Physiological Parameters Monitoring System Using Raspberry Pi

Prof. R.J Sapkal[1], Ankita M. Sharma[2], Shradha D. Surnar[2], Monica D. Sonkamble[2]

[1]Assistant Professor, Department of ENTC, BVCOEW, Pune, Maharashtra, India

[2]Department of ENTC, BVCOEW, Pune, Maharashtra, India

ABSTRACT

In these days devotion towards owns body is one of the important factors. The main motive of this project is to save time of people for regular checkup. Here we are using new technology like raspberry pi and GSM for health care and monitoring actions. We are using temperature sensor, heart rate sensor to check the physiological parameters, also wireless communication is done in this project to upload the result on website. So anyone can operate it from anywhere. Using GSM modem, SMS will be sending on doctor's mobile number, if the values are more than threshold value. Here we are also using telegram app to send message.

Keywords : Raspberry Pi, Temperature sensor, heart rate sensor, wireless communication, GSM modem, Telegram app.

I. INTRODUCTION

Today ease in the life is provided with the help of technology. Every time measuring health parameters of patient manually is not possible. So different technologies can be used for this work, so as to maintain health. An electronic device can be connected to the patient's body which will read physical quantities such as temperature, heart rate and blood pressure. This will help to overcome delay in measurement of parameters. Due to lack of timely and proper health many times patients suffers. If portable system is used for monitoring elderly and ill patients who cannot use hospitals.

This paper introduces a kit that is portable and can be used to implement measurement of various physiological parameters of a patient. This system will be web based system so that patient's health can be monitored online by doctor. System we are introducing cannot be used for critical condition but can be used for periodical monitoring.

System will send message on application such as telegram and SMS as an alert to doctor if parameters exceed threshold value. These abnormal values will be shown in message. So that it would save further problem and proper measures can be taken.

II. SYSTEM OVERVIEW

The figure below (Figure.1) gives the block diagram of the system used for physiological parameter measurement and sending message to the doctor. The kit is used as a wireless system so that the message sent on SMS and telegram application can be observed easily. We are using raspberry pi for processing of different parameters and displaying it on web server.
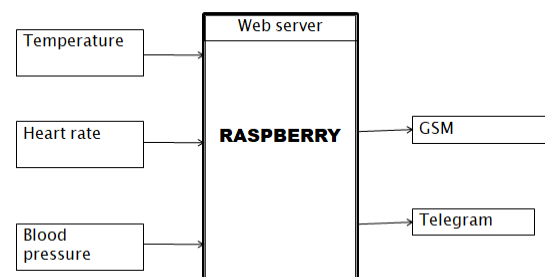

Figure 1. Block diagram of system.

Here we can see three parameters that are being measured are temperature, blood pressure and heart

rate. These are taken by different sensors detailed description is discussed.

A. Introduction to Raspberry Pi

Figure 2. Raspberry pi B+ Model (3)

A minicomputer which that contain processor, graphics card, and memory in a single package is the device widely known as raspberry pi (Figure.2) [1]. The board is developed for the users who wanted to use the system without using the computers and any other operating device [1]. These model was developed in UK, it is about the size of a credit card [1]. This model is later upgraded (Model B & Model B+) to 512 MB [1]. This board can be used for operating whole system as the power supply is needed only for raspberry pi. There is a Broadcom BCM2835 (SoC) that is system on a chip, that has an ARMI176JZF-S 700 MHz processor, on board the 256MB of RAM and Video Core IV GPU [1]. There is no hard disk in raspberry pi so it uses SD card for other purposes like booting and storing data. SD card is used for storing data, programmes and operating system like Linux this is one of the advance feature of this time [1]. All the programmes and its input are handled by the raspberry pi through its operating system. It also contain audio of good quality and quality video playback that is HD (high definition) [1].

Here we are using this model (Figure.2) for interfacing different sensor. The input taken by raspberry are all digital so for now we are displaying some basic parameters but in future other parameters can be displayed.

B. Temperature sensor

DS18B20 is used here for measurement of body temperature as shown in figure below (Figure.3). This is a temperature sensor which can be used for measuring distributed body temperature. The advantages of this sensor includes low measurement time, high monitor precision, etc. Only one data line is required for communication with microcontroller as it communicates over a 1-Wire bus. A 9-bit to 12-bit Celsius temperature measurements are provided by DS18B20 digital thermometer.

Figure 3. Temperature sensor

Precision of the device is ±0.5°C for a range of -10°C to +85°C. The range for which DS18B20 is working properly is   -55°C to + 125°C. There is no need external power supply to drive the device because the power is taken directly from data lines. Only one microcontroller is required over a large area to control several DS18B20s. The reason behind this is its ability of performing function on same I-Wire bus because of unique 64-bit serial code provided to each DS18B20.

C. Heart rate sensor

We can see the heart rate sensor in the figure given below (Figure.4). This heart rate sensor is attached to the patient's body and it will help us to find heart rate [1].
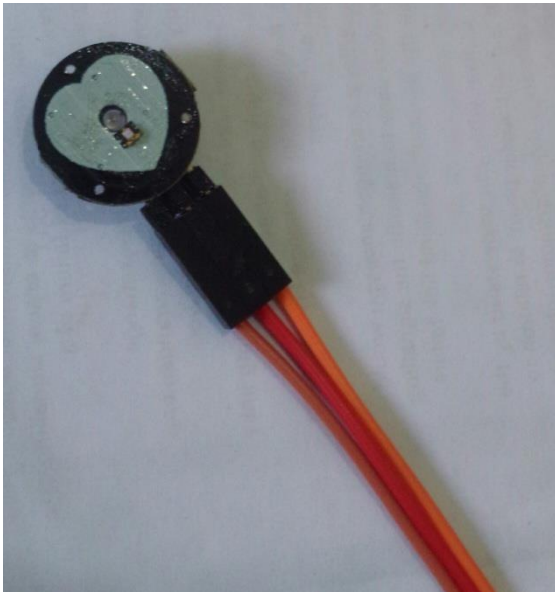
Figure 6. Message display

IV. CONCLUSION

Different medical health parameters like blood pressure, heart rate, and temperature are calculated in this paper using wireless technology and raspberry pi. A single calibrated kit is being used which can be carried anywhere according to patient's requirement. This kit is interfaced with android smart phones which will provide a greater range of access to both the doctor and its patient. The system helps in eliminating the problems arising due to the manual measurement, as sensors are being used the measurement is more accurate and there are more possibilities of real time monitoring. The system will help to reduce the visits to hospital every time patient needs a diagnosis. Registered patients of doctor will get more effective result easily available to them.

V. REFERENCES

[1]. Abhilasha Ingole, Shrikant Ambitkar, Sandeep Kakade, Student member IEEE "Implementation of health-care monitoring system using Raspberry Pi" IEEE ICCSP 2015 conference.

[2]. Dhiraj Sunehara SMIEEE, Pini Ramakrishna "Web based patient health monitoring system using Raspberry Pi" IEEE 2016 international conference.

[3]. Jigar chauhan, Sachin Bojewar "Sensor networks based healthcare monitoring system".

Figure 4. Heart rate sensor

III. RESULT

The results are shown in three ways

Web server:

The physiological parameters will be shown on the website as shown in figure below (Figure.5). Only doctors and patient can login in this site for a given user. The login page makes system transparent for patient's family.
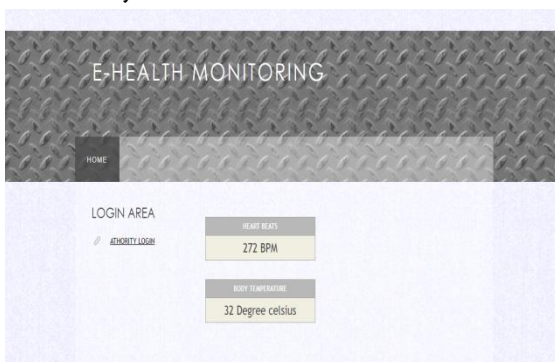

Figure 5. Website display

Mobile SMS:

The message will be delivered at registered number with the help of GSM module as shown below (Figure.6).
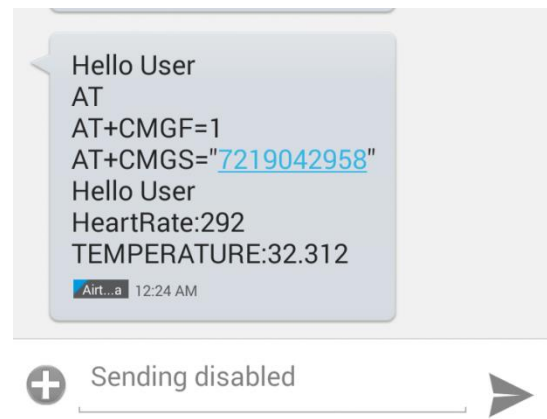
[4]. Nishigandha D. Agham, Vijaya R.Thool,Ravindra C.Thool " Mobile and web based monitoring of patient's physiological parameters using LabVIEW" 2014 Annual IEEE conference(INDICON).

[5]. RKumar, Dr.M.Pallikonda Rajasekaran "IOT based patient monitoring system using Raspberry Pi