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# Real Time Patient Health Monitoring Using Raspberry PI.

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**ABSTRACT**

Regular numerous lives are influenced on the grounds that the patients are not convenient and legitimately worked. Likewise, for constant parameter qualities are not productively measured in facility and in addition in medicinal facilities. At times it gets to be troublesome for medicinal centers to as often as possible check patients' conditions. Likewise, constant checking of ICU patients is impractical. To manage these sorts of circumstances, our framework is helpful. The main aim of this project is to design and implement real time health monitoring system using Raspberry Pi. Here we are going to implement a system which is used to monitor the health of the patient and to update the information regarding patient health. In this we used temperature sensor and heartbeat sensor to check the patient health. The readings from the sensors are sending to raspberry pi board. It will compare the sensor values with some critical values, if those values have crossed the critical values then an update has been sent to the registered mobile number using GSM and those readings will be updated to the server.

**Keywords**: Raspberry pi, Heart beat sensor, Temperature sensor, GSM, LCD

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## INTRODUCTION

Steady checking of wellbeing and crucial parameters of patients is fundamental to give satisfactory social insurance. As crucial parameters and soundness of a patient can vary after some time, there ought to be a system to continually report them to the specialists, medical attendants or guardians, so that prompt consideration can be given to the patient if required. In past, WSNs have been utilized to gain information for modern checking and diagnostics. Current patterns in Telemedicine, Telecare, E-wellbeing and E-medication are pointed towards upgrading the present social insurance frameworks to ceaselessly screen the soundness of patients through constant redesigns of their medicinal records [1]. Progresses in electronic circuit scaling down and Micro Electro Mechanical Systems (MEMS) have given little sensor hubs which can be utilized to sense basic physiological signs from patient's body and transmit them to required destination over a wireless system. Sensor hubs present in Wireless Sensor Networks (WSNs) are asset compelled on the grounds that they have constrained battery power, preparing force and correspondence transfer speed [2].

Nonetheless, they have considerable information procurement and dispersed figuring abilities which make them urgent for detecting and observing applications. Understanding wellbeing checking is one such application where WSNs have found a key part. Wearable physiological sensors can be put on patient's body to always screen imperative parameters of the patient, for example, body temperature, circulatory strain, and respiratory rate and so on, and transmitted to the specialist over a remote system. With the assistance of such systems, specialists, attendants and overseers can remotely and continually screen the soundness of the patients.

Likewise, patients can move around inside a given range while their imperative parameters are being checked. Here we are using GSM for transferring of patient health details to nearest hospitals or doctors. GSM based wearable physiological sensors can be utilized to screen the indispensable parameters of the patients and transmit them to required destination nothing but a hospital. The specialists can have a procurement to get to this data and give required therapeutic consideration to the patients. They got execution is examined in correlation with the required execution of physiological signs utilized for patient wellbeing observing as a part of functional. The current framework goes for monitoring the patient health is through man availability i.e., doctored or nurse availability to monitor the patient health. They keep up a record of the patient health status and give the instructions to that particular patient. The whole procedure is done physically.

## MATERIALS AND METHODOLOGIES

The proposed framework mostly goes for building up a framework to give some data about the patient status report to the hospitality without presence of doctor or nurse to monitoring the patients. In this framework the points of interest have redesigned in server, at whatever point they require it they need to make an impression on the framework. In this proposed framework we are utilizing GSM, heart beat sensor, temperature sensor and raspberry pi to monitor the patient heath status and then for uploading that information to the server. In this framework the patient health monitoring status is uploaded to server, at whatever that information again sends to the hospitality or nurses in the form of SMS by GSM. In this proposed framework we are utilizing GSM, and Raspberry pi.

The main hardware components are:

- Temperature sensor
- Heart beat sensor
- Raspberry pi

It is a sensor used to measure temperature. The LM35 series are precision integrated circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. It measures temperature more accurately than thermistors. It is sealed and does not undergo oxidation. The sensor gives the digital output of heat beat when a finger is placed on it. When the sensor starts, the LED flashes in unison with beat. The output generated is in Beats per Minute (BPM) rate. This gives patient the ability to leave the hospital but still he has to stay in some known places to ensure the ability to reach him in emergency cases. Even with this solution the patient can't move freely and be far from his home. Raspberry pi is a system on chip that integrates the major functional elements in order to increase the performance, and

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reduce the power consumption, size and cost. The Raspberry Pi is a credit-card sized computer that plugs into your TV and a keyboard. It is a capable little computer which can be used in electronics projects, and for many of the things that your desktop PC does, like spreadsheets, word-processing and games.

## RESULTS AND DISCUSSION

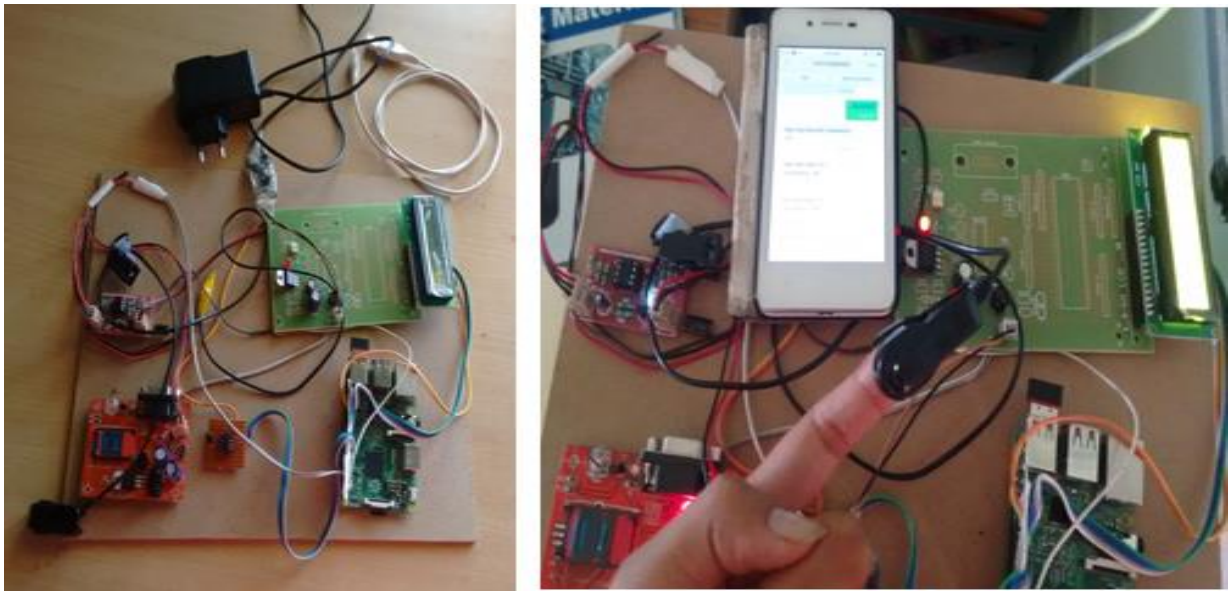

**Figure 1: Hardware Design**


**Figure 2: Heart beat and temperature values display and sending to mobile**

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## Users Page - GPRS LOGGER

Logout Refresh

c5287@gmail.com

FROM TIME: 2013-01-01 00:00:00

TO TIME: 2018-12-31 23:59:59

DEVICE NAME: c5287

Get Data | Refresh

***** Date/Time format:2013-10-23 11:29:21 *****

| SI.NO | DATE | Data1 | Data2 | Data3 | Data4 | Data5 | Sensor1 | Sensor2 | Sensor3 | Sensor4 | Sensor5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 2016-05-24 17:40:59 | 0 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 2016-05-24 17:38:10 | 0 | 85 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 2016-05-24 17:37:09 | 0 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3 | 2016-05-15 16:16:04 | 77 | 81 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 4 | 2016-05-24 17:36:22 | 103 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | 2016-05-15 16:21:55 | 77 | 81 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 6 | 2016-05-15 16:22:27 | 86 | 81 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | 2016-05-24 17:35:01 | 0 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | 2016-05-24 17:34:23 | 91 | 85 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 2016-05-24 17:33:22 | 88 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 2016-05-24 17:32:03 | 0 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 2016-05-24 17:30:05 | 93 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 | 2016-05-15 16:28:33 | 79 | 81 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 13 | 2016-05-16 03:49:47 | 78 | 83 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 14 | 2016-05-16 03:50:23 | 81 | 83 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 15 | 2016-05-16 03:51:10 | 77 | 83 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 16 | 2016-05-16 03:52:13 | 76 | 83 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 17 | 2016-05-16 03:53:04 | 75 | 83 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 18 | 2016-05-16 03:54:04 | 81 | 83 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 19 | 2016-05-16 03:55:12 | 73 | 85 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 20 | 2016-05-24 17:29:08 | 0 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 21 | 2016-05-24 17:28:13 | 86 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 22 | 2016-05-24 17:27:13 | 102 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 23 | 2016-05-24 17:26:08 | 0 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 24 | 2016-05-24 17:25:07 | 79 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 25 | 2016-05-24 17:24:42 | 72 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 26 | 2016-05-16 04:10:13 | 87 | 83 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 27 | 2016-05-24 17:41:31 | 100 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 28 | 2016-05-24 17:42:19 | 88 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 29 | 2016-05-24 17:43:03 | 87 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 30 | 2016-05-24 17:44:19 | 100 | 85 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 31 | 2016-05-24 17:45:05 | 0 | 84 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 32 | 2016-05-24 17:46:04 | 0 | 85 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 33 | 2016-05-24 17:47:04 | 0 | 85 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

**Figure 3: Server page**

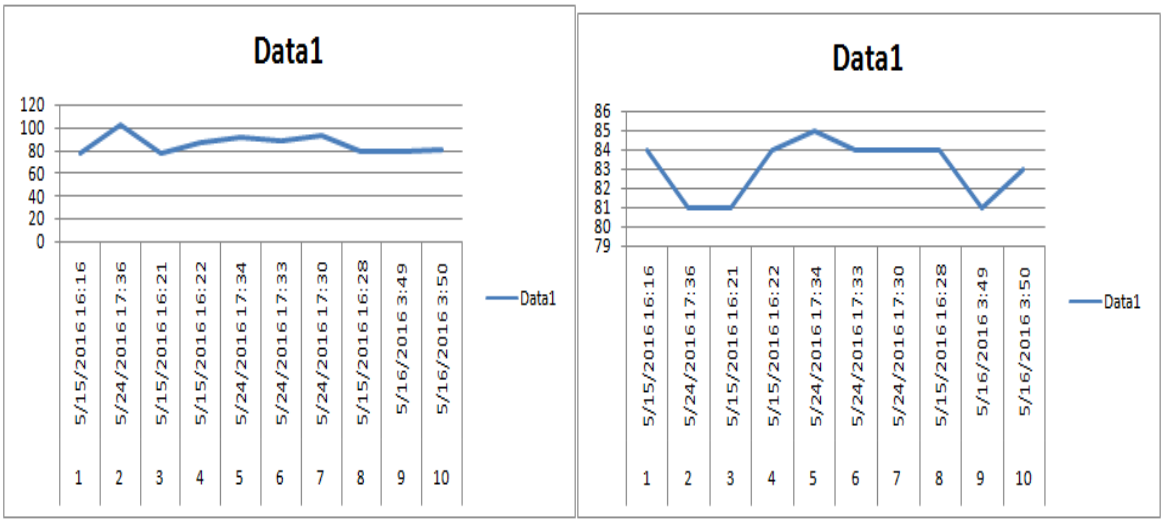


**Figure 4: Time versus heartbeat (Data1) &Time versus temperature (Data1)**

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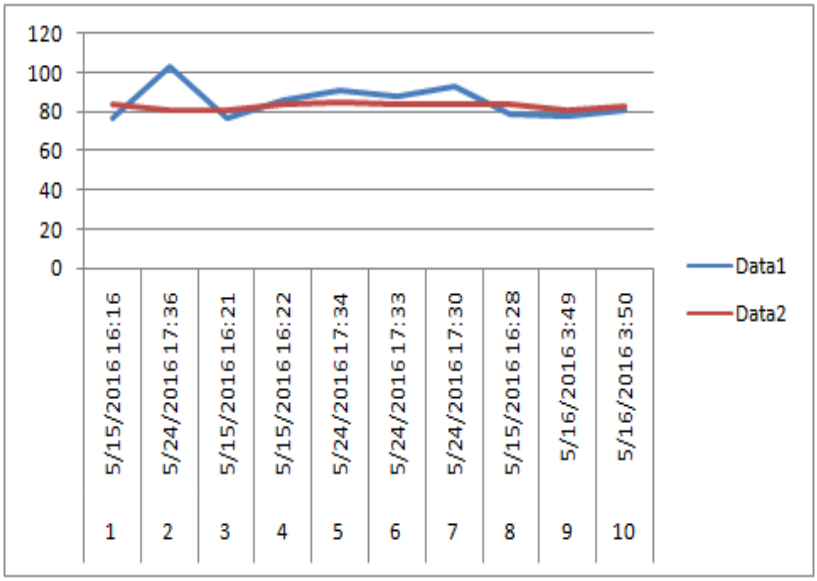


**Figure 5: Time versus heartbeat and temperature**

Figure 3 & 4 shows the relationships between time & heart beet, time & temperature and time & heart beat and temperature. Here observes the temperature of patient through the temperature sensor LM 35 and also it observes the pulse rate or heartbeat of the patient through the heart beat sensor. Then after words it checks the reference readings of temperature and heartbeat. Whenever the readings exceed the normal values of heart beat and temperature then the values uploaded to server also u will get a message and call.If the heart beat is exceeding the critical value (Here the critical value of heart beat sensor is 78) then the heart beat values is send to server, also u will get a message and call. If the temperature is exceeding the critical value (103F) then the temperature values are uploaded to server also u will get the message and call.

## SUMMARY AND CONCLUSION

As health care services are important part of our society, automating these services lessen the burden on humans and eases the measuring process. Also the transparency of this system helps patients to trust it. When threshold value is reached, the alarm system that consists of buzzer and LED alerts the doctors and he can act more quickly. The objective of developing monitoring systems is to reduce health care costs by reducing physician office visits, hospitalizations, and diagnostic testing procedure. The GSM technology helps the server to update the patient data on website. Many further improvements can be made in our system to make it better and easily adaptable such as adding more advanced sensors. The biometric information of the patient which is stored and published online can be given to scientists and researchers of medical fields to analyze the value and find patterns or for other research work. To simplify the hardware and reduce wiring we can have used wireless sensors. Instead of medical application we can use our system in industrial and agricultural application by using sensors like humidity sensors, fertility check sensors, etc.

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