IOT Based Healthcare System: A Review

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Abstract: - In recent development, Internet of Things (IoT), which creates a communication network for everything, is then considered a new technology. Thanks to this technology, the medical industry has developed. Health problems such as heart failure, lung failure and heart disease are on the rise. Theseproblems require a lot of health monitoring from time to time. A modern concept of patient health oversees wireless devices. Here's an example abstract for an IoT-based healthcare monitoring system research paper that uses Raspberry Pi and sensors MPU6050 and MAX30100: With the advancements inthe field of Internet of Things (IoT) and healthcare, there has been a growing demand for the development of remote patient monitoring systems. In this paper, we propose an IoT-based healthcare monitoring system that utilizes Raspberry Pi along with MPU6050 and MAX30100 sensors to monitor the health parameters of patients remotely. The system measures vital signssuch as heart rate, oxygen saturation level, and body movement, and sends the data to a cloud server for analysis. The MPU6050 sensor is used to measure the patient's body movement and posture, while the MAX30100 sensor is used to measure heart rate and oxygen saturation level. The data from both the sensors is collected and processed by Raspberry Pi, which then sendsthe processed data to the cloud server using MQTT protocol. The data is stored on the cloud server and can be accessed by authorized medical professionals. Therefore, doctors are able to save human lives by providing quicker services to them. In this paper, IoT has become the best platform for various application services. Here, the Raspberry Pi used to develop this, because which works as a sensor node and as a controller. In this paper,a simple health monitoring system has been proposed to achievea one-step ahead.

Key Words: Raspberry Pi board, Heartbeat sensor, Temperature sensor, Blood pressure sensor, Accelerometer sensor, Internet of Things.

I. INTRODUCTION

Health risks have been increasing rapidly in recent years. An average of 131.4 million births and 55.3 million deaths occurs annually in the world. Source: Census Reference Bureau and World Factbook. This research paper proposes an IoT based healthcare monitoring system using Raspberry Pi, which can measure parameters such as heart rate, temperature, oxygen saturation, and movement. The system uses sensors such as MPU6050 and MAX30100 to measure these parameters and transmitsthe data to a cloud-based platform using Wi-Fi.

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In emergency situations, this system automatically sent a warningmessage/call to the patient's caregivers, to the hospital and also to the ambulance on if any strange data detected. An uninterrupted health record can be used to identify the disease more effectively. Healthcare monitoring systems are essential in ensuring that patients receive the necessary medical attention promptly. IoT-based healthcare monitoring systems have gained significant attention due to their potential to provide remote monitoring of patients. The proposed system aims to use a Raspberry Pi and various sensors to measure parameters such as heart rate, temperature, oxygen level, gyroscope, and acceleration. The Raspberry Pi is a low-cost, credit card-sized computer that can be programmed to per- form various functions. The system aims to provide real-time monitoring of patients, allowing physicians and caregivers to intervene when necessary. Raspberry Pi and IoT are used withinterest in the field of health and this article gives an idea about these two platforms. The famous Raspberry Pi platform provides a complete Linux server with IoT in a small platformat a very low

cost. Raspberry allows provision of related services and processes through general communication I/O. Using this combination, the design is better. The Internet of Things connects devices and makes human-computer interaction a better life. This article describes the health managementsystem that protects patients from future health problems and helps doctors evaluate patient progress in a timely and healthy manner.

II. LITERATURE REVIEW

A. Dohr, R. Modre-Osprian,et al, [1]" The Internet of Things for Ambient Assisted Living"Internet of Things (IOT) helps us in many ways to communicate between people and different things. Ambient assisted Living (AAL) helps the elderly people to live safe lifestyle and it is used for communication regarding elderly people is most important aspects of AAL. It uses smart technologies and objects to facilitate telemonitoring Systems.

IoT: Remote Patient Monitoring Using Web Services and Cloud Computing" by Junaid Mohammed, Abhinav Thakral et.al,[2] implementation of this system is totally done by design patterns. The name patterns in this system itself we can understand that the system is portioned into 2 layers.

Mohammad S. Jassas, Abdullah A. Qasem, Qusayet. al, [3] did research on the system called" Smart connectivity e-health sensors and cloud" explaining that its main purpose is to reduce latency, by comparison, that is, if there is an event in this, the system reduces latency. time. By accessing patient information and sometimes using the system that many people need to go to the hospital, such as covid, it will help hospitals use this information for testing purposes by detecting information documents about hospital beds. crime.

Hasmah Mansor, Muhammad Helmy et. al, [4] "Body temperature measurement for remote health monitoring system" in this they used temperature sensor (LM35) to measure the temperature of the patient they interfaced this sensor with Arduino UNO, in any system data should be stored for future analysis similarly in this system also they developed a database to store the values.

R.S.H. Stepanian et al. et al., [5]" Mobile Medical Internet of Things for Noninvasive Blood Glucose Level Detection" m-IoT" Possibilities" m-IoT has been developed for new healthcare applications.We are facing a major global diabetes epidemic with health consequences. We have different technologies that we can use to manage diabetes using mobile IoT. We can treat many diseases at low cost.

K.Mathan Kumar, R.S.Venkatesan," et. al, [6] A Design Approach to Smart Health Monitoring Using Android MobileDevices" IoT system mainly connects different things or objects like people and animals etc. and detect IP address of everything in the earth by this IoT system. We use different smart health monitoring system to control body parameters. By using this IoT system we can identify the certain body parameters of the patient and in any emergency the doctor will get alter by using this smart health monitoring system using IoT technology.

Zigbee-Based Wearable Physiological Parameter Monitoring System", by KarandeepMalhi, Subhas Chandra Mukhopadhyay et al, [7] In this system, a person cannot go to the hospital if they are not well, this review will be useful. The system monitors the patient's home status, temperature, through some sensors attached to the finger or wrist.

Nitin P. Jain Preeti N. Jain Trupti P. et al. et al, [8]" Embedded, GSM-based, multi-parameter, real-time patient monitoring and control - application to ICU patients". GSM technology has been developed for monitoring intensive care patients and managing drug therapy. It is a parameter used to remotely control the patient's risk profile. This method is used to maintain the accuracy of the alarm system. It's time to take care of rural patients.

III. METHODOLOGY

In this existing system if a person is feeling is not feeling well, if he is not in a position to attend the hospital in that situation this monitoring system will be useful in real time. The proposed system consists of a Raspberry Pi board, which acts as the central processing unit. The system uses two sensors, namely MPU6050 and MAX30100, to measure the parameters MPU6050 is a 6-axis accelerometer and gyroscope sensor that measures the movement and orientation of the device, while MAX30100 is a pulse oximeter and heart rate sensor that measures the oxygen saturation and heart rate of the patient. The system also includes a temperature sensor to measure the body temperature of the patient. The data collected by the sensors are processed by the Raspberry Pi board and transmitted to a cloud-based platform using Wi-Fi or 4G/5G connectivity. The cloud-based platform stores and analyzes the data, enabling healthcare professionals to access it remotely.

3.1 System architecture

The technology behind this project is IoT (Internet of Things). Picture below. A simple map shows the IoT working as a system; wherein the hardware has sensors, controller, suitable

model to measure parameters for the process of adding and sending data stored in the cloud. In the second part, cloud service provider serving us is selected to store our data and access it via mobile app / website. In the third part, the downloaded data is obtained through an Android app, which provides a user-friendly GUI to help people access tracked health data.

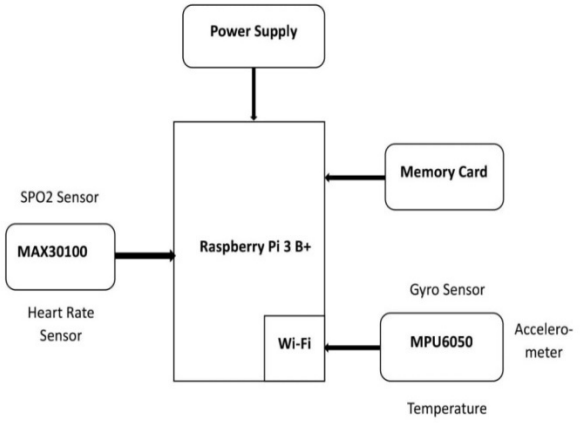

Fig.1. Block diagram of proposed model

3.2 System Circuit Diagram

The healthcare system consists of several sensors connected to patient transmitting data from the operating room. In this project, Raspberry Pi was used for data collection and processing. patients and physician smartphones/computers are used to monitor the system. As shown in Figure 2, the sensor system is used to receive data or readings from the patient and convert the readings to a signal. This signal is provided by the for processing by the Raspberry Pi, an IoT module. The Pi then displays the data on the monitor and stores the data in the cloud. The doctor can access this information from his phone/computer at and get information.

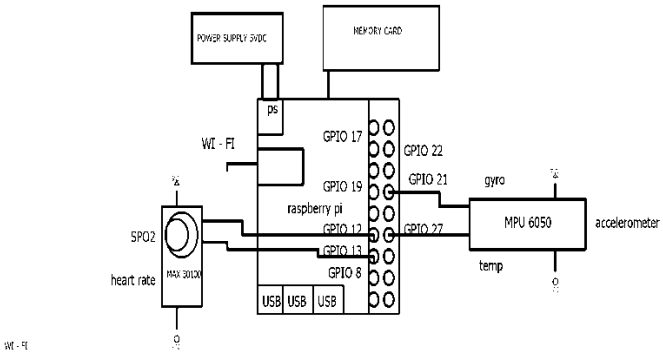

Fig.2. System Circuit Diagram

3.3 Software Architecture

The planning process is explained with the help of system architecture. Intercom connection of various components is described using system architecture. The process starts when system is activated. The sensors are connected to the body of patients. Sensors collect patient data, i.e. Heart rate, body temperature, body weight, body posture. This is the data collection step. After data is collected, the data will be converted to input for Raspberry Pi.

The conversion step converts analog data into digital form. The data is sent to the Raspberry Pi for processing. The step function checks if all are within the specified range. If the data is in the range specified by, it creates a map for storage. If there is no data that the patient is in a critical/abnormal condition in the decision number, it sends a warning to the doctor. Specialists will review the patient's treatment as a precautionary measure. Decision tree algorithms can be used for efficient analysis and prediction to detect a virus before it occurs. Physicians can access with login credentials and view patient information. Doctors can see all previous information and recommended drugs and change the drug for the patient. Likewise, user IDs and passwords are given to patients to view their records.

The system plans to use sensors to understand a lot of things like the patient's body temperature, pulse, blood pressure, body position.

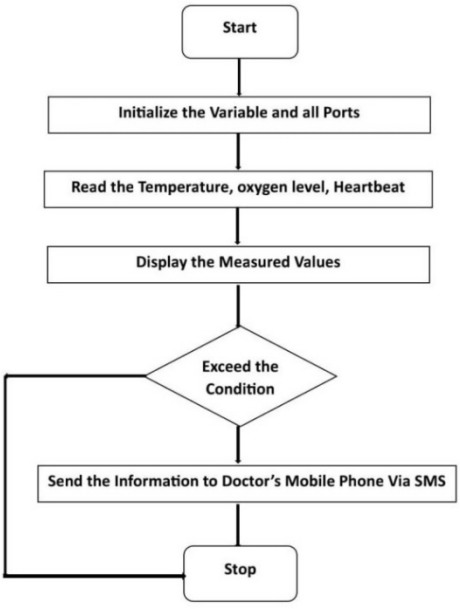

Fig.3. Software architecture of health monitoring system

IV. RESULTS

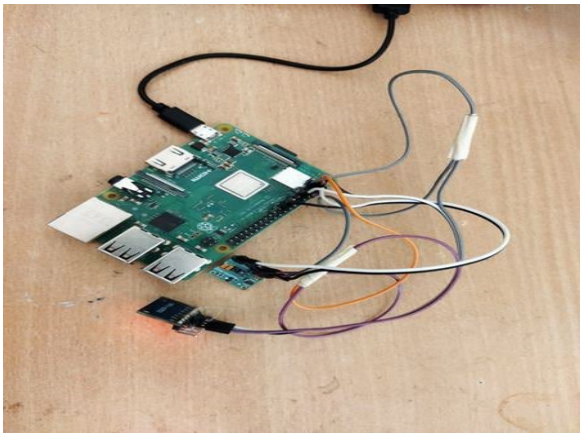

Fig.4. Actual Circuit Diagram

Fig.5. Webpage Output Diagram

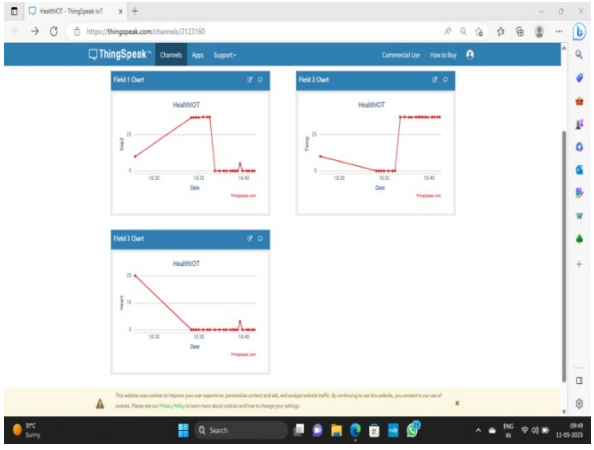

Fig.6. Graph

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V. CONCLUSION

In this work, we construct a healthcare monitoring system that continuously checks the patient's health, making use of the essential Raspberry Pi component. The primary goal is to create a user-friendly device that serves as a conduit between patients and doctors. We put in place a multipurpose system that keeps track of a variety of patient parameters, is easy to measure, and is simpler to use than other systems.

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