

POSTER PRESENTATION 1: HOUSING AND DAILY LIVING

Real-time sleep monitoring system for nursing hospitals

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Purpose As people grow older, they experience changes to their bodies and lives. One of those changes is in their sleep patterns. Sleep disorders can affect a person's physical and mental health while becoming a problem for the elderly (Yacchirema et al., 2018). Usually, polysomnography (PSG) is used to diagnose sleep order. However, PSG can be expensive and labor intensive (Gomathi et al.). In addition, an unfamiliar setting and the attachment of multiple electrodes may reduce the comfortability of the elderly, resulting in inaccurate readings (Cohen-Mansfield et al., 1990). Young and Muir-Nash (Young & Muir-Nash, 1986) suggest that a sleep study is best done in a familiar place, such as a home or a nursing home. However, the elderly seldom has access to the technology necessary to make these measurements. Thus, a home-based monitoring system can help to reduce health risks and improve the elderly's quality of life. Recently, the fourth industrial revolution (or Industry 4.0) has become an essential mainstream tool for transitioning to digital, fully automated environments and cyber-physical systems in the medical field (Ćwiklicki et al., 2020). In particular, the internet of things (IoT), big data analytics, cloud computing, and artificial intelligence have found successive applications in the medical and healthcare sector (Yu et al., 2022). Haghi et al. (Haghi et al., 2017) defined the IoT as the network of physical objects which are supported by embedded technology for data communication and sensors to interact with both internal and external object states and the environment. By connecting to the cloud, it can provide innovative services, such as remote monitoring, alert notifications, and data analysis of health data. To determine the validity of our sleep monitoring system, we documented our field-testing process at a nursing hospital. **Method** For this study, we developed a real-time sleep monitoring framework for nursing homes. For the collection of different human bio-signal data, we integrate our developed eye mask (EEG) and air cushion with a commercially available ECG patch (ECG) and Radar sensor (HR/BR). To ensure the accuracy of the data, we compared sensors with the biopac system. We also developed a collector to collect the data and send it to the server for storage. To determine the feasibility of the system, 20 sleep monitoring systems were field-tested at G nursing hospital. **Results and Discussion** Initial results showed that the developed sensors' accuracy was not significantly different and was within a 5% difference from the Biopac system. The collector could send data constantly to the server and results were collected. To improve the uptake of the system by the elderly, human and environmental factors will need to be considered.

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