

## MEASURING THE HEART RATE USING ARDUINO

### ABSTRACT:

Technological inventions in the field of disease inhibition and keep of patient health have enabled the evolution of fields such as monitoring systems. Heart rate is a very important health factor that is directly related to the soundness of the human cardiovascular system. Heart rate defines as number of times the heart beats per minute, help us to examine different physiological conditions such as biological workload, stress at work and concentration on responsibilities, tiredness and the active state of the autonomic nervous system. While the heart is beating, it is actually pumping blood throughout the body, and that makes the blood volume inside the finger artery to change too. This variation of blood can be sensed through an optical sensing mechanism placed around the fingertip. The signal can be improved and is sent to Arduino with the support of serial port message. With the help of handling software heart rate observing and calculating is performed. The IR LED transmits an infrared light into the fingertip, a part of which is imitated back from the blood inside the finger arteries. The photo diode senses the portion of the light that is imitated back..

### INTRODUCTION:

A heart rate monitor is a monitoring device that agrees a subject to calculate their heart rate in real time or record their heart rate information for later study. The heart rate of a fit adult at rest is around 72 beats per minute (bpm) & babies at around 120 bpm, while elder children have heart rates at around 90 bpm. The heart rate increases gradually during exercises and returns slowly to the recreation value after exercise [2]. The rate when the pulse returns to normal is a sign of the healthy person. Lower than normal heart rates are usually a symptom of a condition known as bradycardia, while higher is known as tachycardia. Heart rate is simply calculated by placing the thumb over the subject's arterial pulsation. By multiplying the obtained number by 2 Heart rate of the matter is found out. This method although easy, is not perfect and can give bugs when the rate is on top. Heart rate monitor with a temperature sensor is definitely a useful instrument in eloquent the pulse and the temperature of the subject or the patient

## **SYSTEM REQUIREMENTS:**

### **HARDWARE REQUIREMENTS:**

- ARDUINO UNO
- HEARTBEAT SENSOR
- PULSE SENSOR
- Liquid Crystal Display(LCD)

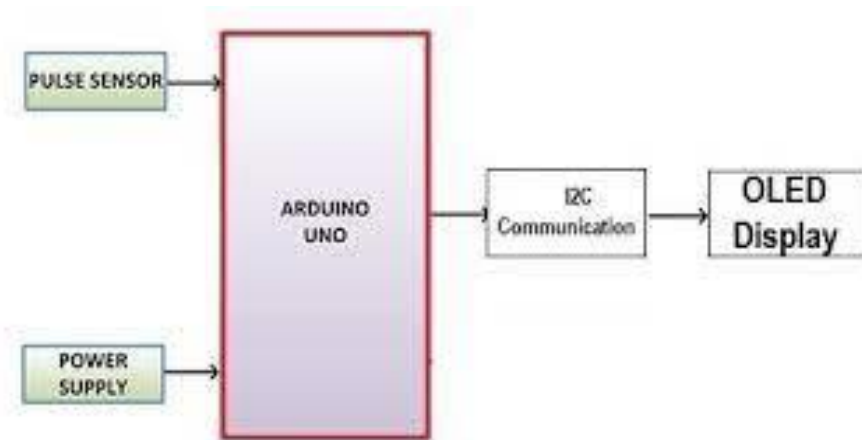
### **SOFTWARE REQUIREMENTS:**

- Arduino IDE

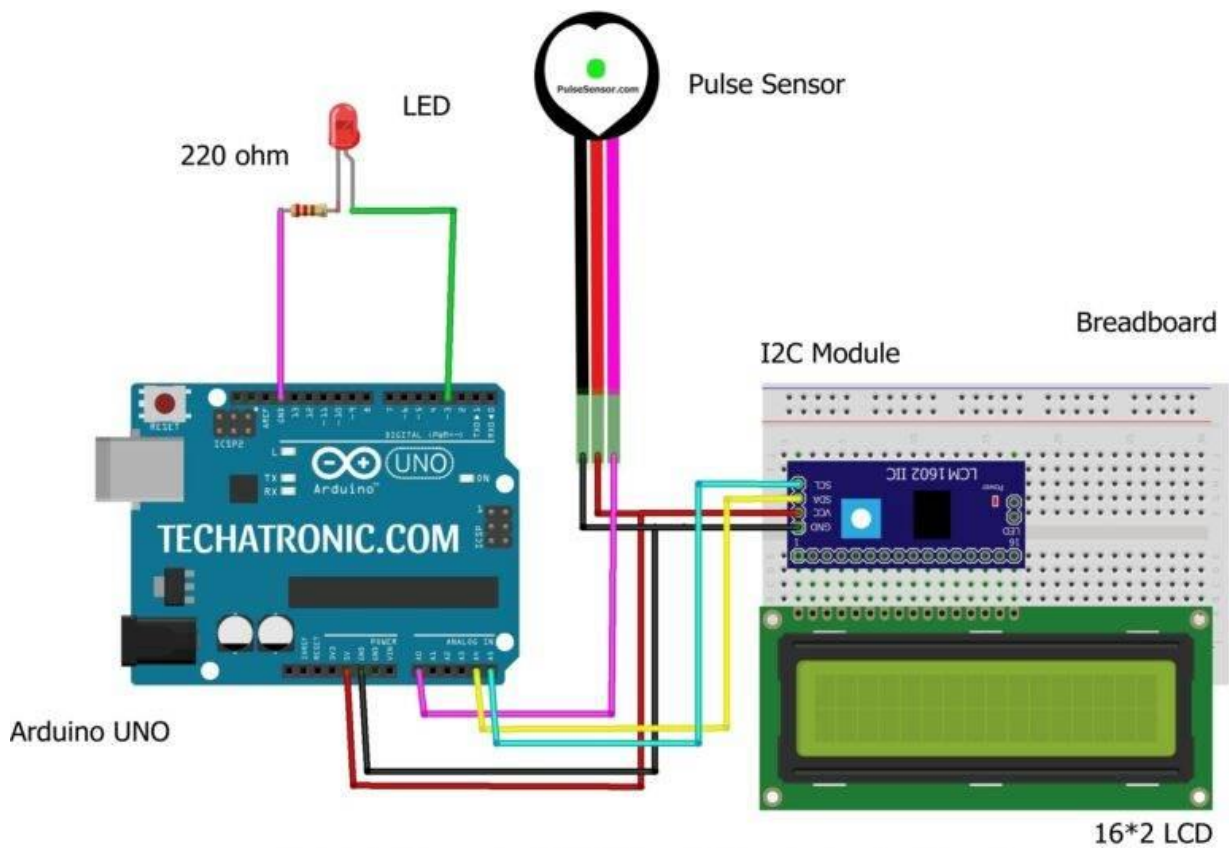
## **WORKING OF THE CIRCUIT:**

Type the code to Arduino UNO software and power on the system. The Arduino requests that we put our finger in the sensor and press the switch. Place any finger (with the exception of the Thumb) in the sensor clasp and push the switch (catch). In view of the information from the sensor, Arduino computes the pulse and shows the heartbeat in bpm. While the sensor is gathering the information, take a seat and unwind and don't shake the wire as it may result in a flawed qualities. After the outcome is shown on the LCD, in the event that you need to play out another test, simply push the lay catch on the Arduino and begin the methodology by and by

## BLOCK DIAGRAM:



## CIRCUIT DIAGRAM:



**ADVANTAGES:**

- It is a fantastic tool for giving a clear indication and evaluation of the condition of cardiovascular system during physical activity
- The device is portable, durable hence could be used by any individual in the proposed region even if not a cardiologist.
- It can also be easily used by individual users, e.g. athletes during sporting activities.
- This device could be used in clinical and nonclinical environments.
- This system detect heart beat level and informs as soon as the heart beat level does not fall within the permissible limit.

**FUTURE SCOPE:**

The current version of the Processing application displays PPG waveform and heart rate but does not record anything. There is a lot of room for developments. ---Logging heart rate calculate means and PPG samples along with the time-stamp information available from the PC ---Beeping sound alarm for heart rates below or above threshold level. ---Heart rate trend over time, etc

**CONCLUSION:**

Biomedical engineering combines the design and problem solving skill of engineering with medical and biological sciences to enhance patient's health care. Cardiovascular disease is one of the major causes of untimely deaths in world, heart beat readings are by far the only viable diagnostic apparatus that could help early detection of cardiac events. By using this we can compute ones heart rate through fingertip. This paper emphasizes on the heart rate monitoring and alert which is able to monitor the heart beat rate condition of patient. The system regulates the heart beat rate per minute and then sends short message service (SMS) alert to the device. It is portable and cost effective. It is a very effective system and very easy to handle and thus provides great flexibility and serves as a great improvement over other conventional monitoring and alert systems.

## REFERENCES:

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- [2] Souvik Das “The Development of a Microcontroller Based Low Cost Heart Rate Counter for Health Care Systems” International Journal of Engineering Trends and Technology Volume4Issue2-2013.
- [3] Embedded Lab. Introducing Easy Pulse: A DIY photoplethysmographic sensor for measuring heart rate. <http://embeddedlab.com/blog/?p=5508>, 2012.

