Arduino Based Wireless Patirnt Monitoring System

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ABSTRACT*:* We live in a generation where diseases have reached such an unprecedented level. Diseases are so much that the greatest worry for many people should be their health. Lifestyle diseases such as cardiovascular ailments and blood pressure are becoming more prevalent. Cardiovascular diseases are some of the leading causes of deaths in world. Heart beat and blood pressure readings are by far the best parameters that could promote early detection of cardiac events. The number of patients is also increasing exponentially, bringing a tremendous challenge to health resources in our very own country India where they have never been enough. My project is therefore designed to ease the burden on doctors and nurses in terms of watching and testing of some parameters such as such as body temperature and transmitting wirelessly using GSM module. Usually it would be used to monitor the sick and the aged at home especially in the absence of a guardian or a relative. My project will be specifically designed to test heart rate and body temperature using appropriate sensors. These two parameters are a great pointer to health status of a patient or a person. Temperature abnormality can be a symptom of so many diseases such as malaria. Abnormality in heart rate is usually a pointer to many complications the function of this system is thus to monitor the temperature and Heart Beat of the patient and the data collected by the sensors are sent to the Arduino Uno, the Arduino processes then transmits the data over the air via shield to a doctors, nurses or a relatives phone.

KEYWORDS: Arduino board, heartbeat, temperature, gsm

I.INTRODUCTION

Telemedicine is a field that did not begin yesterday; there has been a lot of development behind this field. As with all other fields, technology plays a very big role as it eases the burden on health officials, reduces the cost of treatment, surveillance and diagnosis of patients. Patient monitoring systems are already being used in hospitals among other places. However, their costs are prohibitive and hospitals in third world countries can barely have them. This means someone will always have to be there to watch over a patient whether in hospital or at home. The proposed patient monitoring system would be beneficial for medical practitioners to do proper and better treatment. It is also beneficial to relatives or guardians who have are taking care of the sick. As I have stated, the signals for a case of patient at home. My project is thus to create an affordable prototype of heart beat and temperature monitor. It will use Arduino Atmega328, GSM module, LCD display, temperature sensor and heart beat sensor. The Arduino is programmed to know when there is an abnormality in the parameters and also to send signals as a SMS.

II.LITERATURE SURVEY

The human heart is composed of four chambers which are two atriums and two ventricles. The right atrium receives blood returning to the heart from the whole body. That blood passes through the right ventricle and is pumped to the lungs where it is oxygenated and goes back to the heart through the left atrium, and then the blood passes through the left ventricle and is pumped again to be distributed to the entire body through the arteries. Use of light to measure

heart rate is a field of study where abundant research has been done in the past few decades. Fingertip sensor relies on measurement of a physiological signal called Photoplethysmography (PPG) [2], which is an optical measurement of the change in blood volume in the arteries. Fingertip sensor acquires PPG signals by irradiating wavelength of light through the tissue, and compares the light absorption characteristics of blood under these wavelengths. In transmittance fingertip sensor, light is shone through the tissue using an LED and is detected on the other end using a photo detector. In contrast, reflectance fingertip sensor uses a photo detector on the same side as the LED to detect the light reflected by the tissue. The opposite affect is on the reflected light. This can be intuitively justified, as the more blood there is in the tissue, the more the light passing through the tissue gets blocked. Since this improves the amount of light reflecting back, the signal observed in the reflectance configuration increases. Similarly, as the light gets blocked, not enough light reaches the photo detector in the transmittance configuration, and therefore a decline in the signal is observed. Reflectance configuration is not limited to areas where the transmittance configuration cannot be used. It can be employed to measure PPG signal from the ear lobes or the fingers just as the transmittance configuration. However, due to their thin cross-sectional area, fingers and ear lobes transmit much of the light shone through them, resulting in lower signal intensity in the reflectance configuration.

III. SYSTEM ARCHITECTURE
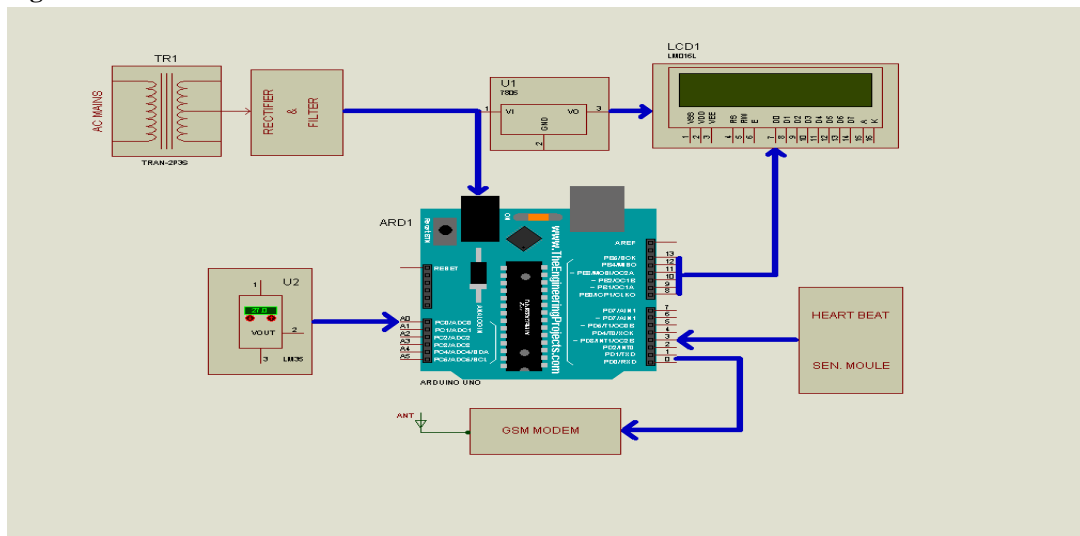
3.1 Block Diagram

Fig (a) Block diagram of System

3.2   Description of Block Diagram

The primary function of this system is to monitor the 2 health parameters of a patient. We have monitored Temperature and Heart Beat of the patient using corresponding sensors by putting finger on the sensor and the data collected by these sensors are sent to Arduino Uno kit. The Microcontroller ATmega328 then transmits the data to the user in the form of SMS

GSM Modem.
Here we are using SIM900A GSM modem in order to transmit the information. From the transmitter, the recordings of patient health parameters are sent as an SMS to the Care Taker or to Nurse or to Doctor. Not only we send the information through GSM module as SMS, we also display the readings on LCD. And when the conditions go abnormal then we sense those values and then alarm the people around by blowing the alarm and also it sends an Emergency SMS.

Temperature and Heart Beat Sensor

The connections of devices are shown in fig (b). The output of temperature monitor is analog in nature so it is provided to analog input pin of Arduino A0. Whereas the Heart Beat sensor module produces output in the form of pulses, so it is provided to PWM pin 3. The Microcontroller communicates via serial communication to GSM modem using AT commands. These commands are given in program. The Tx and Rx pin of Arduino board are connected to Rx and Tx pins of GSM modem respectively.

When patient put his finger on heart beat sensor then the sensor counts the heart beat according to pumping of heart and generates output in the form of pulses. This count is given to Arduino pin no. 3, the controller counts the pulses and then controller counts the pulses this count is displayed on LCD display. The controller generates message using AT commands and sends it via Tx pin of Arduino kit to Rx pin of GSM modem.

To measure temperature the patient should have to hold thermistor between his two fingers (this is because we have to measure body temperature).

LCD

The measurement will displays on LCD panel and also sent to GSM modem. The GSM modem sends message to doctor/nurse/care taker. In this way the circuit works. The main advantage of circuit is we can leave patient alone and we will get updates of patient's health.

Power

This can be a regulated +5V power source (e.g. from the +5V pin of the Mini USB Adapter or an Arduino NG) connected to the +5V pin of the Arduino Mini. Or, a +9V power source (e.g. a 9 volt battery) connected to the +9V pin of the Arduino Mini.
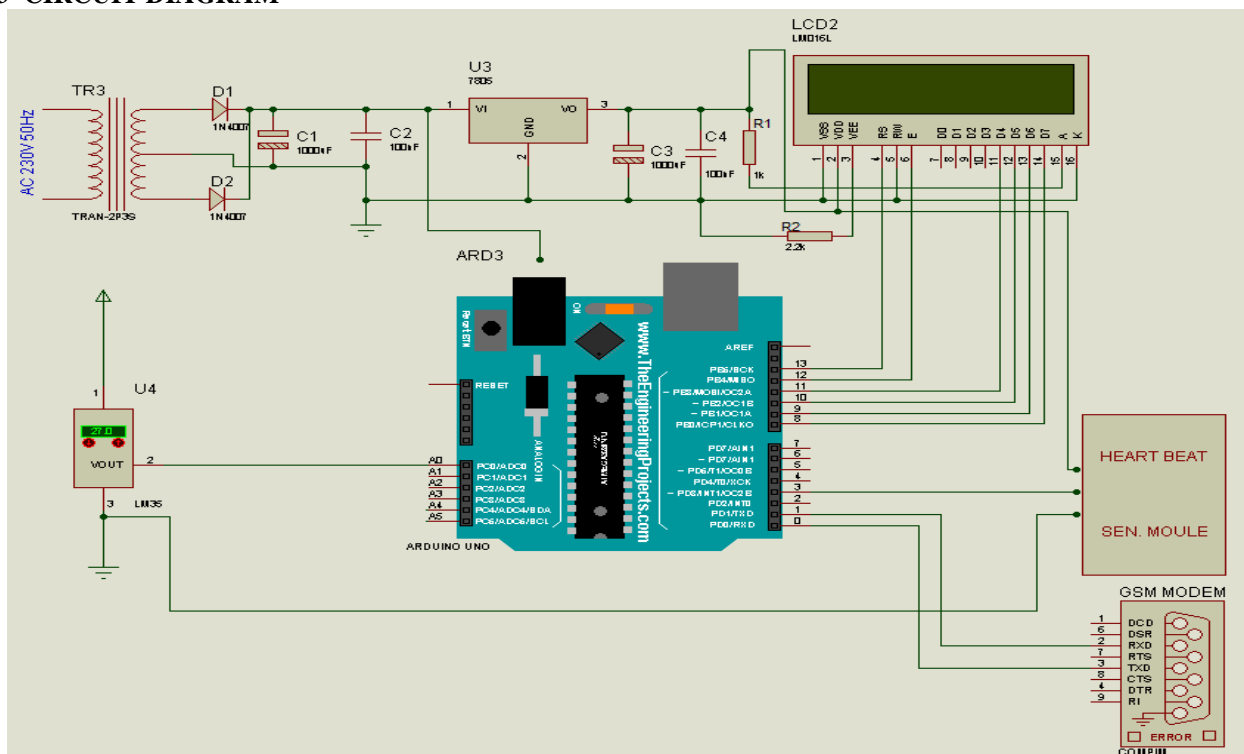
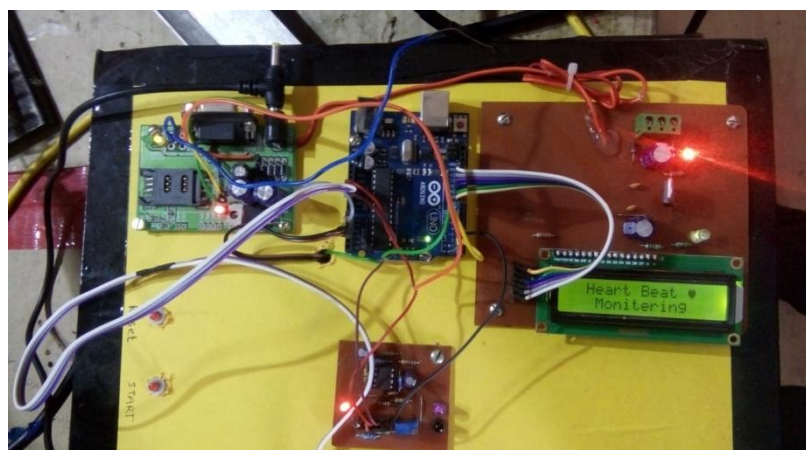### 3.3 CIRCUIT DIAGRAM

Fig (b) Circuit diagram of system

IV.EXPERIMENTAL RESULT

Fig(c) Output image of system

V. CONCLUSION

Thus our group actively with project, and we develop this project named as "**ARDUINO BASED WIRELESS PATIENT MONITORING SYSTEM".** With the help of proposed health monitoring system which is GSM based there is no need of continuous follow-up of Patients at long distance Patient will be under observation of Doctor. The device bridges gap between Doctor and Patient's. The system is simple and power efficient and made of low cost devices.

VI.ACKNOWLEDGEMENT

REFERENCES

1. World health organization website: Http://www.who.int/mediacentre/factsheets/fs310/en/
2. International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 4, April 2016.
3. www.ti.com/product/LM35
4. www.academia.edu
5. www.engineersgarage.com/electronic-components
6. Store.arduino.net
7. www.circuitbasics.com
8. www.circuitstoday.com/transformer
9. Semiconductor Physics and devices by Donald Neaman