

B.M.S COLLEGE OF ENGINEERING

(Autonomous College Affiliated to Visvesvaraya Technological University, Belgaum)

Bull Temple Road, Basavanagudi, Bangalore-560019



MINI PROJECT 2021-22

DEPARTMENT OF ELECTRONICS AND
COMMUNICATION ENGINEERING

A PROJECT ON

COVID-19 DETECTION USING MODERN SENSORS & ML

Submitted by:

ASHUTOSH KUMAR – 1BM19EC022

DARSHAN KUMAR - 1BM19EC041

DEVRAJU MG - 1BM19EC043

GAYATRI U KULKARNI – 1BM19EC049

UNDER THE GUIDANCE OF

Mrs POOJA A.P.

(Assistant Professor, ECE, BMSCE)

OUTLINE:

- INTRODUCTION
- SCOPE OF PROJECT
- PROBLEM DEFINITION
- PROPOSED SOLUTION
- EXPECTED OUTCOME

INTRODUCTION

What are modern sensors?

- In the broadest definition, a sensor is a device, module, machine, or subsystem whose purpose is to detect events or changes in its environment and send the information to other electronics, frequently a [computer processor](#).
- Today's world is the world of technology. Where the innovators, scientist, industrialist are trying to produce something as efficient as humans in different fields and in everyday work.
- Humans can think, can sense and react accordingly. At this point of time we are unable to give machines a self-thinking brain as humans, however we are capable enough to equip these machines with sensors.

Role of Modern Sensors?

- People are becoming more and more aware of health and are concerned towards keeping health at utmost priority. Modern sensors are playing a vital role in this industry. Industries are making sensors which can sense heartbeat, oxygen level, temperature, sleep etc. when these types of sensors are put together in one device it gives birth to **smart watch. Eg : Apple smart watch**

Current trends of Modern Sensors using ML.

- Researchers are trying to help industries make a complete product which combines two fields that are modern sensors for sensing and accruing data and machine learning techniques to make a decision making system for various diseases and abnormalities.

SCOPE OF THE PROJECT

civilization is progressing, heart and breathing related complications are escalating. Conditions like heart attack, Lack of sleep, cardiac arrest, asthma, COPD are becoming more prominent day by day.

In India alone, more than 10 million people are affected by heart attack every year.

It becomes critically important to carefully monitor and visualize these conditions and find a sustainable solution for reducing the potential risk.

A warning system would help in early detection of problem and thus decreasing the threat to life.

Also, the information obtained from the sensor is not an ad-hoc function of heart and lung related issues but can also be used to indicate other fatal underlying problem.

The big MNC's are doing some serious work to deliver something very effective and useful. In this race of mnc's we have come across a major marvel that is active watch or smart watch.

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.

Most people infected with the covid-19 virus will experience mild to moderate respiratory illness, increase in temperature, decrease in blood oxygen level and can recover with the of proper care and medications. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

Our aim is to develop a decision-making system which could possibly alert the subject of possible COVID-19 risk by measuring body temperature blood oxygen level and heart beat

PROBLEM DEFINITION:

- **FULFILLING THE NEEDS.**
- **GOALS AND OBJECTIVES.**
- **RESEARCH COMPONENT.**

fulfilling the needs:

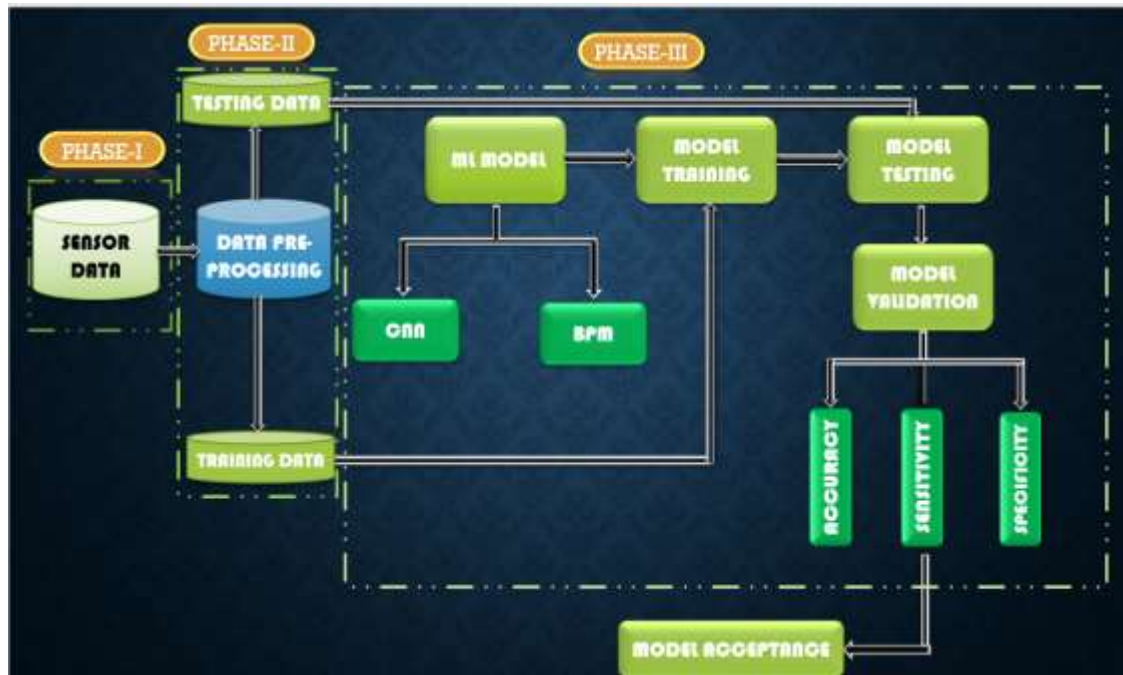
- In this project we are developing a tool which would help us in the ongoing pandemic by calculating the risk and alerting us .
- Since the basic symptoms of COVID-19 are increase in heartbeat, decrease in oxygen level in our body and an increase in our body temperature. Our tool would optimize these values and alert us About the prevailing risk.
- An individual could wear them as wrist bands and keep a track of these levels all the time. Through this project we would help people to be risk-free and create a healthy environment to live in.

goals and objectives

- COVID – 19 tracking tools or contact tracing apps are getting developed at a rapid pace all over the world.
- Our study aims to understand various useful features of this tool and to present different concepts of data science applied within the tool along with its importance in the ongoing pandemic.
- The main objective behind this tool is to help the people improve their response system. This will work as a key tool in helping community workers carry out door to door surveys, and focused awareness campaigns.
- People would now be able to track themselves and get an alert. Arthur Samuel (1959). Machine Learning is a field of study that gives computers the ability to learn without being explicitly programmed.

PROPOSED SOLUTION:

- PHASE 1: DATA ACQUISITION THROUGH SENSORS
- PHASE II: DATA PRE-PROCESSING AND SPLITTING
- PHASE III: ML MODEL DEVELOPMENT AND IMPLIMENTATION



PHASE 1: DATA ACQUISITION THROUGH SENSORS



HEARTBEAT SENSOR:

A pair of photodiode and infrared LED can be used to measure this change. When our heart beats, more blood is passed through the veins and therefore amount of absorption of light also changes. Using precise instruments, we can register this change in intensity as a heartbeat and do the required calculations.

OXIMETER:

The process of measurement of amount of oxygen in blood is very similar to that of heartbeat. Also, the hardware components required for it are almost the same, with one additional red led, blasting visible light along with the Infrared LED.

TEMPERATURE:

Using a Non contact infrared sensor (MLX90614), we will firstly measure the amount of infrared emission from our source and then with its transfer function given in the datasheet, calculate the body temperature. Reading received are very much accurate and precise. Since the temperature is being measured with the infrared radiation, physical contact of the sensor to the body is not required. This is a good aspect of this sensor as it helps in reducing the spread of diseases and pathogens through contact.

PHASE II: DATA PRE-PROCESSING AND SPLITTING



1. The data from the sensors will be acquired using Arduino and will be sent to the system for data preprocessing.

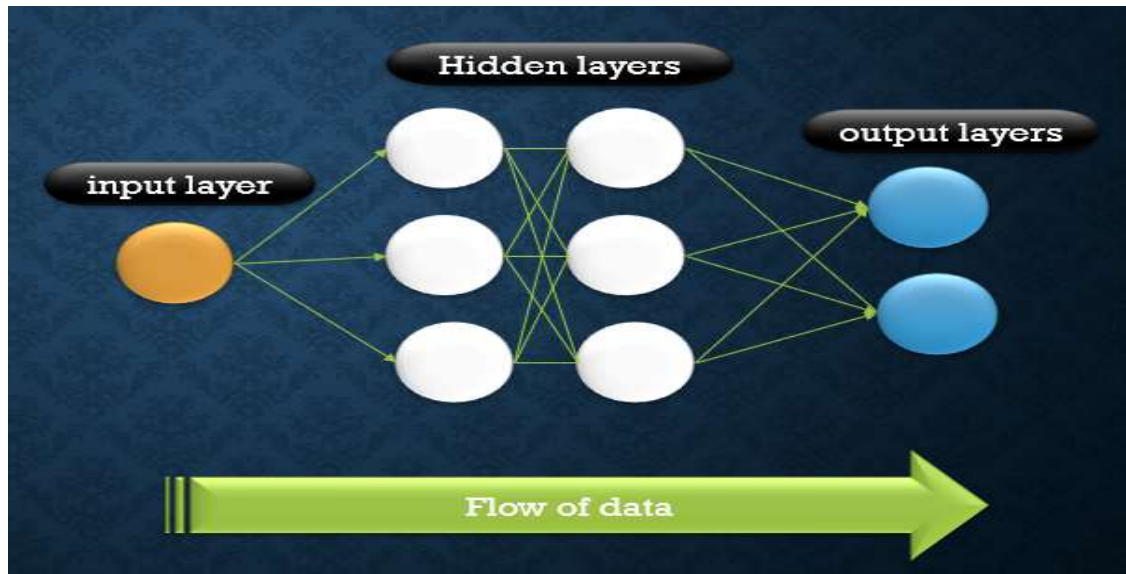
2. In data preprocessing we'll be cleaning the data removing the noise using data science methods.

3. The acquired from the sensors would be then reduced according to the needs of the ML model.

4. Data labeling will be performed after the data is cleaned. In data labeling we'll classify the data as high COVID-19 risk and no COVID-19 risk.

5. will be then split into training and testing. Training data will be 80% of total data available and 20% will be used for testing. This is because the ML model needs to be trained properly to perform with high accuracy in real life. If we ll give garbage to the ML model it ll return garbage. This is why we need to preprocess the data.

PHASE III: ML MODEL DEVELOPMENT AND IMPLIMENTATION



- In this project we are going to use a 2 class classifier using deep nural network.
- We will be giving an input to the trained and tested model and the model in return will give if the sample is at high risk of covid-19 or not