Patient Monitoring Using Solar Power

Dilshad P¹, Mohammed NibinNoushad², Mohammed Sajid V V³, Saju Simon. S. G⁴
¹²³UG Scholars, ⁴Assistant Professor, Department of Biomedical Engineering, Noorul Islam University, Kumaracoil, K.K Dist (India)
dilshadpl1995@gmail.com, nibinnoushad007@gmail.com, sajidansar12342@gmail.com, sajusimon.nta@gmail.com

Abstract-- The heart rate and temperature are the vital parameters of human body. All diseases are directly or indirectly related with heart rate and temperature. Variation in temperature and heart rate are main indication of problems affecting the body. There will be a shortage of electricity in places like remote and tribal areas and it is very difficult to run this type of device. So we are adding solar power to energies the monitoring system. The heart of our system is ATmega 328 microcontroller. The program for calculating the physiological variable was added to Arduino software. When fingertip is placed over the heart rate sensor and temperature sensor the values can be viewed with help of LCD. If the temp is above 37 degree Celsius buzzer beeps alerting the condition of the patient. This solar powered device is very reliable and helpful for saving life of patient living in remote and tribal areas.

Keywords-- Temperature, Heart Rate, Solar Panel, LCD, Arduino Uno.

I. INTRODUCTION

This project focuses on the design and implementation of the hardware element of the patient monitoring system. This project is used to get information about health parameter like body temperature, heart rate. Monitoring the condition of the patient by using sensors such as temperature sensor LM35, Heart rate sensor and necessary alarm system is set with the system. Now a day’s amounts of patients are increasing including heart diseases, COPD, etc. The primary sign of these diseases are abnormal temperature and heart rate [1]. To identify the diseases, it is necessary to check basic parameters of the body. Hence the project senses the temperature and heartbeat of a patient.

We are using solar power as the power supply. This project is mainly finds its application at remote areas tribal areas, homes, bedded patients etc. This project put forward that helps the patient to find their temperature and heart rate without the help of doctor.

The parameters are displayed on the LCD display and can be useful to all type persons. The slight change in the temperature or heart beat can be easily recorded by using this patient monitoring system.

By employing this system manpower can be reduced. Also since there are no human factors for the monitoring and recording purpose the errors can be eliminated and accuracy will be increased the health care [2]. Sensors possess a major role in monitoring systems. Also patient monitoring systems is a major improvement because of its advanced technology. So we are just connecting the temperature sensor and heart beat sensor, so that simultaneously we can monitor the patient’s condition and hence ruling out the use of the thermometer and stethoscope also other devices to check the condition of the patient. When armpit or fingertip is placed over the temperature sensor and heart beat sensor then patient’s temperature and the heart rate can be monitor. This system is easy to operate that using with Visual LCD.

II. BACKGROUND STUDY

Patient monitoring systems are considered as a part of M-health technology. These can also be named as m-health or mobile health. These systems are used for practice of medical and public health with the help of mobile devices [3]. These monitoring systems can be used onsite or remotely. The primary sign of many diseases are abnormal temperature and heart rate [4]. The conventional methods include the monitoring of temperature with thermometer and measuring heartbeat with stethoscope. It has some problems like time loss, accuracy and difficulty to measure [5]. A remote medical monitoring system for heart beat rate and temperature data was introduced that uses costly sensors. Complicated programs and algorithms are necessary for computer based heart rate monitoring systems [6]. Also developed methods are available, that using different sensors for acquiring signals from patient body and monitoring it. But they are expensive and accuracy will be less. If power supply fails these devices won’t work.

Power supply is the main problem that comes across with the patient monitoring system. Also accuracy changes with different microcontrollers and sensors.
III. PROPOSED METHOD

Here we are measuring temperature as well as heartbeat of a patient in remote areas using the temperature sensor LM35 and a heart rate sensor. The microcontroller here used is ATmega328. It is an 8-bit microcontroller and has 32K of flash memory with 1K of EEPROM and 2K of internal SRAM. The Arduino Uno is a microcontroller board based on the ATmega328. Also this chip has an analogue to digital converter inside of it. The main advantage of the Arduino technology says about, it can directly load the programs in to the device without the need of a hardware programmer to burn the program. The temperature sensor used in this system is LM 35. And the LM35 series are precision integrated-circuit LM35 temperature sensors that whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 sensor thus has an advantage over linear temperature sensors calibrated in Kelvin and it does not require any external calibration and provide typical accuracies of ±¼°C at room temperature and ±½°C over a full -55 to +150°C temperature range. The heart rate sensor used to sense the heartbeat with the help of an LED and LDR. Also using 16x2 LCD display and which is very basic module and is very commonly used for various devices and circuit.

The key aspect of the block diagram shown above is the solar panel which is used for the power supply. It is a renewable source of energy, in the case of remote areas electricity is a big problem for using patient monitoring system. For solving such type problem we use solar energy to power the entire unit. This will help to use the system in remote area with long battery backup. It mostly helpful for patients in remote area like tribal area etc. The measured parameters are viewed in LCD. The program for doing this work is given to the Arduino using Arduino software.

Solar panel is connected to the battery, it stores the energy and used by the system.

IV. RESULT

This paper focuses on the design and implementation of the hardware element of the health monitoring system. This project is used to get information about health parameter like body temperature, heart rate. Monitoring the condition of the patient by using sensors such as temperature sensor LM35, Heart rate sensor and necessary alarm system is set with the system.

![Patient monitoring system](image)

The fig 5.1 shows the hardware setup of patient monitoring using solar power. It consist of Arduino UNO, LCD, Temperature sensor with buzzer, Heart beat sensor and Set/Reset Switch. The designed device will help the patients in remote areas like tribal area etc. The measured parameters are viewed in LCD. The program for doing this work is given to the Arduino using Arduino software.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name</th>
<th>Time</th>
<th>Heart Rate (bpm)</th>
<th>Temp. (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sajid</td>
<td>Morning</td>
<td>68</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Noon</td>
<td>68</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Night</td>
<td>70</td>
<td>32</td>
</tr>
<tr>
<td>2.</td>
<td>Nibin</td>
<td>Morning</td>
<td>65</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Noon</td>
<td>66</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Night</td>
<td>68</td>
<td>33</td>
</tr>
<tr>
<td>3.</td>
<td>Dilshad</td>
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<tr>
<td></td>
<td></td>
<td>Noon</td>
<td>66</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Night</td>
<td>68</td>
<td>36</td>
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<tr>
<td>4.</td>
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<tr>
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<td></td>
<td>Noon</td>
<td>72</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Night</td>
<td>68</td>
<td>33</td>
</tr>
</tbody>
</table>
Table 5.1 shows the experiment based on time. From the above survey, it is concluded that temperature is low in morning and it goes on increasing. Heart rate does not show a much variation only slight variations are there.

V. Conclusion

The heart rate and temperature are the most important physiological parameters of human body. All the disease has a direct or indirect relation with heart rate and temperature. The signs of the disease that are affecting the body are by raising the temperature and variation in heart rate. So it is necessary to measure the body temperature and heart rate of a patient.

This proposed work mainly focuses on designing a system that aids all patients by monitoring their temperature and heart beat time to time. The proposed system is powered by solar power. There for we can use this in remote areas where there is deficiency in electricity. The system mainly consist of Temperature sensor (LM35), Heart beat sensor, Arduino UNO, Solar panel, Battery. Here we can measure temperature and heartbeat of a patient quickly.

The temperature and heart rate of patient is shown in LCD.

The main advantage of this system is we can measure these parameters of patients in remote area or where the unavailability of electricity.

REFERENCES


