

# Implementation of Heart beat and Temperature Monitoring system per Minute rate

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## ABSTRACT

The upcoming ageing society and emerging of some newly discovered chronic diseases, the demand of hospital nursing for people has significantly increased. For every disease knowing the heart beat per minute rate is Mandatory. The heart beat is indirectly depends on temperature i.e. when the Temperature is high then glucose levels will be decrease and brain sends a signal to heart to increase the blood pumping rate is nothing but heart beat. In previous systems measured heart beat, but in this system the heart beat is measured with temperature and when its reaches' more than 120bpm sends a message to doctor.

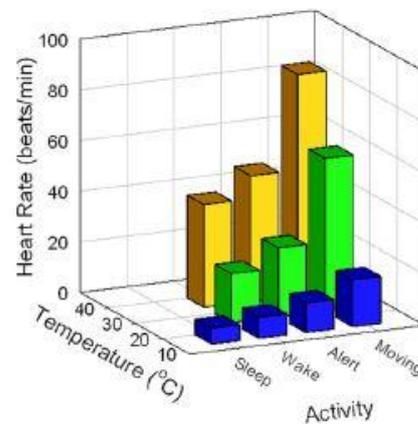
**Keywords** –Microcontroller, Optical sensor, Temperature Sensor, GSM MODEM.

## 1.0 INTRODUCTION

The heartbeat of a person can be measured through a finger tip i.e. means when blood pumps from heart to body and that makes the blood volume inside the finger supply route to change time to time[1]. This fluctuation is detected by an optical sensing mechanism. This design is accurate and low cost implementation. The nature temperature at present noticed by the general purpose temperature sensor. When the heart beat of a person reaches to abnormal levels it sends an indication to the doctor (or any other concerned person) normal heart Beats per Minute (BPM) is 72. [7], [10], and [11]

### 1.1 Temperature and heart beat relation

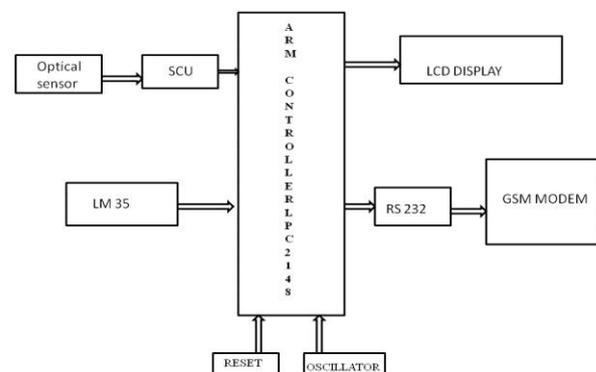
According to survey conducted by Joanna Piercy · Kip Rogers · Michelle Reichert1· Denis V. Andrade Augusto S. Abe, Glenn J. Tattersall, William K. Milsom. From 1973 to 2006 by the different personse in different conditions like when the person is moving, quite, alert and sleeping condition, the temperature variations from difference as [7],[8] normal rate to presence rate shown in figure1.1



**Fig1.1** Variarion of heart beat according to survey[7][8]

The heart rate variation with respective temperature and different activity based differences compared with normal temperature

## 2.BLOCK DIAGRAM SHOWN BELOW WITH HARDWARE BLOCKS



### 3.HARDWARE IMPLIMENTATION

#### 3.1 Optical Sensor Unit

The IR LED emits the IR rays and when there is less volume of blood the photo diode receives less IR rays and the current through the reverse biased p-n junction of photo diode decreases. When the volume of blood is more due to pumping of blood by heart the IR rays are reflected back to the photo diode and the current through it increases. Thus there are continuous fluctuations in photo diode current.

#### 3.2 Signal Conditioning Circuit

The reflected IR signal detected by the photo diode is fed to a signal conditioning circuit that filters the unwanted signals and boosts the desired signals. For this purpose a general purpose Op-Amp is maintained high for necessary amplifications. At the output a LED is connected that will blink with heartbeat. Here a transistor is used at the cathode of LED which is turned on for every 6 seconds. Through this the actual heartbeat can be obtained by multiplying the obtained value with 10 [9].

#### 3.3 Temperature Sensor

Temperature sensor LM 35 is accomplished. This is an assembled exactness temperature sensor circuit is little and can be set anyplace in the body. LM execution is the voltage 35 is on body temperature. The external LM35 obliges no slicing or arrangement to normal correctness's of  $\pm 1/4$  ° C to room temperature and  $\pm 4.3$  ° spread a wide temperature scope of -55 C to + 150 °. This straightforward sign is given to ADC, in the arm controller which changes with the basic sign and holds progressed micro-controller[5,6].

#### 3.4 ARM Microcontroller Unit

As said earlier the output of the signal conditioning circuit changes from Vcc to 0V continuously due to heart beat [1]. A timer is made on and after 6 seconds of time is made off. In this time span the number of fluctuations in conditioning circuit is counted and this is multiplied by 10 to get the beats per second value. The arm consist of dual 10 bit analog to digital converters on is convert the Analog data in to digital form which is coming from optical sensors and another microcontroller is used to convert the analog data which is coming from temperature sensors. and then after processing the calculations of heart beat and temperature These values are displayed on the LCD display. When these values

exceed the particular range data is sent to GSM module through serial port [2, 3, 4, and 9].

#### 3.5 Transceiver and Serial Port Interface

The output of the TTL logic is always 5V and 0V. So these values are needed to be amplified before being transmitted to the GSM Module for this purpose MAX232 is used. It has incorporated switched capacitor charge pump circuits to generate required voltage levels.

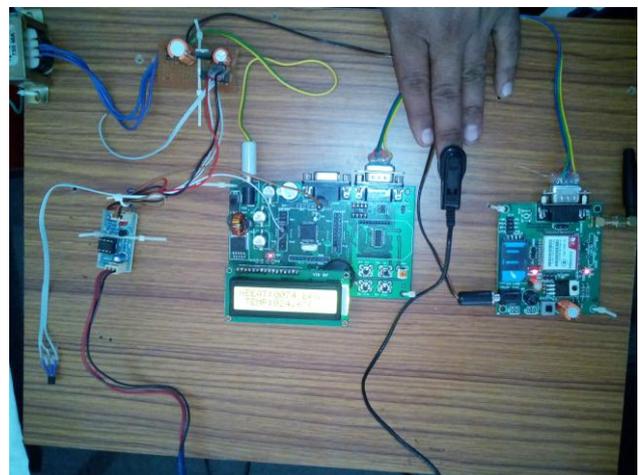
#### 3.6 GSM MODEM Module

An external GSM module is connected through serial port. Through this the extended AT commands for Writing the SMS message can be controlled. Whenever the sensed values exceed the predefined values a signal is sent to GSM Module through transceiver and a serial port.

### 4. SOFTWARE DESIGN

Keil 'C' was used for writing code and flash magic software used for duping into ARM controller.

### 5.RESULTS



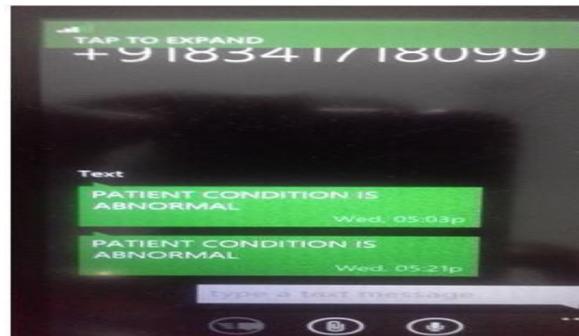
**Fig5.1 Hard ware design**

The above fig shows that the total structure of the circuit with sensor and GSM modem and ARM controller



**Fig 5.2:**

Initial starting message displas when the system starts after switch on



**Fig.5.5.** Message sent through GSM to mobile



**Fig 5.3 :**20-30<sup>0</sup>c temperature and Heart beat rating at Alert stat



**Fig 5.4:**30<sup>0</sup>-40<sup>0</sup>c temperature and Heart beat rating at Alert stat

## 6.FEATURES

This system consumes low cost to develop and having good sensitivity of measuring pulse more over it is simple and sensible temperature rating, and easy communicating data through GSM modem

## 7. CONCLUSION

In this paper mechanism to continuously monitor the heart BPM and body temperature of a person is illustrated using a microcontroller interfaced with an optical sensor unit. This design is interfaced with a GSM module so that when the heartbeat and body temperature reaches to abnormal level a message is sent to the doctor. It is an intrusive process and the patient can be monitored 24x7 without much medical assistance from outsiders.

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A portable electronic system for health monitoring

of elderly people

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