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Survey on IoT Based Health Monitoring System: "IoT Based Biomedical Instrumental Portable Device"

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Abstract – *To Build a IoT Based Biomedical Portable Device with Software Application for monitoring heart rate, oxygen level, body temperature, blood pressure. Sensors continuously read parameters such as temperature and heartbeat, blood pressure rate of a person. In order to avoid such kind of problems we present a work (a device that consists of various sensors) that help minimize the number of deaths. Sensors continuously read parameters such as temperature and heartbeat, blood pressure rate of a person. Data from sensors are transferred to a smart electronic gadget like smartphones. IoT Platform is for development of human useful smart device. This device enhances the life cycle of human and provide them data of their body part in handled devices like smart phones.*

Key Words: **Heart Rate, Oxygen level, ECG, Blood Pressure, Body Temperature, Bluetooth, Health Monitoring, Android Application.**

1. INTRODUCTION

In Today's World, Health is most important part of our lives so to get time to time health information we need to build a strong model which can give us a brief information About all health issues in a minute. Keeping this in mind we are making the IoT Device which can do many tasks like checking blood pressure, oxygen level and body temperature at one time. The data is stored in app as well as on cloud. Quick notification is given if any changes occur in our body. The Health Monitoring System is developed using IoT technologies. Here the Heart Rate, Blood Pressure, Oxygen Level and Body Temperature is measured by using a device having different sensors all in one. The data is sent to mobile device (software application) where the data is analysed and further sent to cloud. After uploading data on cloud, it is forwarded to doctor for check-up. The doctor gives proper prescriptions and medications. The data from the Doctor is then sent to mobile device through software application. In case of emergency, it notifies the user giving an alarm about the danger. All the data is stored in mobile device as well as in cloud.

1.1 Literature Review

[1] Sahana S Khamitkar, Prof. Mohammed Rafi, IoT based System for Heart Rate Monitoring, July-2020

In this paper they have developed a heart rate monitoring system using an IoT technology to detect heartbeat of the patient in the risk of heart attack. Nowadays, health is most important part of our lives that's why we have to focus on it. From this we learned about the IoT based health monitoring system.

[2] K. Nikita, A. Sai Trilok, B. L. Narasimha Rao, Eikshitha.Y, Mylara Reddy C, Android based Portable Health Support System, April-2020

This article shows the need of a portable health support system, so that common people can get the easily regular health checkup. It supports the software application attached to the device. This gives us idea about the portable device with the software application so that we can store our health care data to the application without any problems.

[3] Nayana P N, Umme Hani R, Latha M, Ameena Khan, Bindu Reddy L, Design of a Portable Real-Time Health Monitoring Model using IOT and Thing Speak, 2020.

This paper gives a summary of a portable device that uses various kinds of sensors like an accelerometer gyro sensor, a pressure sensor, a GPS module, a pulse rate sensor, Wi-Fi module, an accelerometer gyro sensor, a buzzer and LCD i.e. liquid crystal display,etc.

2. METHODOLOGY

The Internet of medical things IoMT is application of IoT for medical and health related purpose. It analyzes and demonstrates the data for further purpose using IoT. A Smart Health monitoring system is developed which is capable of monitoring Blood Pressure, Heart rate, Oxygen level and Body Temperature. A smart Healthcare is introduced using IoT. In healthcare this device is remote and easy to use. The areas where doctor cannot reach or

state where some pandemic has taken place, this device is most useful. The handicapped people who are unable to visit hospital get the treatment within seconds.

2.1 Proposed System-

In Proposed system, we are developing a portable IoT-based biomedical device for monitoring heart rate, blood pressure, body temperature, oxygen level. Also building a software application for user's medical record and for better communication between user and medical authorities (Doctors).

2.2 Working System-

Firstly, we are going to inspect the person's Heart rate, Blood pressure, Oxygen level and Body temperature with our device. Then the data will be recorded of each in the Mobile Android application which we have built. If any related health issues are detected then system will notify about it. Proper medications will be provided.

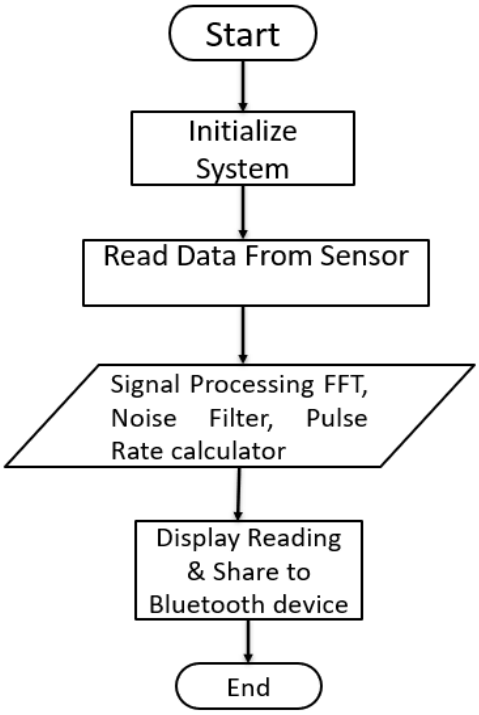

Fig -1: Working System of Hardware

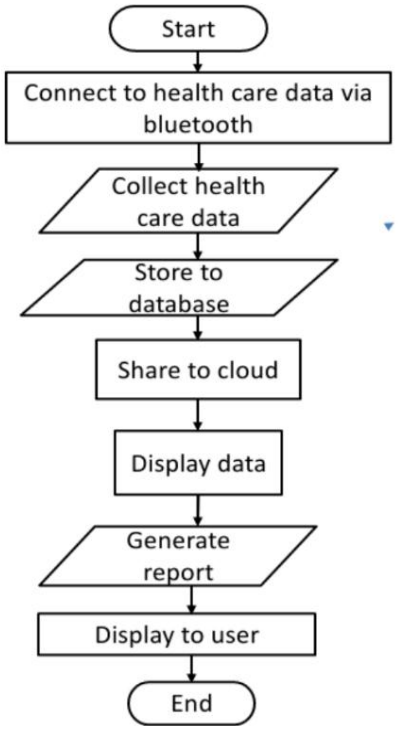

Fig -2: Working System of Software

3. SYSTEM ARCHITECTURE

• We Develop a portable Biomedical instrument regarding Peoples health which measure Blood Pressure, Heart Rate, Temperature, ECG.

• With the ESP32 Microprocessor which is the brain of this project.

• The Wireless Bluetooth are used to connect the data from mobile device to cloud.

• With the help of stored data doctor can view result of patient.

• By seeing this result, it gives precautions as well as health suggestions to patient.

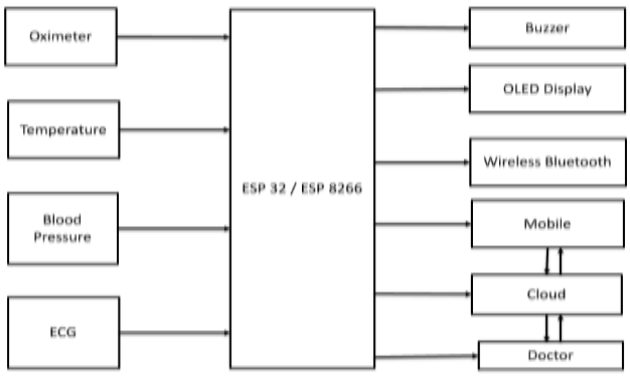

Fig -3: System Architecture

4. MODULES

• ESP32/8266 Processor-

ESP32 could be a series of a low-cost, low-power systems on chip microcontrollers with integrated Wi-Fi and dual mode Bluetooth.

• ECG Sensor-

Turn off electrocardiography. Used to monitoring health rate, ECG sensor are made-up of electrodes. It detects heart rate as well as it notifies if there is any harm. It works on the principle of stimulation of muscles that alters the electrical potential of the muscle fiber.

• Temperature Sensor-

Environment can be anything whose temperature is to be known. It can detect the hotness and coldness of a given thing. The sensor used for measuring temperature are infrared, IR used for medical applications. Temperature sensors are commonly used for measuring forehead temperature, skin temperature, air temperature.

• Oximeter-

Pulse oximeter is a noninvasive method for monitoring a person's oxygen saturation. Peripheral oxygen saturation (SpO2) readings are typically within 2% accuracy (within 4% accuracy in 95% of cases).

• Blood Pressure Sensor-

This blood pressure monitor measures the mean arterial pressure (MAP) and approximates the systolic and diastolic pressures. It requires the use of a pressure transducer, an Arduino Uno, and coding to control the valve and air pump.

5. CONCLUSION

A device where four components are measured is prepared using IoT. The health data like blood pressure, oxygen level, body temperature, heart rate is measured. This data can be used for analyzing patient's routine checkup. The time required for performing all the tests separately is reduced. Also, no big machineries are required as a single device is used for performing all tests in this world where the time is most expensive. Using such a device is must to save time and money. Fraud cases where the doctor misguides the patient is also stopped.

6. ACKNOWLEDGEMENTS

This paper would not be written without the respected advice of our Prof S. R. Bhujbal. Our special thanks visit all the professors and Principal of the computer engineering department of PK Technical Campus for their support and for giving a chance to figure on a survey of an IoT-based health monitoring system.

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