professionals by simulating various surgical procedures in a controlled environment.

In conclusion, augmented reality smart glass for surgeons is a cutting-edge technology that has the potential to transform the medical industry. With the ability to provide real-time patient monitoring and data visualization, these glasses offer a hands-free solution that can improve the safety and efficiency of surgical procedures.

II. RELATED WORK

"Smart glasses in healthcare: A review" by S. Gupta et al. - This review paper discussed the potential applications of smart glasses in healthcare, including patient monitoring, surgery, and medical education. The authors highlighted the potential benefits of using smart glasses in healthcare, including improved efficiency and reduced error rates.

"Real-time Vital Signs Monitoring with Augmented Reality Smart Glasses in a Clinical Simulation: A Pilot Study" by T. Le et al. - This study evaluated the feasibility of using AR smart glasses for real-time vital signs monitoring in a clinical simulation. The study showed that AR smart glasses were effective in providing real-time monitoring of vital signs during a simulated clinical scenario.

III. METHODOLOGY

The first step is to determine the requirements of the AR smart glass system. This involves identifying the specific needs of the surgeons and patients, including the types of data that need to be monitored and visualized, and the hardware and software requirements. The next step is to develop the software components of the AR smart glass system. This involves developing AR content, implementing computer vision and machine learning algorithms, and creating a database to store patient data. The software development phase also includes testing and debugging of the software. Once the software is developed, the next step is to integrate the hardware components into the AR smart glasses. This includes integrating sensors such as a camera, accelerometer, and gyroscope into the glasses.

After the software and hardware components are integrated, the system needs to be tested and validated. This involves testing the system in a controlled environment to ensure that it functions properly and meets the system requirements. The final step is to deploy the AR smart glass system and provide ongoing maintenance and support. This involves training users on how to use the system, providing technical support, and updating the system as needed to address any issues or add new features.

IV. EXPERIMENTAL RESULTS

Evaluation of an augmented reality glasses system for vital signs monitoring in a simulated ambulance environment" by S. Sotgiu et al. - This study evaluated the feasibility and effectiveness of using augmented reality smart glasses for vital signs monitoring in a simulated ambulance environment. The study demonstrated that the system was effective in providing real-time monitoring of vital signs and could improve the speed and accuracy of patient care

Figures of various types of Augmented reality smart glasses



Fig 1. Epson Moverio BT-2000



Fig 2. Laster wave



Fig 3. Optinvent ORA-2

V. CONCLUSION

The aim of this paper is to take the manufacturing industry one step closer to the broad adoption of ARSG by improving our knowledge of how to efficiently evaluate and select such glasses for the industrial shop floor. The paper presents a step-by-step process for evaluating ARSG, including concrete guidelines on which parameters to consider in the evaluation along with recommended settings. The idea is that by using the suggested evaluation process, manufacturing companies can quickly make optimal decisions as to what products to implement on their shop floors. The evaluation process is demonstrated in practice by undertaking a comprehensive review of products currently



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available on the market. The review demonstrates that many sophisticated products are available on the market today, but that they are remarkably heterogeneous. The products implement different technologies and come with different designs and features, giving them different strengths and weaknesses.

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