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# Heart Attack Prediction Using Arduino

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**Abstract:** Nowadays several folks are mislaying their lives because of coronary heart assault and absence of clinical interest to affected person at accurate level. Hence, on this mission we're imposing coronary heart assault prediction device with the use of Arduino.

The first level of coronary heart assault is surprising change in coronary heart beat. Suddenly it is going too excessive or too low. At this level we predict the coronary heart assault by the means of an Arduino and a coronary heart beat sensor, then will inject drug into the body, by means of controlling valve or pump which can be positioned at the center of drug hose. Now controlling coronary heart assault is quicker less difficult and predictable. In this mission coronary heart beat sensor can be connected to affected person's body and ship the coronary heart beat to the Arduino. Now it assesses the values and if the values aren't always regular then the step motor that manage the drug will rotate and will increase the drug flow. For controlling the quantity of drug to be injected to an affected person's body, we use a step motor.

## I. INTRODUCTION

Science and technology by the means of manner of innovations and improvements has made lifestyles less difficult for all in all spheres of lifestyles. One of such is in clinical sciences in which clinical employees at the moment are capable of accumulating important clinical facts from sufferers. Two of the maximum crucial ones are the dimensions of heartbeat and temperature. The Human Heart Rate Monitors (HRM) are gadgets that permit the person to benefit an actual time dimension of their coronary heart beat. They encompass a transmitter which detects the heart beat by the means of measuring the range of instances the coronary heart beats according to minute and a receiver that determines the coronary heart beat on receiving alerts from the transmitter. The first wi-fi Electrocardiography (ECG or EKG) coronary heart beat screen or monitor invented in 1977 by Polar Electro for the Finnish National Cross Country Ski Team to assist them in training. The standards of "Intensity Training" have become a buzz all through the athletic international withinside the eighties, and in 1983 which caused the advent of the primary wi-fi coronary heart screen. By the 1990s, interest shifted from coronary heart beat display units for exceptional training to regular person health issues.

Human Cardiovascular System includes the coronary heart, blood vessels and about 5 liters of blood that the blood vessels transport. Heart beat dimension shows the steadiness of the human cardiovascular system. Heartbeat is one of the very crucial parameters of the cardiovascular system. The dimension of coronary heart rate is utilized by clinical specialists to help withinside the analysis and monitoring of clinical situations. It is likewise utilized by individuals, including athletes, who are interested by tracking their coronary heart rate to accumulate most efficiency. There is a dramatic growth in incidents of coronary heart and vascular sicknesses because of the way of life and bad ingesting conduct. Consequently, coronary heart issues are at the growth on more youthful sufferers. Statistics indicates that coronary heart sickness is now the main purpose of demise. In a medical environment, coronary heart rate is measured under managed situations like blood dimension, coronary heart beat dimension, being attentive to heartbeats by the use of Stethoscope and Electrocardiogram (ECG), however those strategies are pricey and have to be carried out by reputed and experienced clinical employees. Drawbacks with ECG technique are: too many sensors and cables connections, fluctuations withinside the ECG sign baseline, energy line noise, and interference because of muscular movements and excessive price of procurement. More so, ECG isn't always appropriate for non-stop tracking on burnt sufferers and the conduction gel used can also additionally purpose soreness and infection at the pores and skin.

## II. LITERATURE SURVEY

Shweta Gajbhiye et al. [1] applied coronary heart assault early prediction by the use of android software. In this device pulse sensors senses the coronary heart rate and oximeter assessments the stage of oxygen in affected person body. The data of coronary heart rate and oxygen stage acquired by microcontroller can be displayed on LCD module and additionally shipped to Wi-Fi module ESP 8266 microcontroller. This microcontroller will similarly ship this data over net via Wi-Fi. The android software can be used to screen the coronary heart rate and oxygen stage over Wi-Fi.

Ponugumatla Kalyan et al. [2], M.Ganesan et al. [3], Avinash Golande et al. [4], Yosuf Amr ElSaadany [5] applied IoT primarily based total coronary heart sickness prediction and tracking device by the use of Arduino and raspberry pi. In this device AD8232 sensor will detect the coronary heart rate and dispatches it to the Arduino board. The Arduino board ships this data to raspberry pi three boards. The GPS receiver Ublox NEO-6Mv2 will come across the location of affected person and ships it to PL2303 USB to TTL module. This module will have USB connectors which alters the acquired USB statistics to conventional serial port statistics. This serial port statistics can be similarly furnished to raspberry pi three microcontroller. The data of coronary heart rate beats can be saved over a cloud by the use of HTML and Wi-Fi. Because of this the physician or respective person can effortlessly retrieve these statistics via cloud.

Saranya. E et al. [6], Fizar Ahmed et al. [7], Ani R, Krishna S. et al. [8] have applied an IoT primarily based total prediction and analysis of healthcare device. The stress sensor will degree a stress of blood in affected person's body. The LM35 temperature sensor will sense the temperature of body. Heart rate sensor will experience the beat of coronary heart. This data can be fed to Arduino. Arduino will show this data on LCD module as properly ships it to GPRS module linked to it. The data can be stored to cloud and physician will retrieve these facts via cloud server.

### III. PROPOSED METHODOLOGY

MAX30100 heart rate sensor will be attached to patient's body and send heart rate and SpO2 to the Arduino. Now Arduino checks the data and show it on the LCD, if the data is good and normal the LCD's backlight will be blue, else it will be red, and the step motor that control the drug flow will rotate and increases the drug flow. For controlling the amount of drug that will be injected to patient's body. we use a step motor that works like a dialysis pump. This kind of pump works by pushing the liquid that is inside a hose by pressing it. In this project we are going to interface MAX 30102, Pulse Oximeter with Arduino UNO board. The Heart beat is generally measured in Beats per minute i.e., BPM which is around 65-75 for a normal person and the Oxygen saturation level i.e., SPO2 is around 95%. The MAX 30102 sensor is used to detect the oxygen and heart rate. First the infrared radiation is sent and reflected by hitting the finger and then the amount of oxygen in the blood is determined by measuring the wave amplitude. Heart rate is also obtained by analyzing the time series response of this radiation. The MAX 30102 is an integrated module compatible with the Arduino and STM332. It integrates with an infrared LED, a photoelectric detector, an optical device and a low noise electronic circuit for ambient light suppression. Heart rate and oxygen data are also transmitted to the Arduino or other microcontroller via I2C communicator. The four majorly used pins of the sensor are as follows

VCC: Module power supply i.e., 3 to 5 Volts, GND: Ground, SCL: I2C Clock bus, SDA: I2C Data bus.

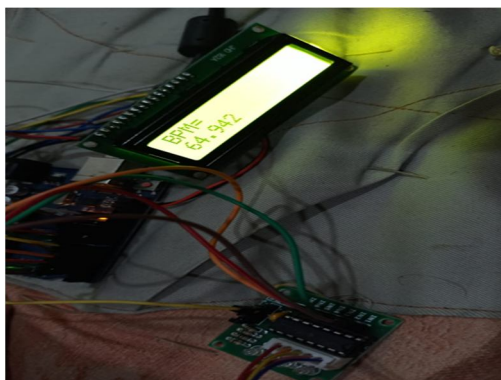
Once we finger comes in contact with the MAX 30102, it takes some time for initializing. After that we get correct reading while a buzzer is used to indicate the correct readings.

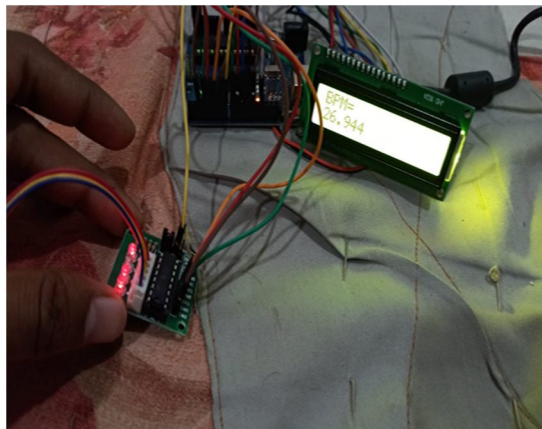
Once the pulse sensor starts reading the BPM values, we can see that on an LCD display or on serial monitor. The code is written in such a way that any reading of BPM which is between 30-100 can be considered as normal.

If the reading is less than 30 or greater than 100 then the motor attached to the Arduino gets powered up which then in turn is used to inject the medicine.

### IV. RESULTS AND OUTPUTS

When the sensor senses the heart rate going above or below the threshold the driver lights up and the stepper motor is on for the flow of medicine.





## V. CONCLUSION

In these days we have an increased number of heart diseases including increased risk of heart attacks. Our proposed system uses sensors that allow to detect heart rate of a person using heartbeat sensing even if the person is at home. The sensor is then interfaced to an Arduino that allows checking heart rate readings and transmitting them. The user may set the high as well as low levels of heart beat limit. After setting these limits, the system starts monitoring and as soon as patient heart beat goes above a certain limit, the system sends an alert to the controller which then transmits this and alerts the doctors as well as concerned users. Also the system alerts for lower heartbeats. Whenever the user logs on for monitoring, the system also displays the live heart rate of the patient. Thus concerned ones may monitor heart rate as well get an alert of heart attack to the patient immediately from anywhere and the person can be saved on time. This project could be a great help for people with heart problems especially aged people who find difficult to move and to be monitored frequently. Providing accurate, up to date and complete information about patient at the point of care. Enabling quick access to patient record for more coordinated efficient care. Securely sharing electronic information with patients and other clinicians. Helping providers more effectively to diagnose patients, reduce medical errors and provide safer care. Improving patient and provide interaction and communication, as well as health care convenience. Enabling safer, more reliable prescribing. Enhancing privacy and security of the patient data.

## VI. FUTURE SCOPE

Monitoring device that could be used to detect the heart beat anomalies of physically challenged individuals without hands. Also a graphical LCD can be used to display a graph of the change of heart rate over time. A serial output can be incorporated into the device so that the heart rates can be sent to a Personal Computer (PC) for further online or offline analysis. It could be integrated with mobile technology for e-health cloud transmission to health care providers

Physicians have been trying to predict heart attacks for as long as there have been heart attacks. Traditionally, they have relied on standard assessments of cholesterol, blood pressure, lifestyle factors and health conditions such as diabetes to predict whether a patient is likely to suffer a heart attack.

Researchers at UT Southwestern Medical Center have identified five tests that, when combined, improve prediction of heart disease, heart failure, heart attack and stroke compared to currently recommended approaches.

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