INTEGRATED HEALTH AND AMBIENT ASSISTED LIVING
FOR ALZHEIMER DISEASE PATIENTS

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Abstract - *Alzheimer Disease is the biggest problem all over the world. The diagnosis of the disease is done by nocturnal study. Alzheimer Disease affects 3.6 percent of the United States adults. The impact of the Alzheimer Disease is huge and the solution of the problem is being searched Alzheimer Disease. This affects the quality of the life of the patients, MRI images. It can help researchers to gain high value of diagnosing early Alzheimer Disease. There is an immediate need to develop an intelligent monitoring system at home for Alzheimer Disease patient's .Survey had been made on these papers for Alzheimer Disease.*

***Key Words*: Nocturnal study, Physical exam, Discussion of the symptoms**

1. INTRODUCTION

Somnambulism Disorder is a disease prevalent in elder people evidenced by problems with memory. Since Somnambulism does not have any cure, the detection of early Somnambulism is a critical part of preventing patients from deteriorating. The world populations of elderly people as well as those who live alone have been increasing over the years. In Malaysia, the total population of elder people increases from 8.2% in 2012 to 8.6% in 2013. For this reason, early detection has grown to be a major research topic, as it can contribute to a better understanding of the disease, and the search for a more reliable diagnostic Techniques and efficacious therapies. These devices can be smart phones, tablets, and laptops etc. almost anything, which includes sensor on it. In the recent years, the vast development of IoT makes all objects to be inter-connected. To check whether the patient is in the location of the predefined marker. If the patient is not in the limit the care taker will receive the message that patient is not in the limit. And the device track patients live location.

Polysomnography (PSG) as a traditional sleep monitoring method has been widely used for the diagnosis of sleep related diseases in hospital. However, the PSG requires at least one night in the hospital and well trained experts for accurate and comprehensive interpretation and diagnosis.

Furthermore, with so many sensors attached to user's body, it is highly intrusive. Because PSG is time-consuming, costly and relatively obtrusive, it is impractical for long-term sleep monitoring.

The communication protocol between the master node and the above described sensors is implemented with Bluetooth Low Energy (BLE). The master node keeps the system clock and handles simultaneous BLE connections with the sensor nodes using customized BLE profiles, with their own Read and Write Characteristics. The sleep classification logic runs on the master board and takes two data sets as inputs. One set consists of minute-by-minute HR variations, calculated as difference between two consecutive HRs. The second data set keeps the mean of the highest two acceleration values for each minute. If sensors disconnect during monitoring, their idle time is marked by appending values of 1000 for HR sensor, and 20000 for wrist activity sensor.

The rest of the paper is organized as follows. Section II presents the state of the art on sleep monitoring. In Section III, the environment monitoring system is illustrated. Section IV includes a security features, finally, in Section V, we discuss the results and draw some conclusions.

2. Various methods used for aiding Alzheimer Disease

In the section below various parameters considered for Alzheimer disease assistance are listed

2.1 Sleep Monitoring

Sleep quality is directly related to overall wellness and can reveal symptoms of several diseases. However, the term ''sleep quality'' still lacks a definitional consensus and is commonly assessed in sleep. Comprising high costs, or through sleep questionnaires, a highly subjective technique. Many reviews with the perception of methods for sleep quality assessment and measures employed by the devices that have been developed to estimate sleep quality is available in literatures. In this review we present detailed discussion based on the cost involved and ease of use.

A posture monitoring using body pressure distribution on the mattress is proposed in which provides Low-cost and fast computation per sample processing along with autonomy this makes the system suitable for long-term operation and IoT applications. The body pressure distribution is acquired through a pressure sensing mattress under the person's body, data is sent to a computer workstation for processing, and results are communicated for monitoring and diagnosis. A supervised learning approach was used to build a model using a robust synthetic data.
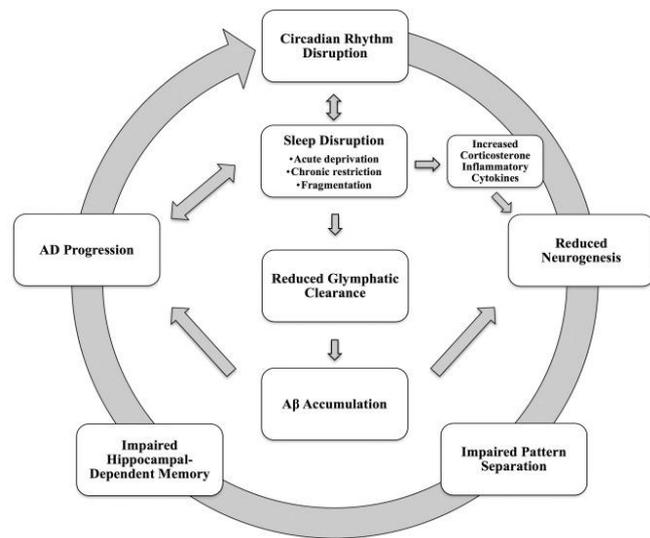

To evaluate the performance of the proposed unobtrusive system, two preliminary experimentations have been carried out. The former experiment aims at validating the stage detection method, and the latter is designed to asses the sleep position classification algorithm. Getting enough quality sleep at the right times can help protect mental and physical health, quality of life, and safety.

The weakness of classic autography-based systems, since it is easy to deploy and it is based on inexpensive technology. An automatic sleep monitoring system targeting at long-term application in daily home healthcare. The system has currently been running continuously for more than two years. An automatic and real time sleep monitoring system for home healthcare. The basic system consists of sensor boards, bedside boxes and a group of servers with various functions for analyzing sleep data and reporting sleep qualities of users. The sensor board is installed beneath a pillow to measure pressure change signal during sleep. The basic system consists of sensor boards, bedside boxes and a group of servers with various functions for analyzing sleep data and reporting sleep qualities of users.

A system for sleep monitoring that can continuously analyze snoring, breathing, sleep phases and the activity of the patient during the night and the beginning of the day. The system first analyses the sleep using the acoustic information provided by the electret microphone. From the acoustic information breathing events and heartbeats are identified. Sleep disorders are generally diagnosed through an overnight polysomnography (PSG) study carried out in a sleep laboratory. PSG involves the measurement of a number of physiological parameters including brain activity (EEG), eye movements (EOG), muscle activity (EMG), heart patterns (ECG), blood oxygenation, and respiratory effort.

2.2. Environment Monitoring

The environment monitoring used to measure the body temperature, oxygen saturation value and pulse rate. The central part of the system is a server based on Amazon EC2, which hosts MQTT broker. The Wi-Fi router is connected to the internet. Arduino UNO board and Raspberry Pi board are used to connect the sensors. The temperature sensor is connected to the Arduino board, which collects the body temperature of the patient and it is transmitted to the server through a Wi-Fi module, based on MQTT protocol.
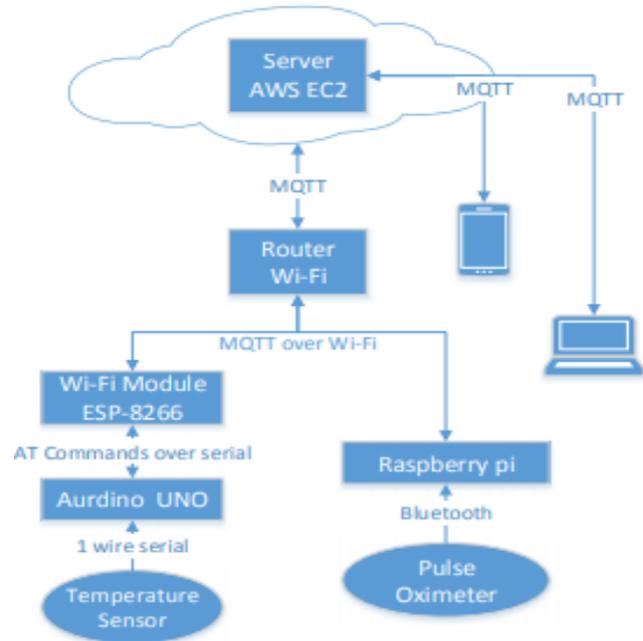
The pulse oximeter is connected to the Raspberry Pi board, which measure the patients oxygen saturation value and pulse rate and sends the information to the server using MQTT protocol through the inbuilt Wi-Fi connected to the router. The information can be displayed in a mobile or a laptop using MQTT client software.

2.4. Security

An accelerated population aging, there is an increasingly interest in developing solutions for the elderly living assistance. The Internet of Things is a new reality that is completely changing our everyday life, and promises to revolutionize modern healthcare by enabling a more personalized, preventive and collaborative form of care. Aiming to combine these two important topics, an IoT-ready solution for the elderly living assistance which is able to monitor and register patients vital information as well as to provide mechanisms to trigger alarms in emergency situations.

For the working range, the system has proved to perform well within a range of 60 meters before the out-of-range warning being triggered. A security measures and data communication security involved in health care systems in order to ensure information protection.

To ensure privacy of patients and the content authenticity of a health care information system, three principles are critical: all electronic medical records should be protected through ownership controlled encryption, enabling transmission, access, and secure storage; the maintenance of electronic information should preserve the content authenticity, patient privacy, and data integrity; the information sharing and access should provide source verification through signatures and certification process against unauthorized access or change in EHR content. From the perspective of services to the population, with vast social implications, in which the security, confidentiality, and access to personal data represents a critical region, the medical services and information systems that are on the base of the strategic management in health care systems, are a theme of maximum interest and rather less approached. The prospect of at-home health care systems for screening and rehabilitation has raised enormous interest and is seen as a new method to approach the disease more efficaciously.

Internet of Things has many applications in different areas. IoT has been already designed for Body wireless sensor network (BWSN). It has been developed for health monitoring. New technologies and methodologies which are already used to improve applications of IoT has Raspberry Pi kit, Wi-Fi modules, temperature, blood pressure, pulse oximeter, heart beat rate sensors are currently in used for IoT. It is very important to monitor various medical parameters and post operational data. To access the patient's medical parameters in local and remote area, healthcare communication using Internet of Things (IoT) method is adapted.

The prominent application segment of Internet of Things framework is in the Security Sector. It is important to arrive at a unique low cost solution to prevent theft and ensure security to members of the home. The Internet of Things(IoT) Layered Architecture based design approach assists the system designer to conveniently differentiate the system component requirements distinctly at various layers. It remarks the uses of customers end application such as Telegram to securely transmit information through layers of IoT architecture.

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