Health Monitoring/Security System for Alzheimer Patient

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Abstract - *Alzheimer's disease (AD) is one of the kinds of encephalon diseases. AD is a cure-less neuron disease that causes memory loss due to the death of brain cells. Alzheimer's is the quickest developing infection in individuals matured 68 and more older. The modest framework is a health and security tracking interfaced with smartphones completely for Alzheimer patients. The Smartphone device will be used for guiding the Alzheimer patients to help them in their daily activities, the Internet of Things IoT plays an important role for assisting the Alzheimer patient, we will further target the nearest relative of patients using the special Android and iOS based app to keep a record of the patient. The application consists of various quizzes and games that help to boost the patient's brain functions and display progress report. The application gives notification of the placement of various objects and also gives a remainder of which medicine is to be taken It likewise tracks the patient's location utilizing the Global Position System and gives the location to the overseer i.e. caretaker. Unobtrusive member's photographs play a vital role in assisting the patient. IoT gadgets are applied for detecting the patient's condition utilizing the remote wireless medium for correspondence. The felicitous aim of this system is to engender an environment opportune for the patient working at home and reduce health expenses and also minimize the burdens on professionals.*

***Key Words*: Alzheimer, IoT, Android, GPS, Heart Rate, Raspberry Pi.**

1.INTRODUCTION

AD is a chronic neurodegenerative disease that causes the death of encephalon cells due to the loss of recollection that occurred. AD is most expeditious growing in people aged 65 and older. In India alone, there are more than 40,00,000 people with some form of encephalon diseases. Worldwide at least 4,50,00,000 people are living with encephalon diseases, making the disease a consequential health crisis that must be addressed. AD's sickness is the most pervasive kind of dementia, a general term for conditions that occur when the encephalon no longer functions congruously. Alzheimer's causes quandaries with recollection, cerebrating and demeanor. In the beginning stage, dementia manifestations might be negligible, however as the sickness causes more damage to the encephalon the symptoms may worsen. The rate at which the ailment propels is different for everyone, with the exception of considering everything, individuals with Alzheimer's live for an amount of almost eight years after symptoms com- mence. While there are right now no medicines to prevent Alzheimer's infection from advancing, there are medications to treat dementia symptoms. Research suggests that encephalon health is proximately cognate to heart and blood vessel health. The encephalon gets the oxygen and nutrients needed to function mundanely from blood, and the heart is respon- sible for pumping blood to the encephalon. Ergo, factors that cause cardiovascular disease withal may be linked to a higher risk of developing Alzheimer's and other dementias, including smoking, inordinate corpulence, diabetes, and high cholesterol and high blood pressure in midlife. Till February 2020 there hasn't been a treatment for early recognizable proof of AD. The main aim of this system is to engender a working environment for patients at home and abbreviate health expenses and additionally put fewer burdens on health care professionals and family suffering.

2. LITERATURE SURVEY.

2.1 Alzheimer

Stages: There are three stages in Alzheimer's Disease

1) Early Stages: In this stage person may function independently. Still the person may have recollection quandaries. Patient forgets familiar faces etc.
Common problems are:

- Difficulty in remembering names
- Difficulty in performing social tasks
- Trouble in planning and organizing events

2) Middle Stages: This stage condition last for many years among Alzheimer patient. Patient gets frustrated and angry, acting uncertain, refusing to do daily routine tasks etc. Com- mon problems are:

- Forgets personal history
- Forgets to sleep
- Get lost somewhere

3) Late Stages: This stage is considered to be worst stage where people forgot to breath and unfortunately dies.

Patient requires extensive care. Common problems are:

- Need full time assistance
- Difficulty in communication
- Suffers from infection

2.2. Causes.

Being that exploration presently can't seem to close a secluded reason for the advancement of Alzheimer's sickness, specialists on neurocognitive issues concur that various contributing components lead to the illness's beginning. Hereditary, physical, and natural impacts, notwithstanding other hazard factors, are referred to as the most huge determinants for the improvement of this condition. Memory misfortune is the key indication of Alzheimer's malady. An early indication of the illness is normally troubling recollecting ongoing occasions or discussions. As the infection advances, memory weaknesses intensify and different side effects create. Expanding age is the most consequential kenned hazard factor for Alzheimer's. The number of individuals with the sickness pairs at regular intervals past age 65. Around thirty-three percent of all individuals, age Eighty-Five and more established may have Alzheimer's sickness. The reasons for late-beginning Alzheimer's, the most well-known structure of the sickness, most likely incorporate a mix of hereditary, way of life, and natural elements. The consequentiality of any one of these elements in expanding or diminishing the peril of improvement Alzheimer's may contrast from individual to individual.

2.3 Effects.

Alzheimer's ailment is not a curable ailment and dynamically declines after some time. The long haul impacts of Alzheimer's illness can be wrecking to both friends and family members. Inevitably, individuals with Alzheimer's sickness can't deal with their fundamental needs, or they lose portability or the capacity to talk. Transmutations in the comportment of the individual are normal in Alzheimer's disease. As the individuals who have late-arrange Alzheimer's start to lose the coordination of the muscles that control biting and gulping, it makes the peril of inward breath of nourishment matter into the lungs dangerous, as this can prompt yearning pneumo-nia. Notwithstanding yearning pneumonia, individuals with Alzheimer's ailment are likewise powerless against urinary tract diseases as they lose control of their gut and bladder. Urinary contamination is extremely normal in the older and can prompt intense and perilous diseases if not appropriately treated. Lack of healthy sustenance during later phases of the illness, individuals with Alzheimer's malady frequently can't eat or drink without anyone else. Malnutrition is a huge hazard for individuals with Alzheimer's ailment as it can cause possible risky satiations. Abuse, belligerent mood swings can lead to acting out which can, in turn, lead to abuse, injuries from

falls account for a substantial magnitude of earnest injuries in the elderly. Falling can prompt broken bones, head wounds, and at times, demise.

2.4 Current Scenario

GSM module are used to between doctor and caretaker for communication. Does not provide family details, reminder, schedule, etc. Need caretaker constant support. No multiple patient application.
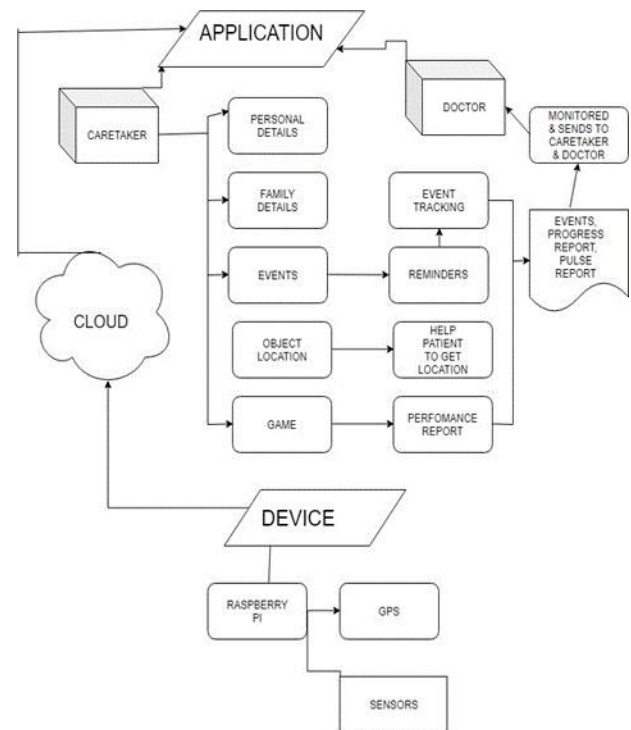
3. Proposed System.

Figure 1- Block Diagram of Proposed System.

The Proposed System is 3 parts i.e. (Application, Cloud and Device). The Device will consist of Raspberry pi 3, GPS module and various sensors. The cloud will be a source of through internet. The proposed system will be a better system than most of the devices. Because of the cloud connectivity, we can get the real time data of the Alzheimer patients. As per our references, one of the devices contains the GSM technology, as per that technology the device will work on 2G which is not fast enough and the range of that technology is up to few meters. The application will have a database of the personal and family details. It also consists an alert system which gives reminder to the caregiver for the medicines which were needed to give to the Alzheimer patient. As we know Alzheimer patients have a problem of memory loss, the application also tracks the current position of the Alzheimer patient using the GPS module present in the hardware device. The device will also

contain some brain games to track the progress of the Alzheimer patients.

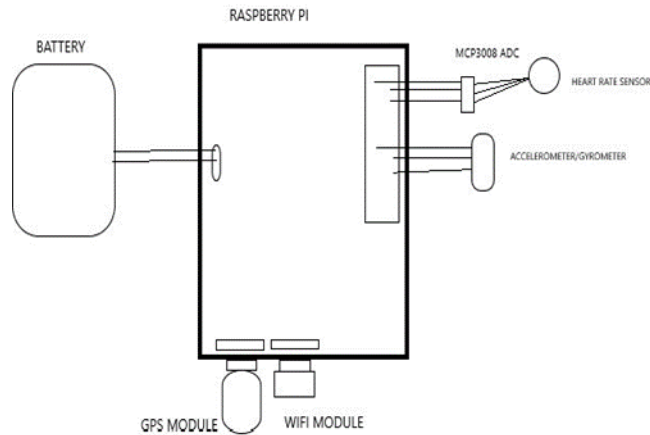## 4. Configuration of Proposed System

Figure 2- Circuit Diagram of Proposed System.

The hardware of the proposed system consist of a processor called Raspberry pi, a GPS module(VK-1620SB) for tracking, heart rate sensor(ADC MCP-3008) and accelerometer(ADXL- 345). The Raspberry Pi 3 is a tiny credit card size computer. Raspberry Pi 3 consist of a Micro USB Power Input which hands upto 2.5 amps., a LAN port, 4 USB port, a 40 pins for installing sensors, a micro SD card slot and 1 HDMI port. It also consist of a CSI Camera Port for any visuals needed. The GPS module basically gives the live location through IoT rather than the basic GPS technology. The IoT is much faster and secure compared to the 2G. The proposed system will be a wearable device which would be wore by the patient.

5. Software Used for Proposed System.

5.1 React native

React Native is an open source mobile application frame- work created by Facebook.

5.2 JavaScript

JavaScript often abbreviated as JS, is a high level, interpreted scripting language that conforms to the ECMAScript specification.

5.3 Cloud Firestone

Cloud Firestone is a flexible, scalable database for mobile, web, and server development from Firebase and Google Cloud Platform.

5.4 Python for Raspberry pi

Python is an interpreted, high-level, general purpose programming language.

5.5 Redux

Redux is an open source JavaScript library for managing application state.1

6. Advantages

• The app consists of game that helps the patient to estimate his/her progress.
• Ease of burden to the caretaker and user friendly interface.
• The transportation cost is reduced for weekly checkups.
• The app gives reminder to have medicines to the patient.
• Gets instant help and advise to the caregiver.

7. Applications
• Can be used in health centers, hospitals etc.
• The expense is cut down to a large amount.
• Can be sold as an online product.

8. Future Scope
• Implementation of multi-doctor to multi-patient service.
• Addition of new sensors like EEG, ECG etc.
• The size of the model can be made even more compact
• Manufacturing of the product on a large scale can be achieved.
• Chat box can be added to the app.
• Secure login system can be achieved by assigning unique ID to the doctors.

9. Conclusions.
The proposed system planned for Alzheimer's patients is a smartphone and device-based system. In this research a system was developed to ease the circadian routine for patients with Alzheimer's. To make this possible, we are carrying out an analysis of patient anxiety cycles so that we can use wearable sensors that can obtain precise bio-signals. The work began with the development of a wearable sensor-based system suitable so to make the application get the data. Using the global position system sensor in a device the patient's exact location is tracked and alert is triggered when the patient goes outside the perimeter as specified by the caretaker. The device can be instantly connected to multiple mobile devices on multiple platforms. Therefore, with this real-time multiple platform smartphone application, the patient's overall progress can be quantified by both family members and the doctor.

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