

Implementation of Temperature and Heartbeat Measurement for Hypertensive Patient Using IoT

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Abstract: Health-related issues have been view as one of the main problems which directly impact quality of life of a person. Health Monitoring System monitors the patients' health based on sensors data. It enables the doctors to monitor patient's health parameters like Blood Pressure, Heartbeat in real time. Here the parameters of patient are measured continuously Blood Pressure, Heartbeat are wirelessly transmitted using Internet of Things (IoT).

Keywords— Raspberry Pi; Temperature Sensor; IoT; Health Monitoring; Humidity; Blood Pressure; Real Time;

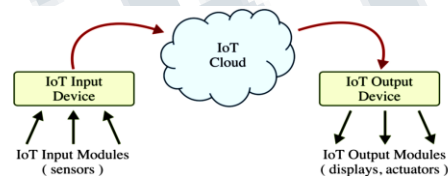
I. INTRODUCTION

Internet of things (IoT) can be described as embedded devices (things) with Internet connectivity that interacts with each other, services and people on a comprehensive scale [1-4]. Health Monitoring System, monitors the patients' health based on sensors data. If a particular patient's health parameter falls above or below to the threshold value, an automated SMS is sent to the pre-configured Doctor's mobile number using a IoT interfaced to the Raspberry Pi module. Here, we are using Iot for wireless transmission.

II. IOT IN HEALTHCARE

IoT in the field of health care observing comprises of custom-assembled sensors, patient worn bits that sample, and send the information through a wireless system. Patients in the clinic whose health status should be ceaseless checked can without much of a stretch be observed utilizing IoT-driven, noninvasive observing.[2] This type of IoT empowered arrangement utilize sensors that get physiological data from the patient's body and utilizing gateways and the cloud to analyze and store data this information is sent wirelessly to the specialists(doctors) for propel examination and survey [6-8]. It replaces the act of having a health expert to check the health status at normal interims of the patient.[5] IoT enormously enhances the nature of health care through consistent consideration and fewer mistakes and furthermore brings down the cost of care by wiping out the requirement for a parental figure. The main challenge here is to give reasonable correspondence (prepared) when there is an emergency situation of the patient paying little heed to the area and time for picking up treatment from specialist.[7] Physical checking of the patient is required if there is a basic condition. In this

way, manual process can be screwing up slanted and less effective.



There are many individuals everywhere throughout the world who endure health issues since they don't have prepared access to powerful health checking. Be that as it may, with the assistance of Raspberry Pi which is a smaller than expected PC comprising of processor, graphics card, and memory in a solitary bundle, capable wireless solution associated with internet it is feasible for checking the health of an individual adequately and proficiently [9], [10]. These arrangements can be utilized to safely catch, exchange the patients health information from a grouping of sensors to processors and apply complex computations to analyze the data and after that impart it through remote network to medicinal specialists who can make proper health proposals.

HARDWARE DESCRIPTION

Implement the health monitoring system continuously without hospitalization using wearable sensors. Wearable sensors monitor the parameters of the human body like temperature, pressure, heart beat by using sensors and also display the symptoms in the LCD. For emergency the alert message is send to the ambulance or to the doctor's mobile phone using GSM technology. The main purpose of GSM is to provide the mobile healthcare for remote areas. This method reduces the time, easy to use and also used for self-monitoring the patients

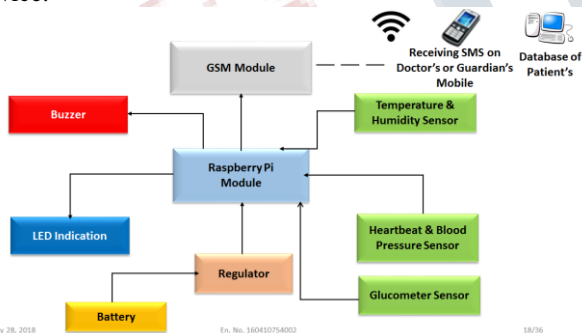
anywhere at any time. The implementation of the system is done by using Internet of Things (IoT).



Fig.1 Logic Diagram of Patient Health Monitoring System [3]

III DESIGN METHODOLOGY

The system is developed for home use by patients that are not in a critical condition but need to be constant or periodically monitored by clinician or family.[1] In any critical condition the SMS is send to the doctor or any family member.[2] So that we can easily save many lives by providing them quick Service.



II. FIG. 2 BLOCK DIAGRAM

THE SYSTEM WORKS CONTINUOUSLY IN REAL TIME, MONITORING PHYSIOLOGICAL SIGNALS OF PATIENT’S AND GENERATES ALERT IN ABNORMAL SITUATIONS. IF A PARTICULAR PATIENTS HEALTH PARAMETER FALLS ABOVE OR BELOW TO THE THRESHOLD VALUE, AN AUTOMATED SMS IS SENT TO THE PRECONFIGURED DOCTORS MOBILE NUMBER USING A STANDARD GSM MODULE INTERFACED TO THE RASPBERRY PI MODULE.

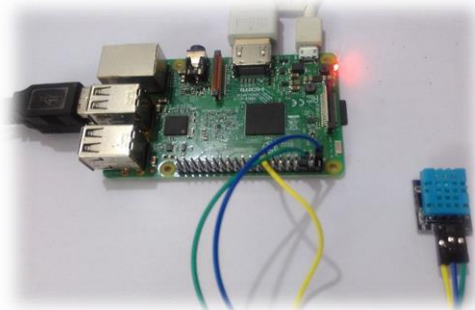


Fig. 3 Hardware

Wireless transmission. In alert case beep sound into wristband which are attached to the body warns the parents. This system is developed for home use by patients and elders who are in critical condition need to be constant monitoring and send alarm notification to doctors and guardians. The doctor can get a records of a particular patient’s information by just accessing the database of the patients on his PC which is continuously updated through Raspberry Pi receiver.

RASPBERRY PI 3

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor and uses a standard keyboard and mouse. The Raspberry Pi Model B+ has dual core ARM11 processor with 512MB SDRAM and powers through Micro USB socket of 5V [16].

Temperature Sensor

DHT22 Digital Temperature and Humidity Sensor is a Composite Sensor Contains a Calibrated Digital Signal Output of the Temperature and Humidity. Applications are Humidity Regulator, Medical and Other Humidity Measurement and Control. Features: Low Cost, Long-Term Stability, Relative Humidity and Temperature Measurement, Fast Response, Long Distance Signal Transmission, Digital Signal Output.

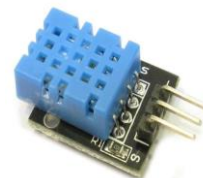


Fig. 4 Temperature and Humidity Sensor (DHT 22)

Heartbeat Sensor

The sensor gives the digital output of heart beat when a finger is placed on it. The output generated is in Beats per Minute (BPM) rate [13]. The Pulse Sensor Amped is a plug-and-play

heart-rate sensor for Arduino. It sips power with just 4mA current draw at 5V so it's great for mobile applications. Heart beat sensor is designed to give digital output of heart beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heartbeat. This digital output can be connected to microcontroller directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.



Fig. 5 Heartbeat Sensor SEN-11574

HARDWARE



Fig. 7 Hardware of Mounting Temperature Sensor and Heartbeat Sensor

The Sensor Including Temperature and Humidity DHT 22 through the Raspberry Pi to the Transmitter Section. To measure Patient Body Parameters such as Temperature and Heartbeat.

SOFTWARE

RESULT

Flow Chart Of Patient Health Monitoring System

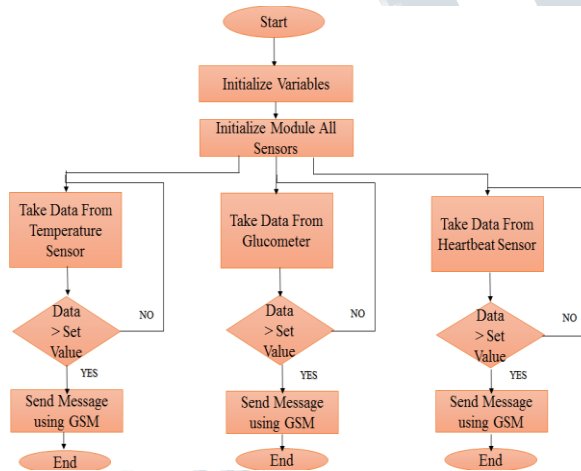


Fig. 6 Flowchart of Patient Health Monitoring System

The Figure 7 describes the flow chart of the proposed system. Initially temperature sensor, heart beat sensors and glucometer sensor capture the data from the patient and are compared against the normal values. If the values exceed the normal range the GSM module is activated and SMS is sent to the doctor. Otherwise the data captured is simply stored in the local server and the values are displayed on the web page upon request.

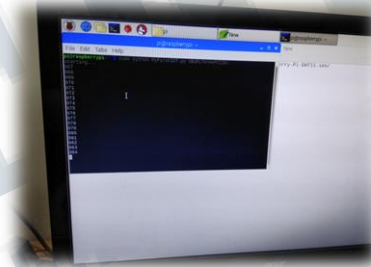


FIG. 8 PHYSIOLOGICAL PARAMETERS VALUE STORED INTO RASPBERRY PI

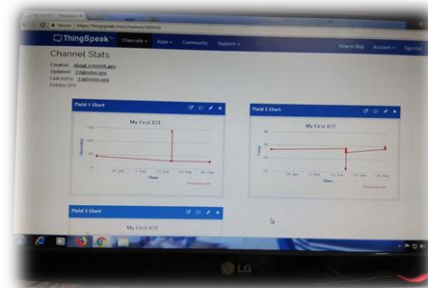


FIG. 9 GRAPH OF PATIENT'S BODY TEMPERATURE AND HUMIDITY

Patient Health Monitoring System Displayed On Thingspeak.Com It Shows The Graph Of Patient Body Parameters Such As Temperature And Humidity.

CONCLUSION

In This Paper, Implementation Details Of IoT Based Physiological Parameter Monitoring System Using IoT Data. When The Physiological Data Are Exceed Certain Threshold, The Doctor Is Alerted By SMS. The System Is Useful For Monitoring The Health Status Of Elderly And Ill Patients Who Are Not Able To Visit Hospital Daily And Require Assistance In Critical Conditions.

FUTURE SCOPE

Currently Temperature/Humidity Sensor And Heartbeat Sensor Are Connected With The Raspberry Pi And Aurdino. In Future Diabetic Sensors Will Be Implement In This Project.

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