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IoT Based Smart Health Monitoring System to Provide Secure Emergency Solution to Elder People

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***Abstract*: IoT is currently transforming the technological infrastructure. The Internet of Things has made it possible for us to integrate a variety of complex systems quickly and easily, including smart home appliances, smart traffic control systems, smart office systems, smart environments, smart vehicles, and smart temperature control systems, etc. One of the most notable IoT applications is health monitoring. This project would support real-time activity and monitor the healthcare system for elderly citizens. The information collected by different sensors in real time is stored in a local server which thereby connects the caretaker, and ambulance at the time of emergency for the right information. This research provides an IoT-based system for elderly people who lives alone, that can track and record the health parameters using different wearable sensors and detect fall using fall detection system and include mobile user interface and protocols for medication alarms.**

***Keywords*: Internet of Things, wearable sensors, fall detection system, firebase.**

1. Introduction

IoT is currently transforming the technological infrastructure. by enabling simple communication between distinct parts. IoT has made it possible for us to install a variety of sophisticated systems quickly and efficiently, including smart home appliances, smart traffic control systems, smart workplace systems, smart environments, smart automobiles, and smart climate control systems. One of the most notable IoT applications is health monitoring. The internet has created a global village, and the internet of things is making it smarter and more efficient by enabling a variety of sensors and perceptive objects to collect and process data for various reasons. The Internet of Things (IoT) is a revolutionary phenomenon that completely affects our way of life and aspires to turn present healthcare into a more. This project is developed to keep an eye on elderly people for their safety all the time and to overcome emergencies at the right time. This will enable caregivers to observe old people without having to be physically present with them and inform caretakers during emergencies. This project would support real-time activity and monitor the healthcare system for elderly citizens. The information collected by different sensors in real time is stored in a local server which thereby connects the caretaker, and ambulance at the time of emergency for the right information. The design and implementation of this system will hopefully improve the health monitoring of elderly people in the future.

A. Motivation

Nowadays, to overcome the increase in daily expenses, most young teenagers went out to work from early morning until late evening or night. Therefore, they have to leave their parent or elders that need to take care in the house while they are working. However, for some of the elders who are facing health problems such as high blood pressure, heart attack, facing difficulties in movement, or other diseases, if there is something happens to them, it may hard to notify them since we are working outside. However, for some of the elders who are facing health problems such as high blood pressure, heart attack, facing difficulties in movement, or other diseases, if there is something happens to them, it may hard to notify them since we are working outside. India is the largest process data for various reasons. The Internet of Things (IoT) is a revolutionary phenomenon that completely affects our way of life and aspires to turn present healthcare into a more. This will enable caregivers to observe old people without having to be physically present with them and inform caretakers during emergencies. This project would support real-time activity and monitor the healthcare system for elderly citizens. The information collected by different sensors in real time is stored in a local server which thereby connects the caretaker, and ambulance at the time of emergency for the right information.

B. Objectives

To develop a wearable device by using sensors for detecting the variation in health parameters of elders who lives alone. To send an alert notification to caretakers and call with to an ambulance in case of emergency. To maintain medical records of the elders and to set up alarms to remind them about their medicine schedule. To help the caretakers or family members to be aware of the health condition of their elders.

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2. Proposed Methodology

As elders are facing so many issues related to health when they are living alone. We come up with the idea to generate a device that contains sensors and these sensors help to know their minor health problems in an emergency situation by wearing this device they may feel a little secure as this device will be intimate by sending messages to an ambulance and caretakers as well. Target customers are elders priority we are giving to the elders who are living alone at home we are creating a device that includes different types of sensors to check their heart rate, fall detection, etc. with the help of that device we can track the health condition of our family members.

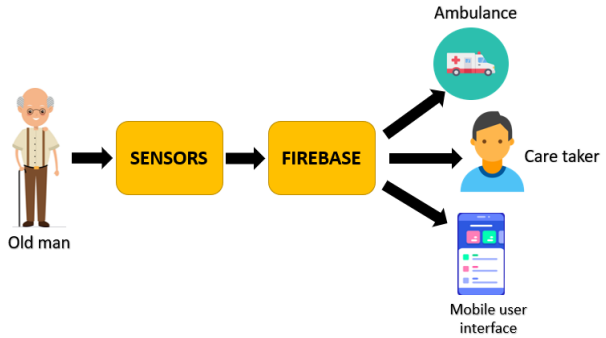

Fig. 1. System architecture for proposed methodology

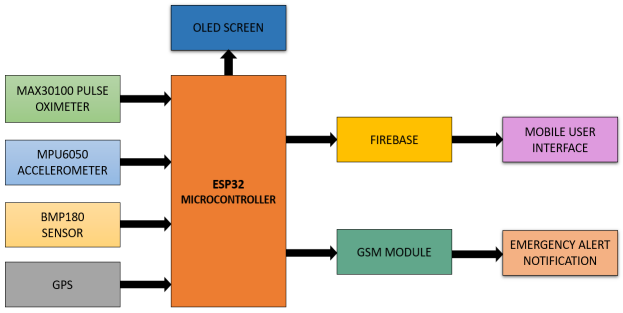

Fig. 2. Design diagram

The above diagram is design of the working system. The system consists of different sensors like the MAX30100 pulse oximeter sensor, BMP180 sensor, MPU6050 accelerometer sensor and GPS.

The proposed system uses IOT technology and sensors to monitor the heart rate, temperature, and oxygen level in the blood and for fall detection. The data collected from the sensors are stored in firebase and visualized using the mobile interface. The proposed system sends an alert notification to caretakers and ambulance when there is fall detection and vary in a health parameter. The system also maintains medical data and helps to setup alarm to remind about their medicine schedule.

The system consists of different sensors like the MAX30100 pulse oximeter sensor, BMP180 sensor, MPU6050 accelerometer sensor and GPS. Different sensors are connected to ESP32 microcontroller. ESP32 is a series of low-cost, low-power system on a chip microcontroller with integrated Wi-Fi and dual-mode Bluetooth. The data collected by sensors are stored in firebase. Firebase is Google's mobile app development platform. An end-to-end development environment, a quicker time to market for developing apps, and scalable infrastructure are some of its benefits. Everyone can create useful IoT programmers using the easy, visual programming environment offered by Firebase platforms. IoT apps require modules to read and transmit data to the Firebase Database since they must collect and send data in real-time. The data kept in Firebase is used to create mobile user interfaces.

Caretakers and the developed system are connected using a GSM module. A network is created between the system and carers using the GSM module. In order to offer a wireless connection, a GSM modem or GSM module uses the GSM mobile telephone technology.

The suggested system employs IOT technologies, sensors, and fall detection to remotely monitor blood temperature, heart rate, and oxygen saturation levels. The mobile interface is used to display the sensor data that is stored in Firebase. When a fall is detected and certain health metrics change, the suggested system calls carers and SMSs them with a live location update. The method aids in reminding the user of their medication routine.

3. Conclusion

In this project, the use of IoT in health monitoring systems has been summarized. Although IoT is being used in all sectors of medical science, there is room for further improvement and research. The early identification of any health problem can help the patient to take necessary emergency measures, which can potentially save the patient's life. IoT can help in this regard. IoT based health monitoring systems can monitor the patient through IoT. The health of our loved ones is always our area of concern especially when they are in their old age. Our family is important to us we may not be living close to them and knowing their whereabouts always concerns us.

The smart health care system developed for elders using IOT technology and smart sensors can be used to decrease the effect of unexpected emergencies. It provides an advanced way of handling and monitoring patients which decreases the threat to life. Thus, it ensures the safety and security of patients' health-related data in and around the patient. This design is very effective in monitoring an elder's health continuously because it is fully automated and helps elders to take medications at right time. There is a call out there to view aging and those who are already older in a different way and to realize part of the reason to do so is that we are all aging—we are all going to be older adults eventually. In order to see ourselves aging in a healthy way, respected for what we know and can still do, and able to make decisions about where to live and what kind of care we want, we must start thinking of the already old in the same way.

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