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A **Project Phase-II** report on

“USING DYNAMIC MODELS SHOWCASE PANDEMIC PREVENTION MEAS”

Submitted in fulfillment for the requirements of VIII semester degreeof

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IN

INFORMATION SCIENCE AND ENGINEERING

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CERTIFICATE

Certified that the Project on topic **“ USING DYNAMIC MODELS TO SHOWCASE PANDEMIC PREVENTION MEASURES EMPIRICAL COVID-19”** has been successfully presented at **Don Bosco Institute of Technology** by **SWARAJ (1DB15IS053), CHANDRA KIRAN B (1DB16IS011), and MANOJ KUMAR O (1DB16IS025),** in partial fulfillment of the requirements for the VIII Semester degree of **Bachelor of Engineering in Information Science and Engineering** of Visvesvaraya Technological University, Belagavi during academic year 2020-2021. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The Project report has been approved as it satisfies the academic requirements in respect of Project work for the said degree.

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ABSTRACT

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 and recover without requiring special treatment the COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Although for most people COVID-19 causes mild illness, this can be fatal. Our project mainly focuses on the monitoring of patient's health and the precautions taken to avoid the constant transmission using SPO2 level monitor and thermal scanning and providing support to the patients by helping them with the basic needs with the help of food delivery agencies and NGOs. And to help with the prevention, this work is aimed at revealing certain facts about the current situation not presented clearly by data predicting and forecasting about future situations using an enhanced version of the SIR Epidemic model explained further in this work an IoT-Based System for Automated Health Monitoring and Surveillance AI-assisted sensors can be used to help predict whether or not people are infected with the virus, based on signs such as body temperature, coughing patterns, and blood oxygen levels. Tracking people's location can be another usefulfeature.

TABLE OF CONTENTS

CERTIFICATE	**i**
ACKNOWLEDGEMENT	**ii**
ABSTRACT	**iii**
TABLE OF CONTENTS	**iv**
LIST OF FIGURES	**v**

SL NO.			CHAPTER NAME	PAGE NO.
1			**INTRODUCTION**	**01**
	1.1		Introduction	01
	1.2		Problem Statement	01
	1.3		Objectives & Aims of Project	01
	1.4		Existing System	02
		1.4.1	Disadvantages of Existing System	03
	1.5		Proposed System	03
		1.5.1	Block Diagram	03
		1.5.2	Data Flow Diagram	04
		1.5.3	Advantages of Proposed System	05
2			**LITERATURE SURVEY**	**05**
3			**METHODOLOGY**	**12**
	3.1		Software Requirement Specification	12
	3.2		Requirements	12
		3.2.1	Functional Requirements	12
		3.2.2	Non-Functional Requirements	12
		3.2.3	Hardware Requirements	12
		3.2.4	Software Requirements	12
	3.3		Description about Modules	13
		3.3.1	Tesseract OCR	13
		3.3.2	Open CV	13
		3.3.3	Python IDE	13
		3.3.4	Blynk	14
		3.3.5	Anaconda & Thingspeak	15
4			**PROJECT DETAILS**	**17**
	4.1		System Design	17

SL NO.	CHAPTER NAME	PAGE NO.
4.2	High Level Design	18
5	**SYSTEM IMPLEMENTATION**	**19**
5.1	Pseudo Code	19
5.2	Module Description	21
5.2.1	Monitoring spo2 and Temperature	21
5.2.2	Medicine Requirement	21
5.2.3	Food Delivery	22
5.2.4	Hand Sanitizer	23
	5.2.4.1 Mask Detection	24
	5.2.4.2 Corona live Status	24-25
5.2.5	Machine Learning Algorithms	26
5.2.5.1	CNN Algorithm	26
5.2.5.2	Naïve Bayes Algorithm	22
5.2.5.3	Random Forest Algorithm	23
5.2.5.4	SGD Classifier Algorithm	23
5.2.5.5	LSTM Algorithm	24
5.2.5.6	MFCC Algorithm	25
5.2.5.7	CNN Algorithm	25
6	**SNAPSHOTS**	**26**
7.1	Snapshots of code	32
	CONCLUSION & FUTURE ENHANCEMENT	**39**
	BIBLIOGRAPHY	**40**

LIST OF FIGURES

Fig No.	Description	Page No.
1.4.1	Braille Systems & Finger Reader	02
1.4.3	Sign Language	03
1.5.1.1	Block Diagram of Project	03
	Data Flow Diagram for Speech Recognition	04
	Data Flow Diagram for Image to Speech	04
	Data Flow Diagram for Text to Speech	04
	Data Flow Diagram for Gesture to Text	05
	Digital Display showing Welcome & how you are	06
	Model of a System	06
	Architectural Diagram using PiCam	07
	Text Output for OK and Zero	07
	Reconstruction of Text in the Interface	08
	Experimental Setup & Test Mode Result	08
	Gesture to Speech	09
	Block Diagram of a System & Testing Prototype to Users	09
	The Databases Pictures to recognize the Gestures	10
	Gesture Pattern, Braille Output, Arduino Setup & Patterns	10
	GlovePi Prototype	11
	Sign Language & Filtered Image	11
	Tesseract OCR	13
	Open CV	13
	Espeak	14
	Anaconda Navigator	14
	Putty	14
4.2	Data Flow Diagram	16
	Text to Speech (TTS) Algorithm	18
	Image to Speech (OCR)	19
	Gesture to Text	20
	Speech to Text	21
	Decision Tree	22
	Formula for Naïve Bayes	22
	Random Forest Regression Algorithm	23
	SGD Classifier Algorithm	24

Fig No.	Description	Page No.
5.2.5.5	LSTM Algorithm	25

Chapter 1

INTRODUCTION

Corona virus disease (COVID-19) is an infectious disease caused by a newly discovered virus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Although for most people COVID-19 causes mild illness, this can be fatal. Our project mainly focuses on the monitoring of patient’s health and the precautions taken to avoid the constant transmission using SPO2 level monitor, thermal scanning and providing support to the patients by helping them with the basic needs with the help of food delivery agencies and NGOs. And to help with the prevention.

1.1 Problem Statement

There is no proper device which helps in constant monitoring for Covid patients. Alcohol gel hand sanitizers are usually applied by squirting the sanitizer liquid when one presses a pump with one’s hand. This causes many people to come into contact with the pump handle, which increases the risk of viral transmission. No conventional channel for food delivery for the covid-19 patients There is alternative to get the medicines delivered to the patient's house due to the panic caused by the virus. People being negligent of wearing face masks to prevent the spread of Covid-19, There is no ecosystem which helps helps in catering the basic needs for the patient during their quarantine period.

1.2 Aims and Objective of the Project

The main goal of our project is to design an ecosystem. It provides a solution for the patient suffering from covid-19 precaution and checkup. Monitor’s patient health by observing SpO2 and Temperature readings, Patient sends requirement of Medicine to NGO or order from medical Store. Patient sends requirement of Food to NGO Automatic had sanitizer machine. Face Mask Detection and Alerts Live Corona Status. A guiding bot which helps users with the project uses.

1.3 Existing System

Foot operated hand sanitizer dispensing device-A long press is made with the footer, such that the mechanical stress is made on the instrument. The mechanical stress made, is forced to spray out the Sanitizer. Zomato, swiggy is a delivery-oriented system that allows clients to order food from multiple restaurants at the same time.1MG and Med Plus allows patients to order medicine and other toiletries from the website which is delivered to the doorstep, there are specialized labs which are working on Covid testing and Officials who penalize people for not wearing a mask.

1.4 Disadvantages of Existing System

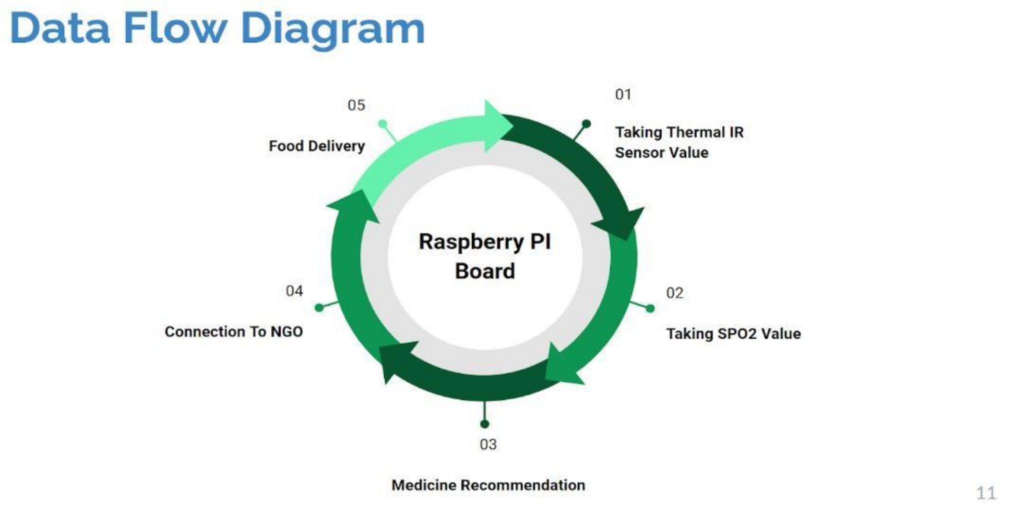
Many people to come into contact with the pump handle, which increases the risk of viral transmission. And sometimes due to the existing pedestal stand system not working people come in contact with the pump handle. Zomato and swiggy strictly do not deliver in the contaminated zone and the orders are being cancelled, Medicine is not easily available in remote areas and some people are still clueless or face difficulties to order medicines because of complicated catalogues and payment methods.

There is a whole gap caused between the positive tested patients and the medical personal working with them, it is unnecessary wastage of manpower for penalizing people for not wearing a mask.

1.5 Proposed System

Touchless system which dispenses sanitizer, Connecting patient with the food and medicine delivery. A device which monitors and shows live updates regarding the total number of positive Covid cases, Ecosystem which seamlessly connects the patients with all the essential needs which acts as one solution to all the complications faced by the patients, detects people who are not wearing a mask, A chatbot which shows information about the project working.

Block Diagram



Data Flow Diagram

Raspberry PI Board

01 Taking Thermal IR Sensor Value

02 Taking SPO2 Value

03 Medicine Recommendation

04 Connection To NGO

05 Food Delivery

11

Fig1.4.1.1 Block Diagram of Project

1.3.1 Data Flow Diagram

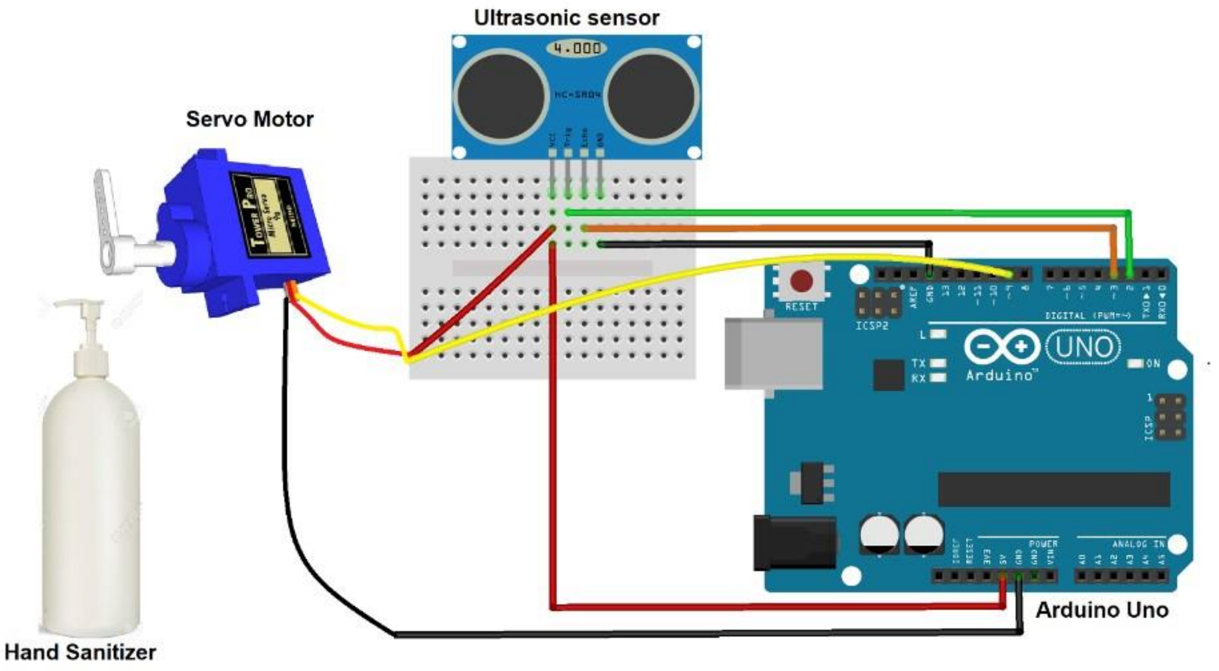


Fig 1.5.2.1 Data Flow Diagram of Automatic Hand Sanitizer.

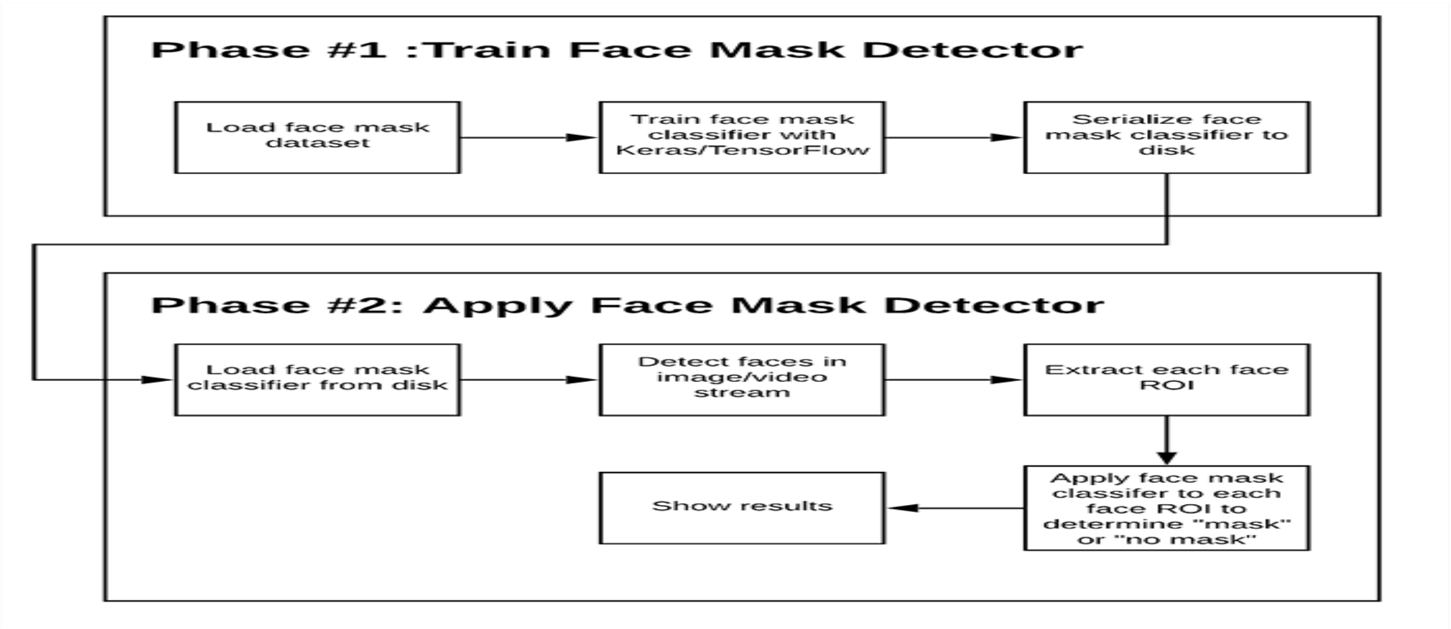

Phase #1 :Train Face Mask Detector
Load face mask dataset
Train face mask classifier with Keras/TensorFlow
Serialize face mask classifier to disk
Phase #2: Apply Face Mask Detector
Load face mask classifier from disk
Detect faces in image/video stream
Extract each face ROI
Apply face mask classifer to each face ROI to determine "mask" or "no mask"
Show results

Fig 1.5.2.3 Data Flow Diagram for Face Mask Detection

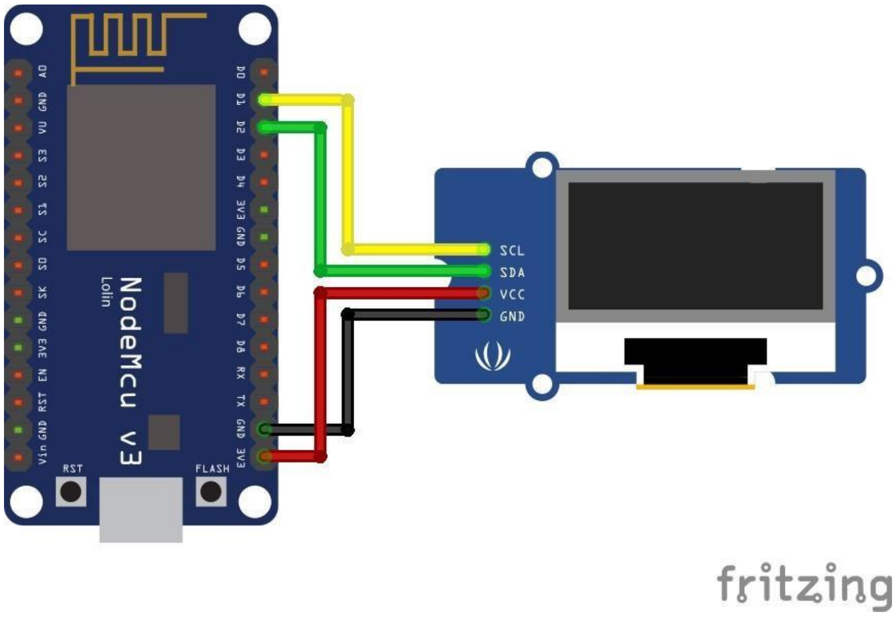


Fig 1.5.2.4 Data Flow Diagram for Corona Live Status .

1.3.2 Advantages of Proposed system

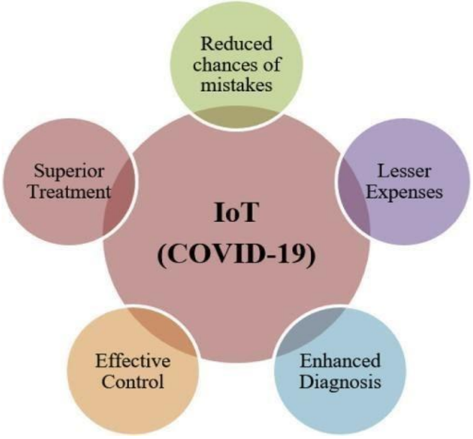
- The model thus developed is an all-in-one mode where the touchless system which dispenses sanitizer.
- Connecting patients with what they required with the particular food and medicine delivery.
- They can detect if anyone who is not wearing the mask in their surroundings.
- A device which gives constant alerts, monitors and shows live corona updates.
- A chatbot always which helps users with the project uses.

Chapter 2

LITERATURE SURVEY

1. "COVID-SAFE: An IoT-Based System for Automated Health Monitoring and Surveillance in Post-Pandemic Life"

In this article, we present a potential application of the Internet of Things (IoT) in healthcare and physical distance monitoring for pandemic situations. The proposed framework consists of three parts: a lightweight and low-cost IoT node, a smartphone application (app), and fog-based Machine Learning (ML) tools for data analysis and diagnosis. The IoT node tracks health parameters, including body temperature, cough rate, respiratory rate, and blood oxygen saturation, then updates the smartphone app to display the user-health conditions.



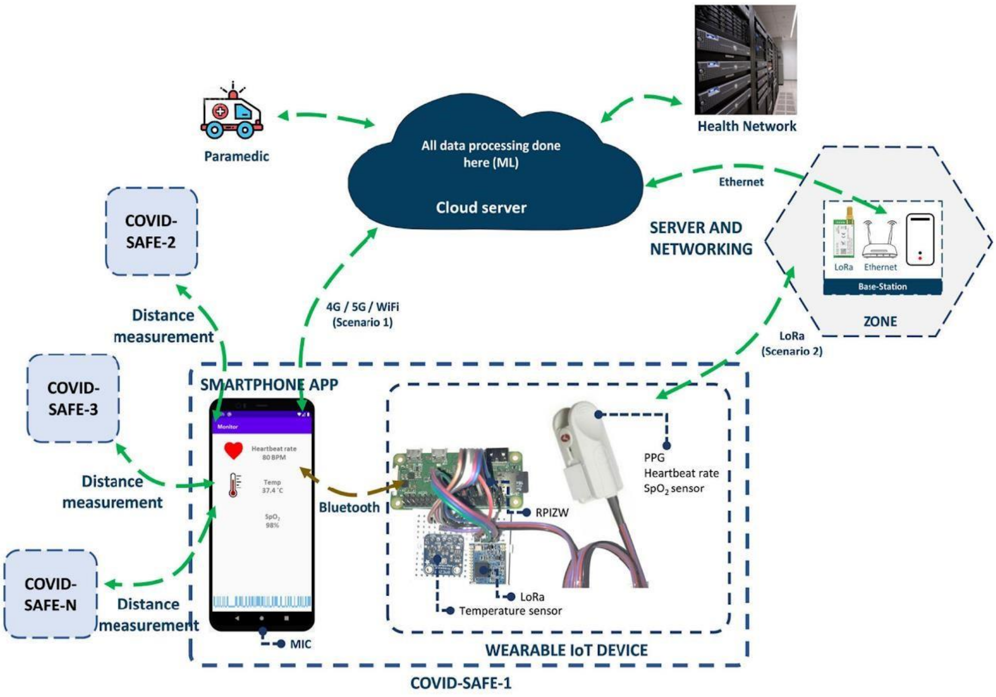


FIGURE 1. High-level architecture of COVID-SAFE framework, in which COVID-SAFE-1 is carried by the user and COVID-SAFE-2 - N belong to adjacent people.

Fig 2.1: Digital display showing Welcome and how you are

2. “Prediction and forecast for COVID-19 Outbreak in India based on Enhanced Epidemiological Models”

In this work, the difference between the number of actual reported confirmed cases and an approximate number of actual cases, due to an insufficient number of tests being conducted, is highlighted based on a unique approximate mathematical formula, thereby establishing a relationship between Death Count due to disease and

number of people infected with it. Further, utilizing ICMR’s available data about COVID-19 patients in India and employing an Enhanced Version of the SIR Epidemic Model also known as SIRD devised by generating optimal parameter values and taking the number of deaths due to pandemic into account, the time dependence of Outbreak’s Intensity in India forecasting maximum number of confirmed active cases of COVID-19 present in a day (Peak Value) and also predicted total number of deaths in India due to the outbreak.

3. “Research on infrared body temperature measurement – virus spreading prevention”

This paper researches infrared temperature measurement. We also propose a simple solution based on IR temperature sensors that could help with the prevention of virus spreading in crowded areas such as office buildings. The proposed solution is designed to be cost-efficient and easy to use for fever screening, through the use of a well-known MLX90614 infrared temperature sensor, an ultrasonic distance sensor and an RGB led that offers fast feedback to the user. The measurement system is suitable for installation in an indoor fixed position, like the entrance to an open space floor of an office building.

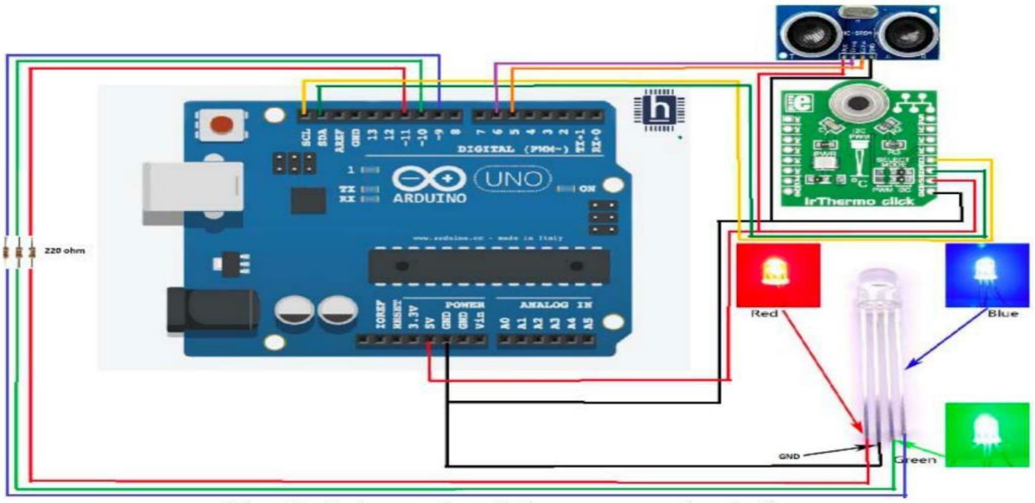


Fig. 3. Schematic of the proposed solution

.

Fig 2.3: Schematic of the proposed solution

4. “Design and Implementation of Heartbeat rate and SpO2 Detector by using IoT for patients”

In this proposed system, Beer’s Law used to implement the Heart Beat Rate and SpO2 the detector used to measure SpO2, heartbeat rate, and temperature range. Two different light wavelengths (Red Led and Infrared Led) are used to measure the actual difference in the absorption spectra between HbO2 and Hb. The SpO2 probe placed on the person’s finger and the other end with a microcontroller to calculate the number of pulses and the amount of the SpO2 present on their body. The measurement range of the SpO2, Heart Beat Rate, and Temperature are viewed via OP APP (Outpatient Android Application) and the same is viewed by the doctor in the other end through the cloud.

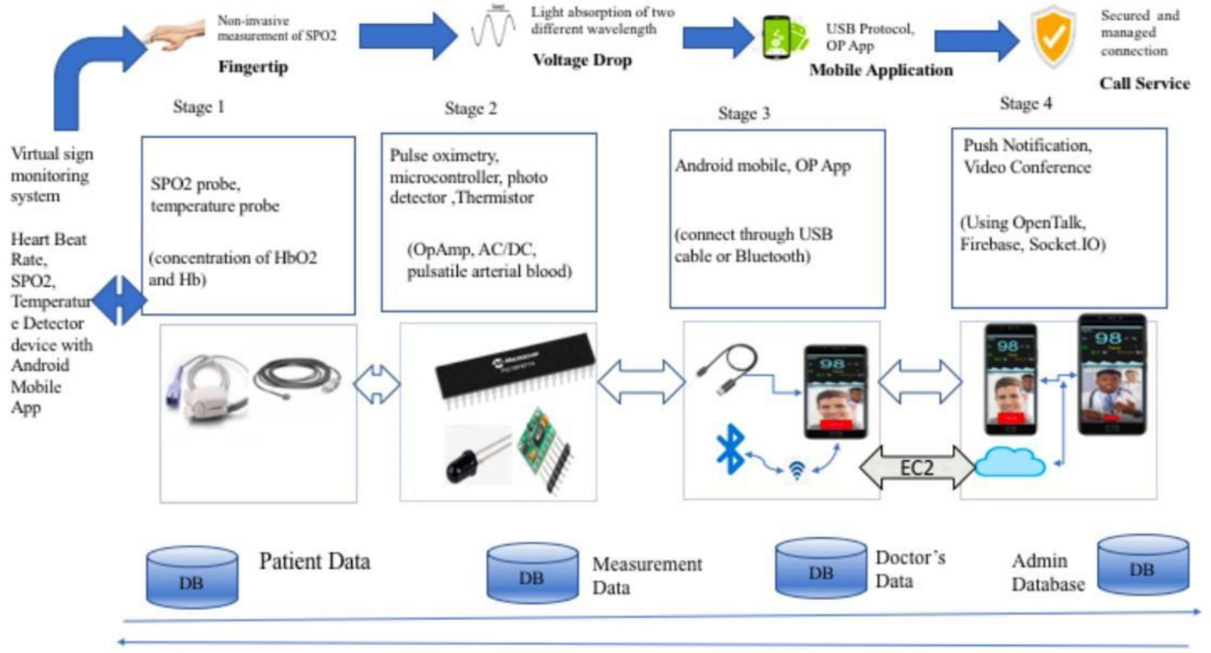

Non-invasive measurement of SPO2
Fingertip
Light absorption of two different wavelength
Voltage Drop
USB Protocol, OP App
Mobile Application
Secured and managed connection
Call Service
Stage 1
Stage 2
Stage 3
Stage 4
Virtual sign monitoring system
Heart Beat Rate, SPO2, Temperature Detector device with Android Mobile App
SPO2 probe, temperature probe
(concentration of HbO2 and Hb)
Pulse oximetry, microcontroller, photo detector ,Thermistor
(OpAmp, AC/DC, pulsatile arterial blood)
Android mobile, OP App
(connect through USB cable or Bluetooth)
Push Notification, Video Conference
(Using OpenTalk, Firebase, Socket.IO)
98
EC2
DB
Patient Data
DB
Measurement Data
DB
Doctor's Data
Admin Database
DB

Figure. 1. The architecture of the proposed system

Fig 2.4 The Architecture of the proposed system.

5. “Understanding Drug Delivery from a System Perspective: Concept and Demonstration”

In our work, for the first time, we view drug delivery as a drug supply chain and analyze the drug supply chain from a system perspective. The main contribution of this paper is to present a systems perspective to drug delivery; in particular, a supply-demand feedback control system was proposed for generalizing a drug delivery system along with its implementations.

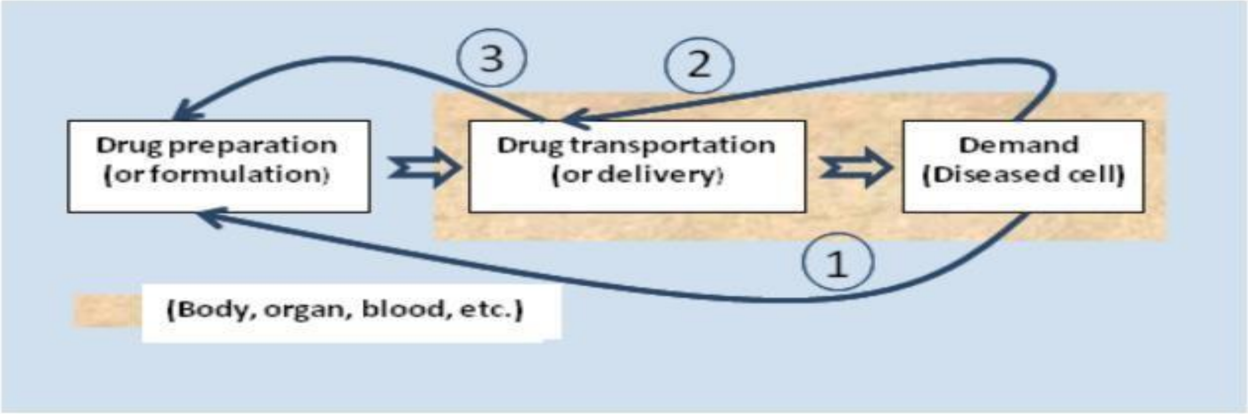

3
2
Drug preparation (or formulation)
Drug transportation (or delivery)
Demand (Diseased cell)
1
(Body, organ, blood, etc.)

Fig 2.5: Food Delivery

6. “Formal Specification for Online Food Ordering System using Z language”

This paper reduces the issues of ambiguity levels for the Software Requirements Specification (SRS) using formal methods. The result shows the effectiveness in specifications through Z language. The Z specification is created for the commercial application of an online food ordering system to improve the order details accuracy and efficiency. The stakeholder needs for the food ordering system are gathered from the project goal. The system is designed using a Unified Modelling Language (UML) illustration of the use case diagram. The specification is created for the system behaviour to remove the ambiguity. Along with this, the Z/EVES tool is used for the evaluation of Z specifications for the demonstration.

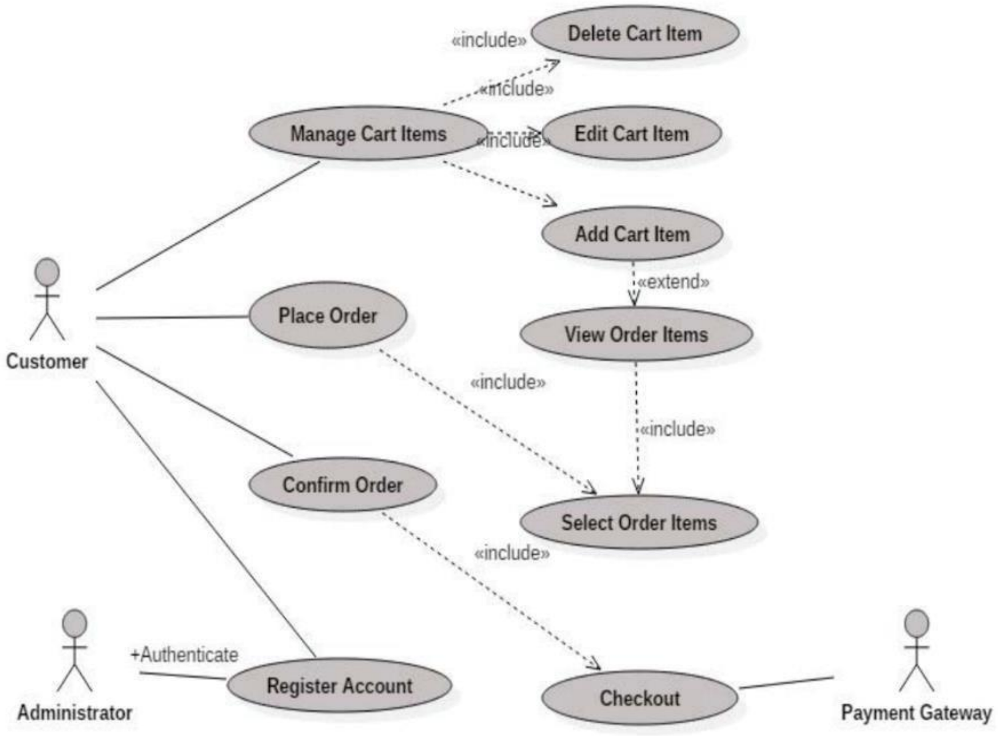


Figure. 1. Use Case diagram for Food Ordering System

Fig2.6: Block Diagram of the Food Ordering system.

7. “. Self-Activating Sanitizer with Battery Imposed System for Cleansing Hands”

This paper gives a brief idea about the automatic hand wash sanitizer. The motor pumps the sanitizer liquid or solution to the human while detecting the IR Sensor. The IR Sensor is the photodiode used for sensing human hand detection and it is used to control the motor pump from the liquid. The motor is connected to an RC timer delay setup and the pipe connected to a reducer is used to control the flowing liquid of the sanitizer. It has three modes of Control LEDs in the system, White LED is used for the user to understand that the setup is in working mode and the battery is in use. Red LED is used for the user to understand that Battery is in charging mode. Green LED is used for the user to understand that battery is in full charged mode. It has an on/ Off switch to control the whole setup from the battery supply.

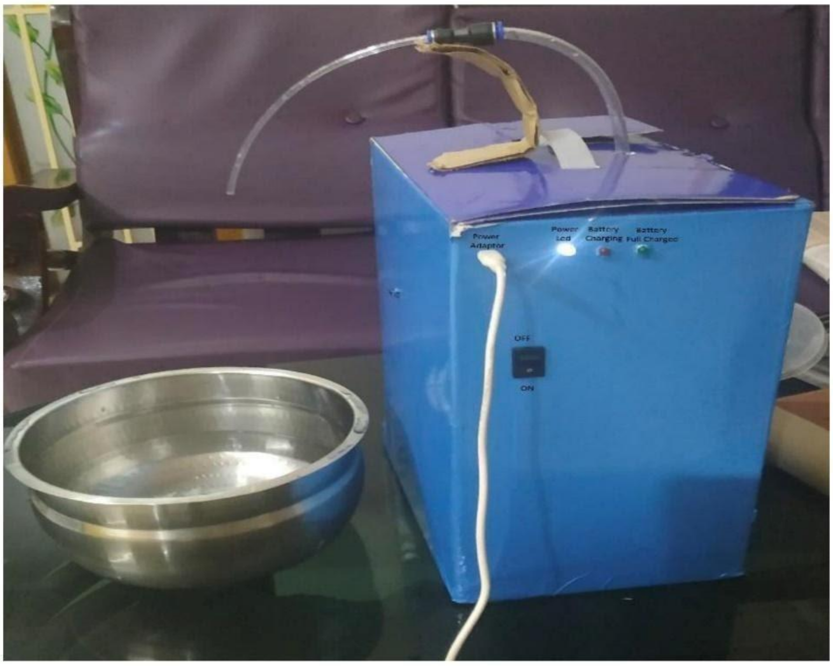


Fig.7 Self-Activating Sanitizer With Battery Imposed System For Cleansing Hands

Fig 2.7: Self activator sanitizer.

8. “A Deep Learning-Based Assistive System to Classify COVID-19 Face Mask for Human Safety with YOLOv3”

we have attained that people who wear face masks or not, it's trained by the face mask image and nonface mask image. Under the experimental conditions, real-time video data finalized over detection, localization, and recognition. Experimental results show the average loss is, 0.0730 after training 4000 epochs. After training 4000 epochs mAP score is 0.96. This unique approach of face mask visualization system obtained noticeable output which has96% classification and detection accuracy.

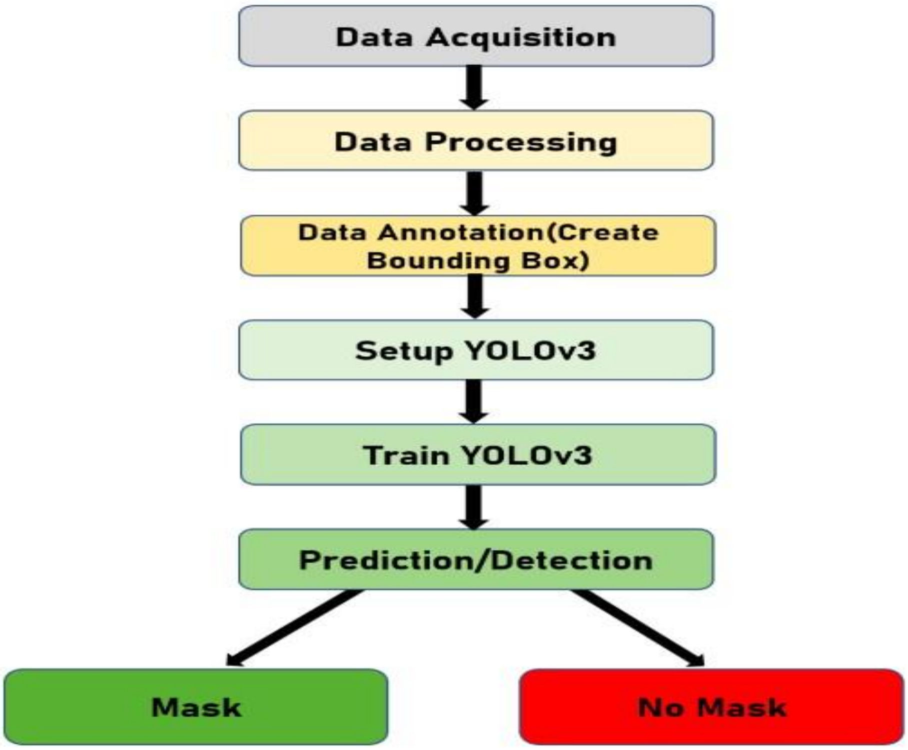


Fig. 1. Workflow Structure.

Fig 2.8: Work Flow of Mask Detection

9. “. Detection and Tracking Contagion using IoT-Edge Technologies: Confronting COVID-19 Pandemic”

. In this study, we have proposed a smart edge surveillance system that is effective in remote monitoring, warning, and detection of a person’s fever, heartbeat rate, cardiac conditions, and some of the radiological features to detect the infected (suspicious) person using wearable smart gadgets. The proposed framework provides a continually updated map/pattern of the communication chain of COVID-19 infected persons that may span around in our national community. The health and societal impact of suggested research are to help public health authorities, researchers and clinicians contain and manage this disease through smart edge surveillance systems. The proposed model will help to detect and track the contagious person. Moreover, it will also keep the patient’s data record for analysis and decision-making using edge computing.

Chapter 3

METHODOLOGY

3.1 Software Requirement Specification

A Software Requirements Specification (SRS) -a requirements specification for a software system – is a complete description of the behavior of a system to be developed. In addition to a description of the software functions, the SRS also contains non-functional requirements. Software requirements are a sub-field of software engineering that deals with the elicitation, analysis, specification, and validation of requirements for software.

3.2 Requirements

3.2.1 Functional Requirement

- Device should do minimal computations on its own.
- Device should give vocal feedbacks to the user via headphone.
- Device should be able to capture image and display it on the screen meanwhile the voice should be generated.
- Device should be able to convert the received speech-to-text.

Non-Functional Requirement

- The camera is enabled during the image to speech.
- The images will be refreshed as the new image is captured.

3.2.2 Hardware Requirements

1. System : Quadcore Intel Core i7 Skylake or higher
2. RAM : 16 GB
3. Hard Disk : 40GB
4. Monitor : 15 VGA Colour
5. Mouse : Logitech
6. Rasberrypi
7. Arduino
8. Thermal Scanning
9. LCD Display
10. OLED Display
11. ESP8226
12. Servo Motor
13. MAX03100

3.2.3 Software Requirements

- Tesseract OCR
- Open CV
- gTTS
- Anaconda Navigator
- Espeak
- Putty

3.3 Description about modules

3.3.1 OpenCV

It is a library of programming1functions mainly aimed at real-time1computer vision. It is developed by Intel research center and subsequently supported by1Willow Garage and now maintained by its. It is written in C++ and its primary interface is also, in C++. Its binding is in Python, Java, and Mat lab. OpenCV runs on a variety of platforms i.e., Windows, Linux, and macOS, OpenBSD on desktop and Android, IOS, and Blackberry in mobile. It is used for diverse purposes for facial recognition, gesture recognition, object identification, mobile robotics, segmentation, etc. It is a combination of OpenCV C++ API and Python language. In our project we are using OpenCV version 2 OpenCV is used to gesture control to open a camera and capture the image. It is also used in the image to text and voice conversion technique.

Fig 3.3.1 Open CV

3.3.2 Python IDE

An IDE (or Integrated Development Environment) is a program dedicated to software development. As the name implies, IDEs integrate several tools specifically designed for software development. These tools usually include:

- An editor designed to handle code (with, for example, syntax highlighting and autocompletion)
- Build, execution, and debugging tools
- Some form of source control

Most IDEs support many different programming languages and contain many more features. They can, therefore, be large and take time to download and install. You may also need advanced knowledge to use them properly.

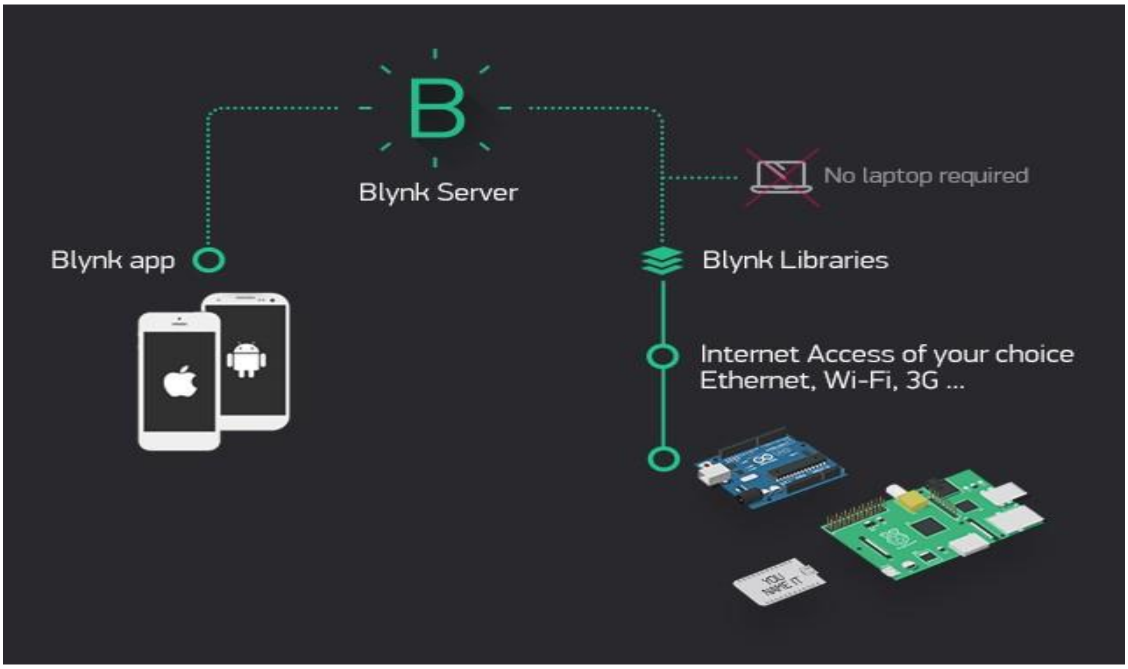
In contrast, a dedicated code editor can be as simple as a text editor with syntax highlighting and code formatting capabilities. Most good code editors can execute code and control a debugger. The very best ones interact with source control systems as well. Compared to an IDE, a good dedicated code editor is usually smaller and quicker, but often less feature-rich.

3.3.3 Blynk

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it, and do many other cool things. There are three major components in the platform:

Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide.

Blynk Server - responsible for all the communications between the smartphone and hardware. We can use our Blynk Cloud or run your private Blynk server locally. It’s open-source, could easily handle thousands of devices, and can even be launched on a Raspberry Pi. Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.



3.3.4 Anaconda

Anaconda Navigator is a desktop graphical user interface (GUI) included in Anaconda® distribution that allows you to launch applications and easily manage conda packages, environments, and channels without using command-line commands.

Fig 3.3.3 Anaconda

3.3.3 ThingSpeak

According to its developers, "ThingSpeak is an open-source Internet of Things (IoT)application and API to store and retrieve data from things using the HTTP and MQTT protocol over the Internet or via a Local Area Network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates". ThingSpeak was originally launched by Io Bridge in 2010 as a service in support of Io applications. ThingSpeak has integrated support from the numerical computing.

software MATLAB from MathWorks, allowing ThingSpeak users to analyze and visualize uploaded data using MATLAB without requiring the purchase of a MATLAB license from MathWorks. ThingSpeak has a close relationship with MathWorks, Inc. All of the ThingSpeakdocumentation is incorporated into the MathWorks' MATLAB documentation site and even enabling registered MathWorks user accounts as valid login credentials on the ThingSpeak website. The terms of service and privacy policy of ThingSpeak.com are between the agreeing user and MathWorks, Inc.

Chapter 4

PROJECT DETAILS

4.1 System Design

System design is the process of defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements. System design could see it as the application of systems theory to product development. Theory is some overlap with the disciplines of system analysis, systems architecture and systems engineering.

If the broader topic development "blends the perspective of marketing, design, and manufacturing into a single approach to product development," then design the act of talking the marketing information and creating the design of the product to be manufactured. Systems design is therefore the process of defining and developing systems to satisfy specified requirements of the user.

Until the 1990s systems design had crucial and respected role in the data processing industry. In the 1990s standardization of hardware and software resulted in the ability to build modular systems. The increasing importance of software running on generic platforms has enhanced the discipline of software engineering.

Object-oriented analysis and design methods are becoming the most widely used methods for computer systems design. The UML has become the standard language in object-oriented analysis and design. It is widely used for modelling software systems and is increasingly used for high designing non- software systems and organizations.

System design is one of the most important phases of software development process. The purpose of the design is to plan the solution of a problem specified by the requirement documentation.
In other words, the first step in solution is the design of the project.

The design of the system is perhaps the most critical factor affecting the quality of the software. The objective of the design phase is to produce overall design of the software. It aims to figure out the modules that should be in the system to fulfil all the system requirements in efficient manner.

The design will contain the specification of all the modules, their interaction with other modules and the desired output from each module.

4.2 High level design

Data flow diagram

A data flow diagram **(DFD)** is a graphical representation of the flow of the visualization of data processing. On a DFD, data items flow from an external data source or internal data source to internal data source or external data sink via an internal process. DFD provides no information about the timing of process or about whether process will operate in sequence or in parallel.

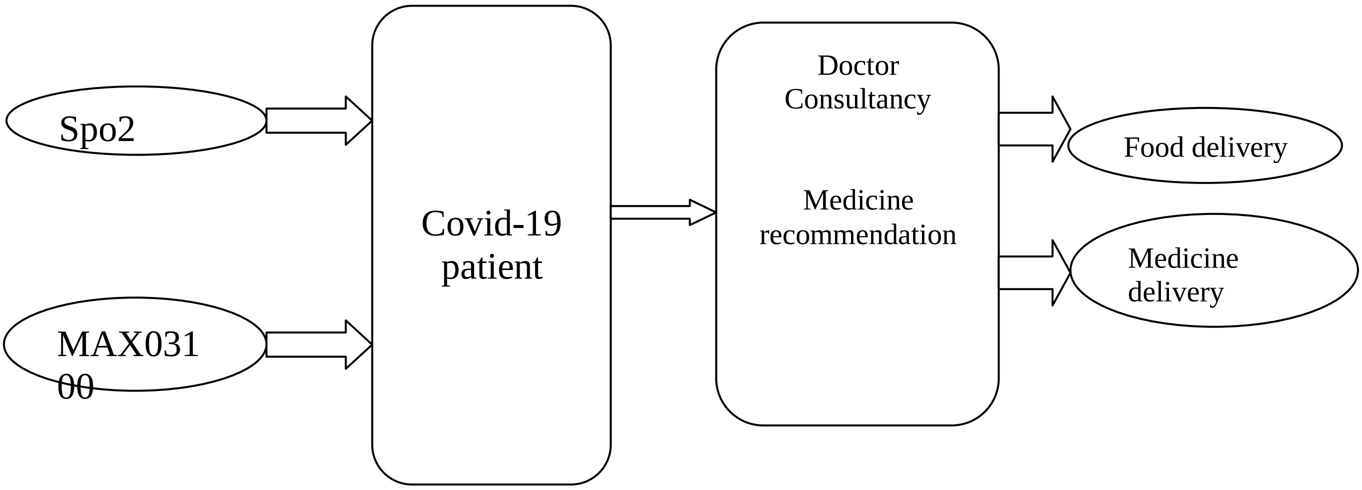


Fig: **4.2 Data Flow Diagram**

Chapter 5

SYSTEM IMPLEMENTATION

Implementation is the realization of an application, or execution of a plan, idea, model, design, specification, standard, algorithm, or policy. In other words, an implementation is a realization of a technical specification or algorithm as a program, software component, or other computer systems through programming and deployment. Many implementations may exist for a given specification or standard.

Our Project mainly focuses on creating a platform that helps covid patients to cater to all their needs and to simplify their complications faced during their lockdown, our first module is an SPO2 monitor which helps in identifying the blood oxygen level and a thermal scanner that scans the overall body temperature.

The second module is a touch less hand sanitizer that sprays or dispenses the sanitizer by motion detection. The servo motor applies mechanical pressure on the pump handle when the ultrasonic sensor detects motion.

The third module is face mask detection which detects and alerts a person if they are not wearing a mask. This can be integrated into a device that keeps track and detects if we are not wearing a mask.

The fourth module is a food delivery where a chain of restaurants and NGOs are going to be displayed based on a tie-up and depending on the person's needs they can order food from their desirable restaurants or food chains that deliver food to their doorstep.

5.1 Pseudo code

Pseudo code is an informal high-level description of the operating principle of a computer program or other algorithm. It uses the structural conventions of a programming language, but is intended for human reading rather than machine reading. Pseudo code typically omits details that are not essential for human understanding of the algorithm, such as variable declarations, system-specific code and some subroutines. The programming language is augmented with natural language description details, were convenient, or with compact mathematical notations.

The purpose of using pseudo code is that is easier for people to understand than conventional programming language code, and that it is an efficient and environment independent description of the key principles of an algorithm. It is commonly used in textbooks and scientific publications that are documenting various algorithms, and also in planning of computer program development, for sketching out the structure of the program. Before the actual coding takes place. No standard for pseudo code syntax exists, as a program in pseudo code is not an executable program. Pseudo code resembles, but should not be confused with skeleton programs, including dummy code, which can be compiled without errors. Flowcharts and Unified Modelling Language (UML) charts can be thought of as a graphical alternative to pseudo code, but are more spacious on paper.

5.2 Module Description

The Project is divided into 6 different modules:

5.2.1 Monitoring spo2 and Temperature

Step 1: Start.

Step 2: Taking value of spo2 sensor.

Step 3: Taking a value of the temperature sensor.

Step 4: connecting both sensor and transmitting the sensor value into the microcontroller.

Step 5: Those value sent into the server.

Step 6: From the server, it gets into the respective need.

Step 7: Stop.

The first process it takes values of spo2 sensor, and then takes readings of temperature from the sensor. The both sensor and transmitting the values of sensor into the microcontroller. After that those values are sent to the server, from the server it is used respectively by the needy.

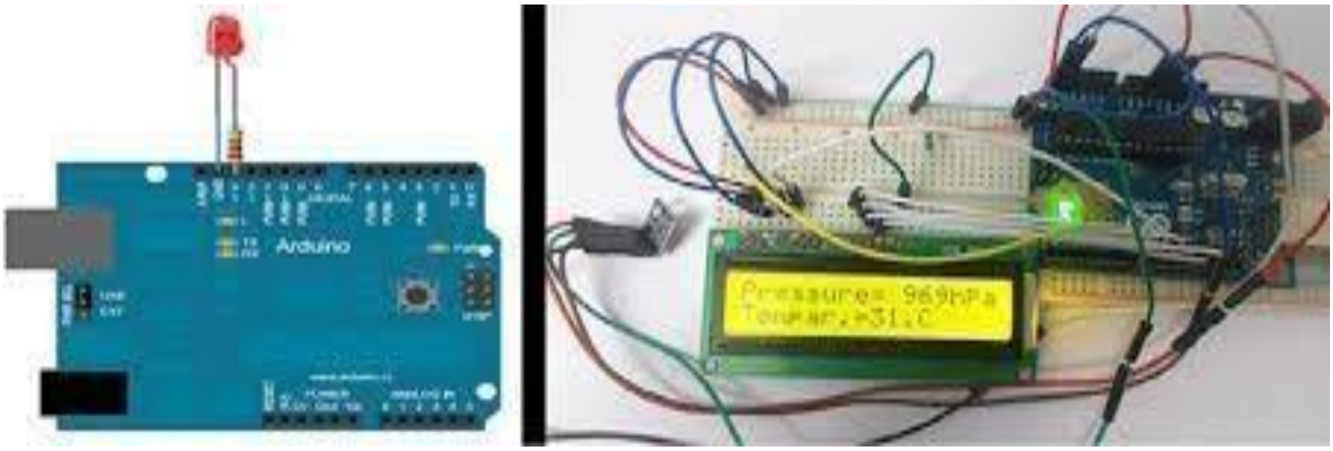


Fig 5.2.1 Monitoring spo2 Temperature

5.2.2 Medicine requirement: -

Step 1: Start.

Step 2: Taking value of spo2 sensor.

Step 3: If anything goes wrong.

Step 4: Connect with doctors.
Step 5: Medicine recommendation.

Step 6: Stop.

The second process is developed for the medicine requirements. In order to help people, to get prescribed medicines as they want. If things went wrong patients can directly interact with doctors and get the medicines.

5.2.3 Food delivery: -

Step 1: Start

Step 2: Taking all the value from the sensor.

Step 3: If anything goes wrong.

Step 4: Connect with restaurants.

Step 5: Food delivery.

Step 6: Stop.

The third process is developed for the food delivery for home quarantined patients, people who cannot go outside buy the food they can place the order by themselves in the website. So it may help the patients to stay in home.

Fig 5.2.3 Food Delivery

5.2.4 : -Hand Sanitizer

Step 1: Start.

Step 2: Taking value from the ultrasonic.

Step 3: If the distance is less.

Step 4: Apply a mechanical force with the help of servo motors.

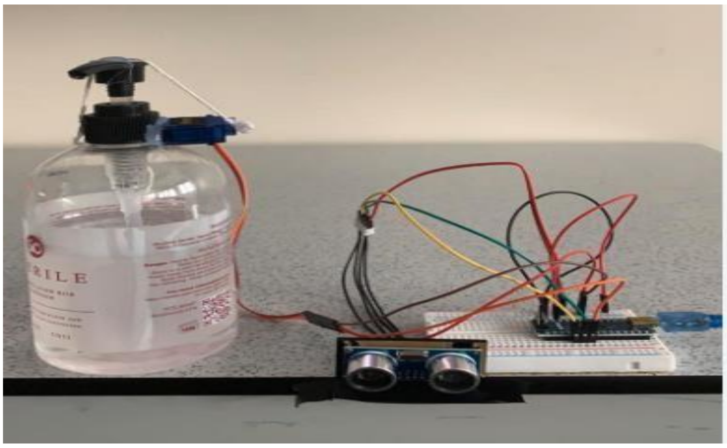
Step 5: The mechanical force will apply to the sanitizer bottle.

Step 6: Than sanitizer comes out.

Step 7: Stop.

The fourth process is developed for the automatic hand sanitizer, from the values of the ultrasonic. It checks the distance of a person and if the distance is less, it applies a mechanical force with the help of servo motors. The process is performed by people and the mechanical force will apply to the sanitizer bottle. And then the sanitizer comes out as in result.

Fig 5.2.4 Hand Sanitizer



5.2.4.1 Face mask detection

Step 1: Start.

Step 2: Taking image dataset.

Step 3: Training the module from the dataset.

Step 4: Apply the trained module.

Step 5: Take the live stream video.

Step 6: Detect the face mask.

Step 7: Stop.

This is the fifth process whether a person is wearing mask or not can be detect in this process. Taking image dataset with mask and without mask from few open sources, we going to train the module from the dataset. And apply the trained module to mobile nets and take the live stream video Step with the help of OpenCV. And finally Detect the face mask of person with accurate percentage.

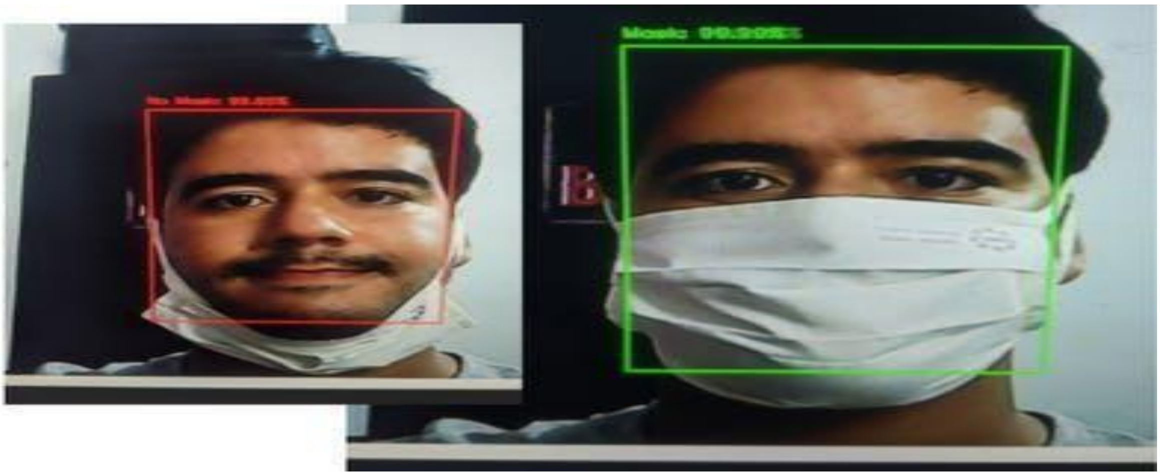


Fig 5.2.5.1 Face Mask Detection

5.2.5 : - Live Corona Status.

Step 1: Start.

Step 2: Visit website https://www.mohfw.gov.in/.

Step 3: Making the API for the active, discharge, death cases.

Step 4: Putting the API in the ESP8226**.**

Step 5: ESP8226 is connected with an OLED display

Step 6: ESP8226 is connected with WIFI to access the live status.

Step 7: Stop.

This is the sixth process gives the detailed information of the live corona updates. Firstly, we visit the official website. And making the API for the active, discharge and death cases for the nationwide. Putting the API to the ESP8226 and it is connected to the OLED display which it is connected the active WIFI network. And finally, through the OLED display it shows the live corona status.

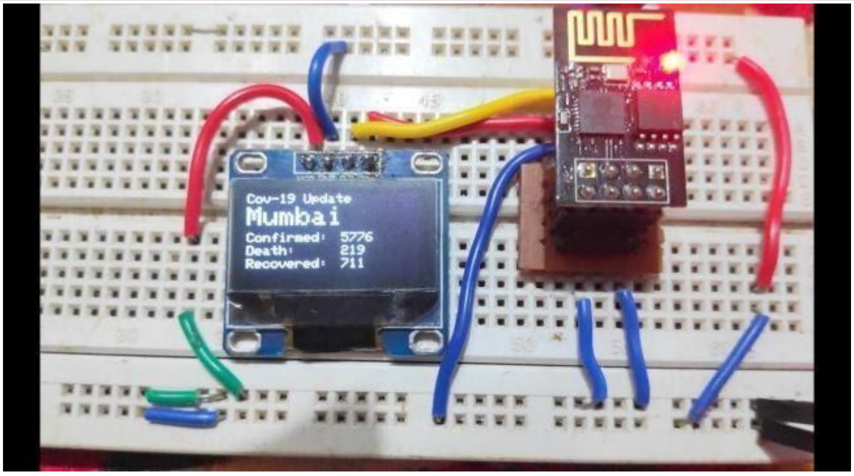


Fig 5.2.5.2 Live Corona Status.

MACHINE LEARNING ALGORITHM USED IN THIS PROJECT IS:

5.2.5.1 CNN

- In neural networks, Convolutional neural network (ConvNets or CNNs) is one of the main categories to do images recognition, images classifications.
- Object's detections, recognition faces etc., are some of the areas where CNNs are widely used.
- CNN image classifications take an input image, process it and classify it under certain categories (E.g., Dog, Cat, Tiger, Lion).
- Computers sees an input image as array of pixels and it depends on the image resolution.

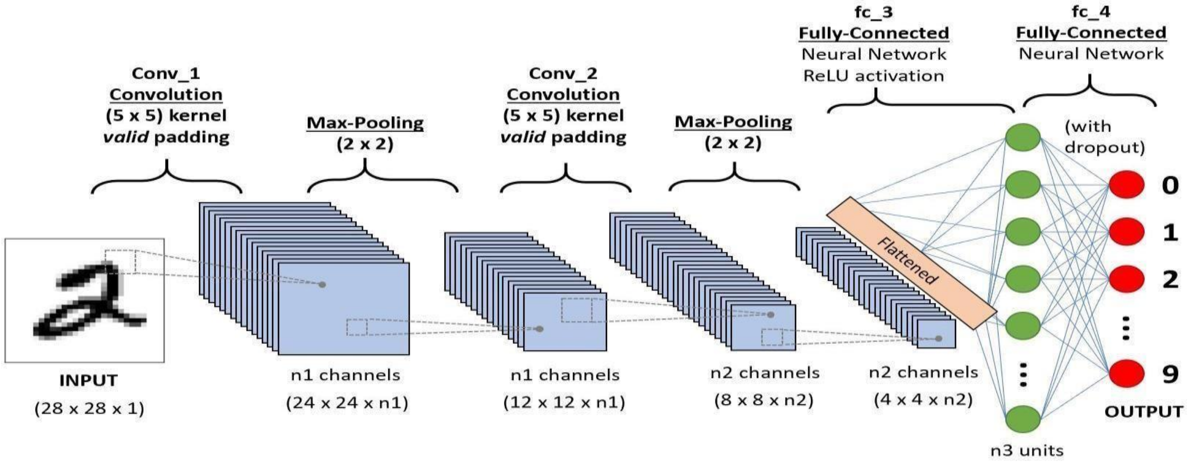


Fig 5.2.5.7 CNN Algorithm

CHAPTER 6

OBSERVATIONS & RESULTS

6.1 SNAPSHOTS

6.1.1 Actual Output of Hand Sanitizer: -

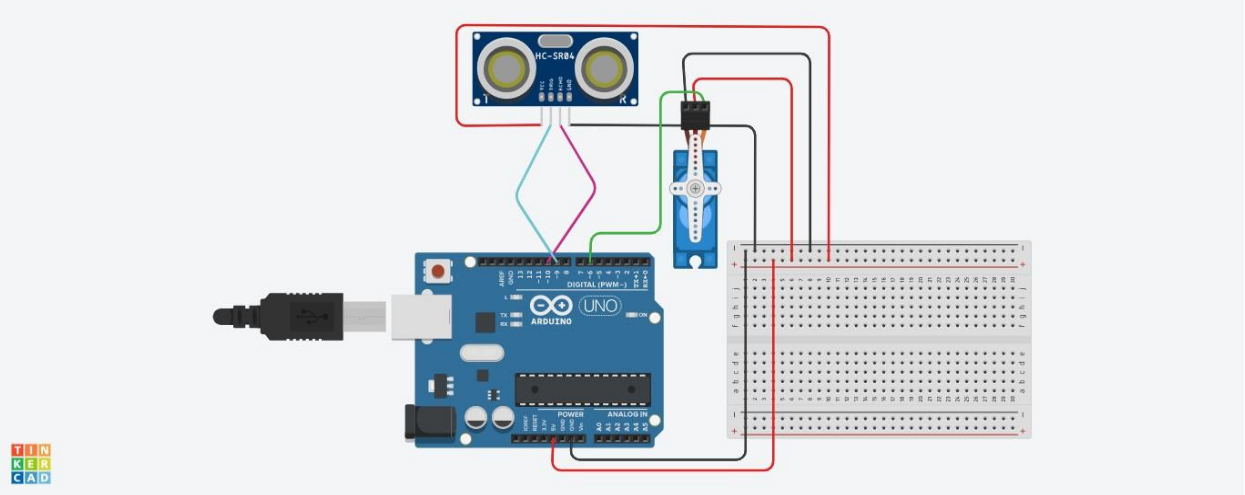


Fig 6.1.1 Automatic Hand Sanitizer.

The automatic hand sanitizer as a person come contact to it, without applying any mechanical force the sanitizer will come.

6.1.2 Face Mask Detection: -

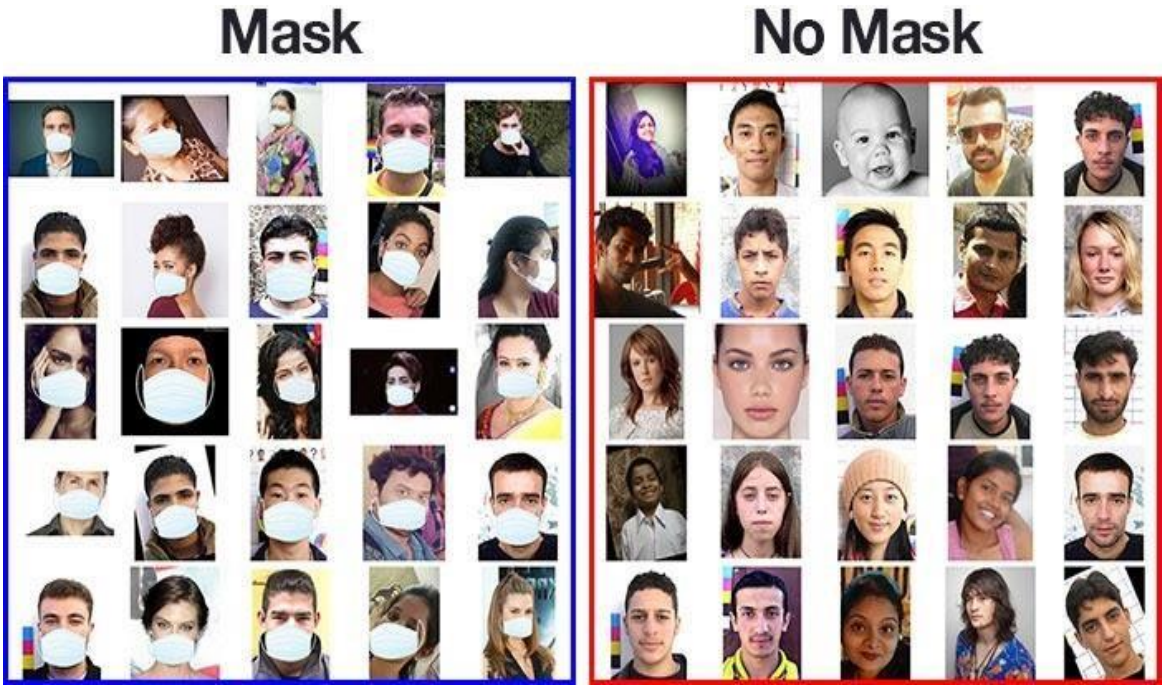


Fig 6.1.2 Face mask detection datasets with mask and without mask.

6.1.3: Training Block Diagram of Face mask detection.

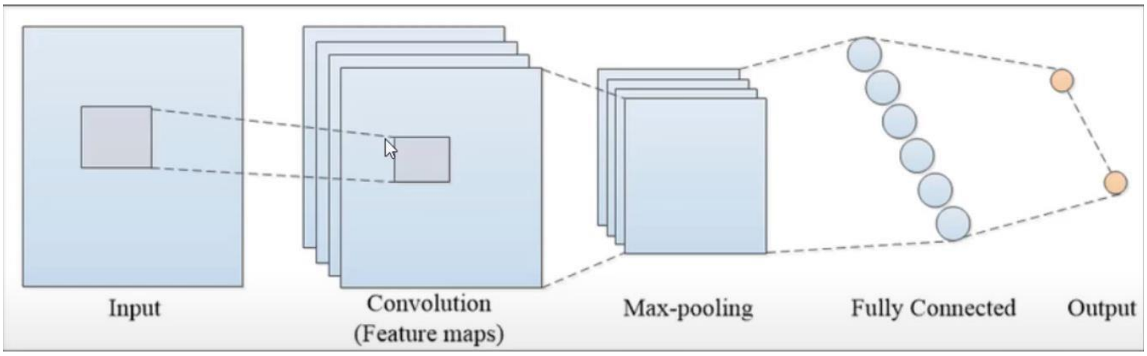


Fig 6.1.3 Data block diagram of training the dataset.

6.1.4: Actual output of face mask detection.

The Face Mask Detection module shows the accurate percentage, of a person whether he/she wearing mask or not. If people with mask it recognizes with the green if not recognizes in red, this module will help in mass gatherings and any public events.

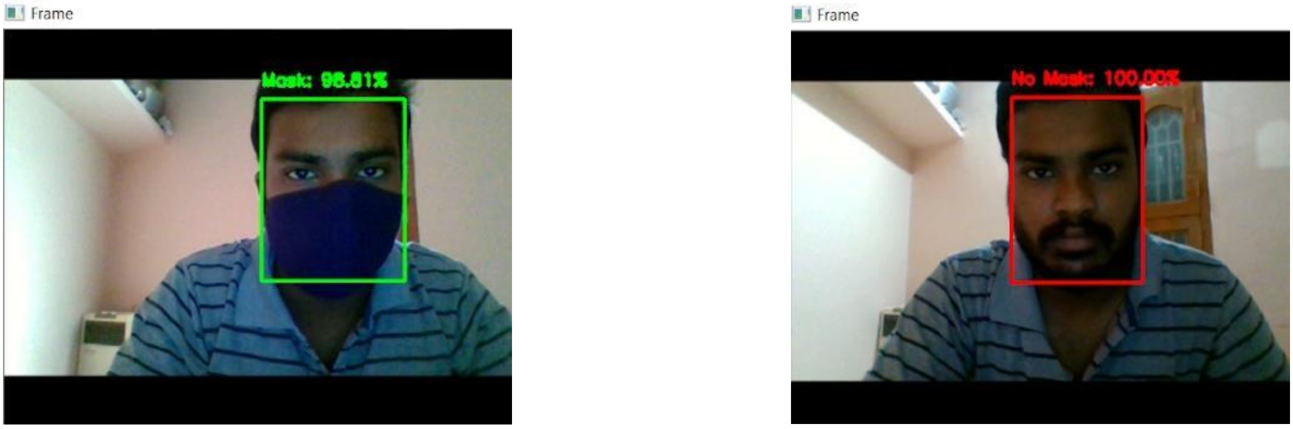
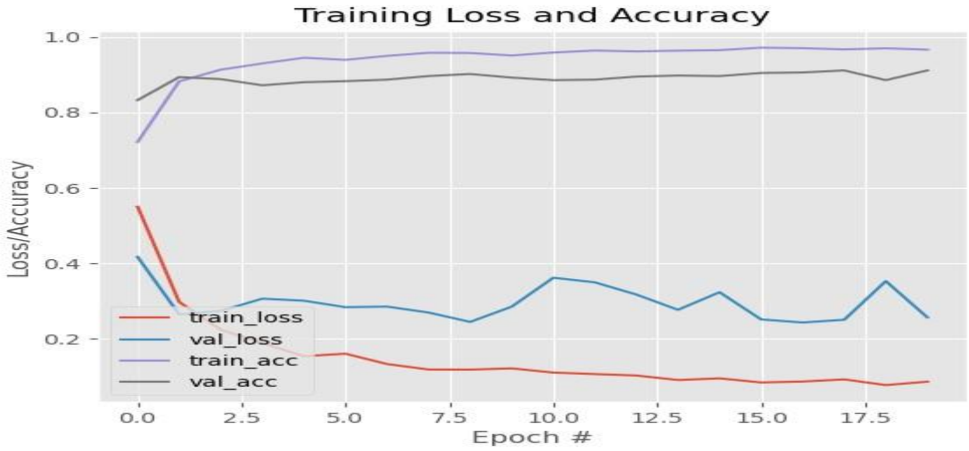


Fig 6.1.4. Actual output of face mask detection.

6.1.5: A graphical representation of the training loss and accuracy.

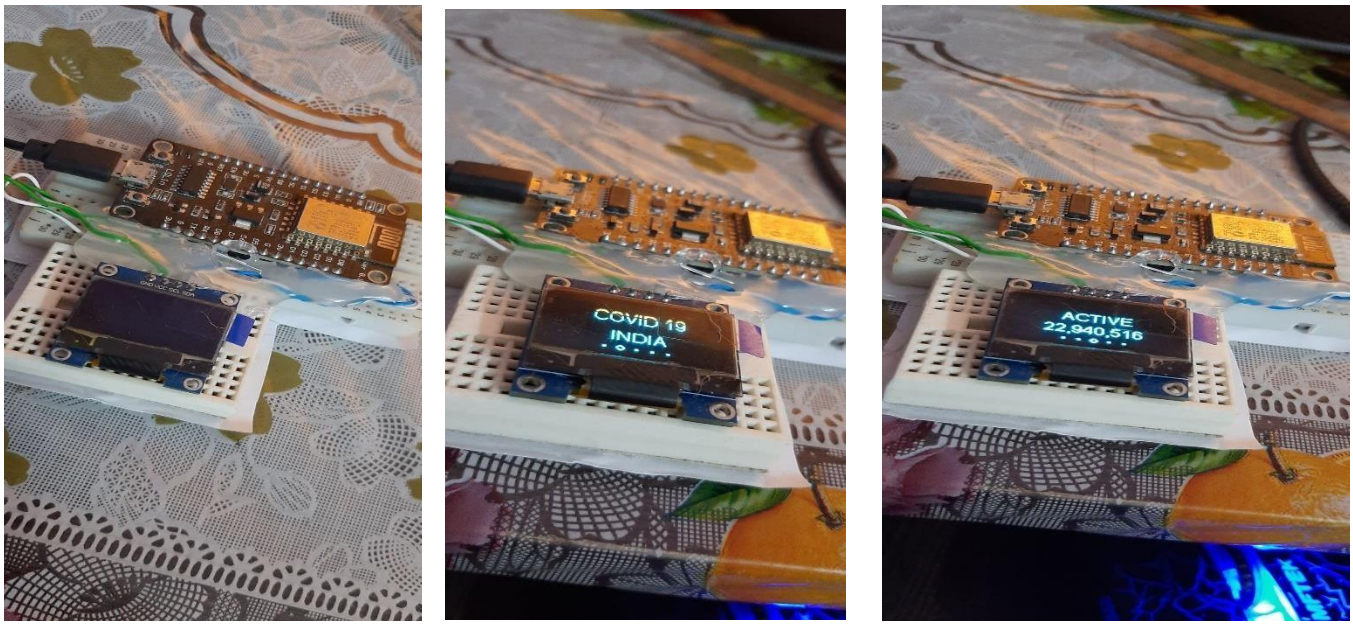
This graph shows that training loss and accuracy of the given module, here epochs is used to train the neural network with all the training data for one cycle



.

Fig 6.1.5. Graphical representation training loss and accuracy of the face mask detection

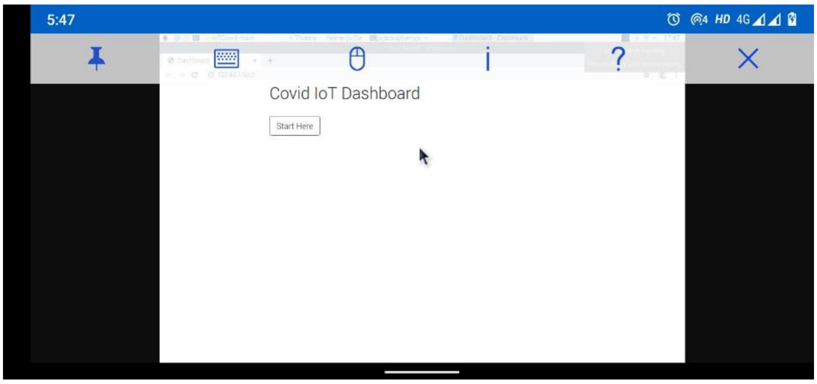
6.1.6: Corona Live Status actual output.



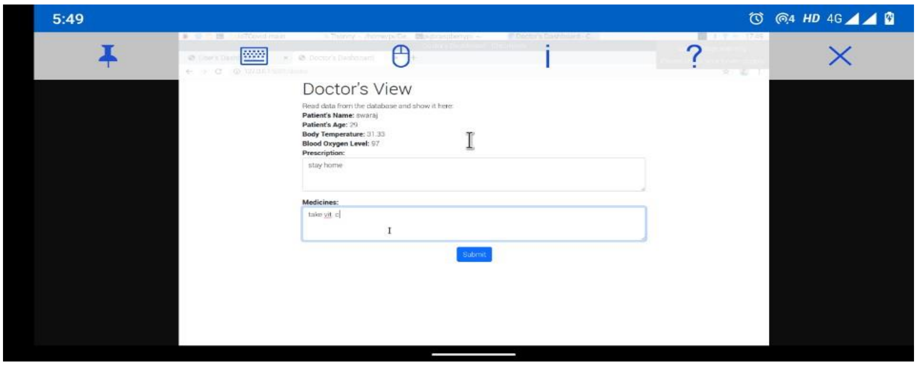
6.1.7: Iot Infrastructure for covid Patients.

This is the main module of our project where patient will record their SP02 and Temperature and send their details to doctor for consultation and doctor will send the medicine and precaution through mail (doctor.covid.iot.project@gmail.com).

Even patient have option to order medicine and food.



Covid IoT Dashboard



Doctor's View

Read data from the database and show it here:

Patient's Name: swaraj

Patient's Age: 29

Body Temperature: 31.33

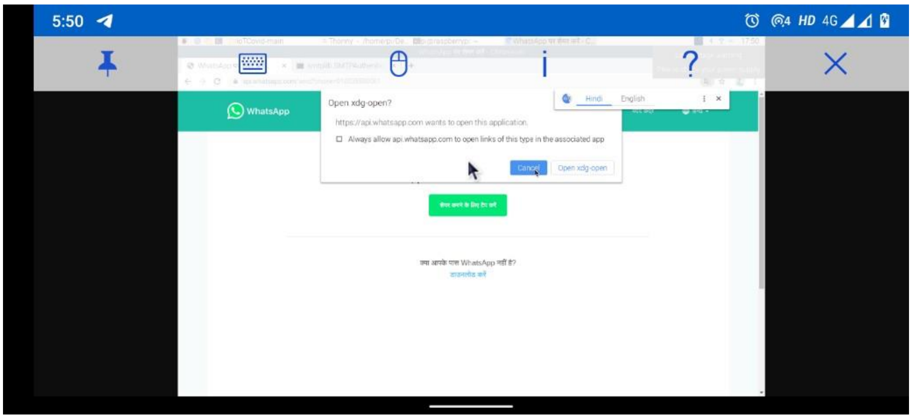
Blood Oxygen Level: 97

Prescription:

stay home

Medicines:

take vit. c



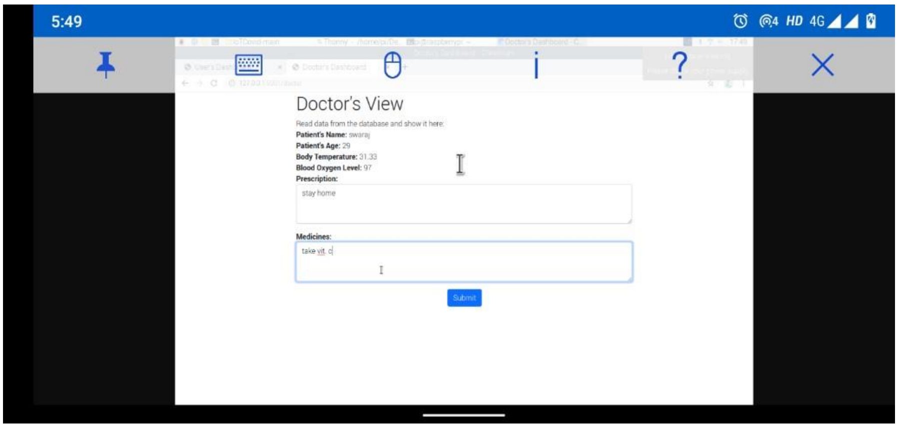
Open xdg-open?

https://api.whatsapp.com wants to open this application.

□ Always allow api.whatsapp.com to open links of this type in the associated app

क्या आपके पास WhatsApp नहीं है?

डाउनलोड करें



Doctor's View

Read data from the database and show it here:

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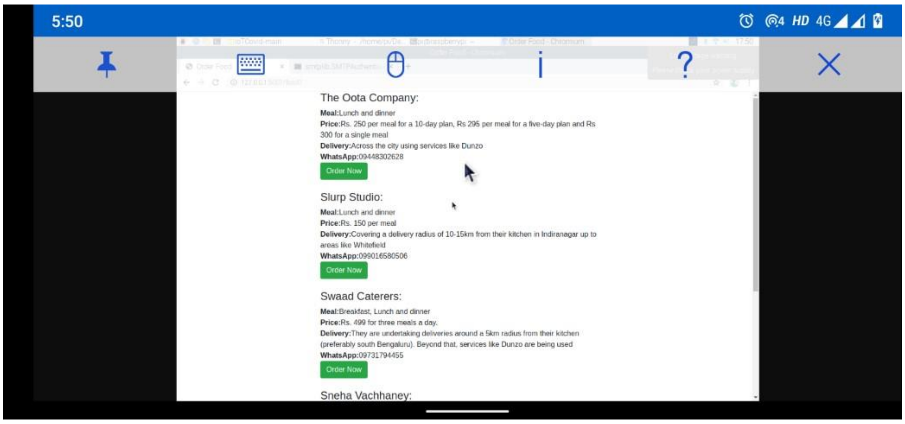


The Oota Company:

Meal: Lunch and dinner

Price: Rs. 250 per meal for a 10-day plan, Rs 295 per meal for a five-day plan and Rs 300 for a single meal

Delivery: Across the city using services like Dunzo

WhatsApp:09448302628

Slurp Studio:

Meal: Lunch and dinner

Price: Rs. 150 per meal

Delivery: Covering a delivery radius of 10-15km from their kitchen in Indiranagar up to areas like Whitefield

WhatsApp:099016580506

Swaad Caterers:

Meal: Breakfast, Lunch and dinner

Price: Rs. 499 for three meals a day.

Delivery: They are undertaking deliveries around a 5km radius from their kitchen (preferably south Bengaluru). Beyond that, services like Dunzo are being used

WhatsApp:09731794455

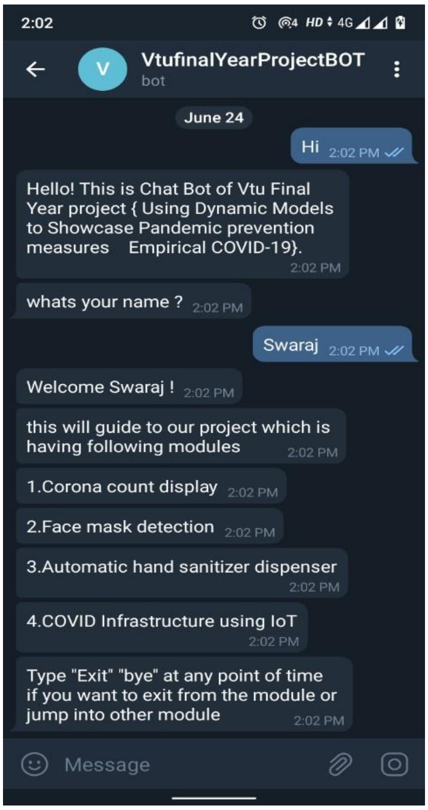
Sneha Vachhaney:

6.1.8: A Telegram Chatbot.

A chat bot which explains all the modules of the project in detail and gives a wide array of options which shows how the project works and can be implemented.

Chatbot name - VtufinalYearProjectBOT

Chatbot link -(http://t.me/VtufinalYearProject_bot)



Hi 2:02 PM

Hello! This is Chat Bot of Vtu Final Year project { Using Dynamic Models to Showcase Pandemic prevention measures Empirical COVID-19}. 2:02 PM

whats your name ? 2:02 PM

Swaraj 2:02 PM

Welcome Swaraj ! 2:02 PM

this will guide to our project which is having following modules 2:02 PM

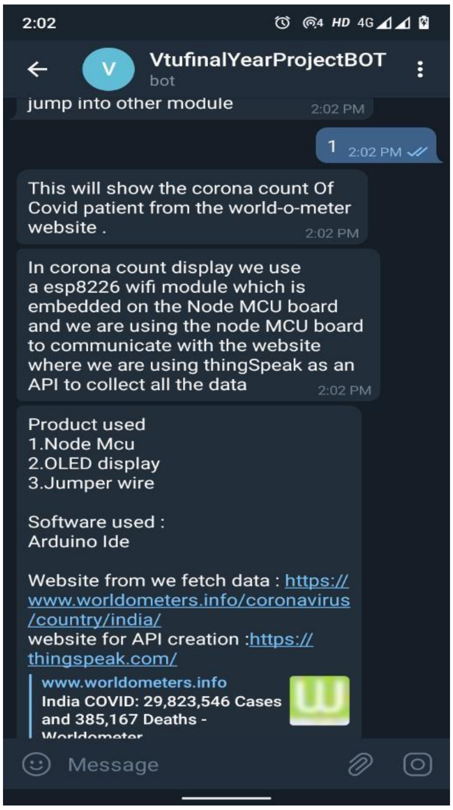
1.Corona count display 2:02 PM

2.Face mask detection 2:02 PM

3.Automatic hand sanitizer dispenser 2:02 PM

4.COVID Infrastructure using IoT 2:02 PM

Type "Exit" "bye" at any point of time if you want to exit from the module or jump into other module 2:02 PM



jump into other module 2:02 PM

1 2:02 PM

This will show the corona count Of Covid patient from the world-o-meter website . 2:02 PM

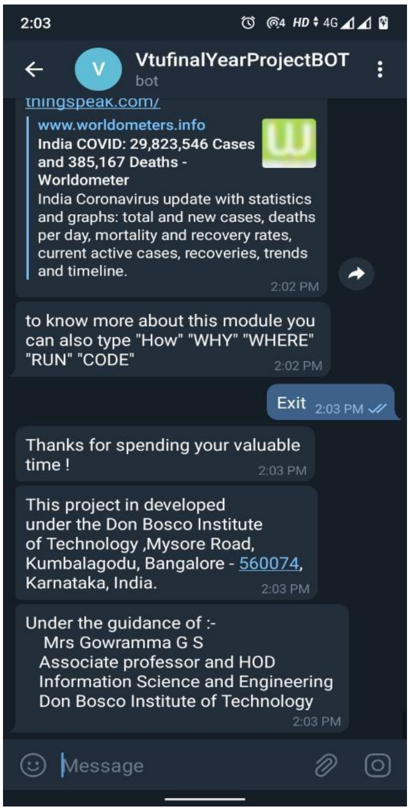
In corona count display we use a esp8226 wifi module which is embedded on the Node MCU board and we are using the node MCU board to communicate with the website where we are using thingSpeak as an API to collect all the data 2:02 PM

Product used
1.Node Mcu
2.OLED display
3.Jumper wire

Software used :
Arduino Ide

Website from we fetch data : https://www.worldometers.info/coronavirus/country/india/
website for API creation :https://thingspeak.com/

www.worldometers.info
India COVID: 29,823,546 Cases and 385,167 Deaths - Worldometer



thingspeak.com/

www.worldometers.info
India COVID: 29,823,546 Cases and 385,167 Deaths - Worldometer
India Coronavirus update with statistics and graphs: total and new cases, deaths per day, mortality and recovery rates, current active cases, recoveries, trends and timeline. 2:02 PM

to know more about this module you can also type "How" "WHY" "WHERE" "RUN" "CODE" 2:02 PM

Exit 2:03 PM

Thanks for spending your valuable time ! 2:03 PM

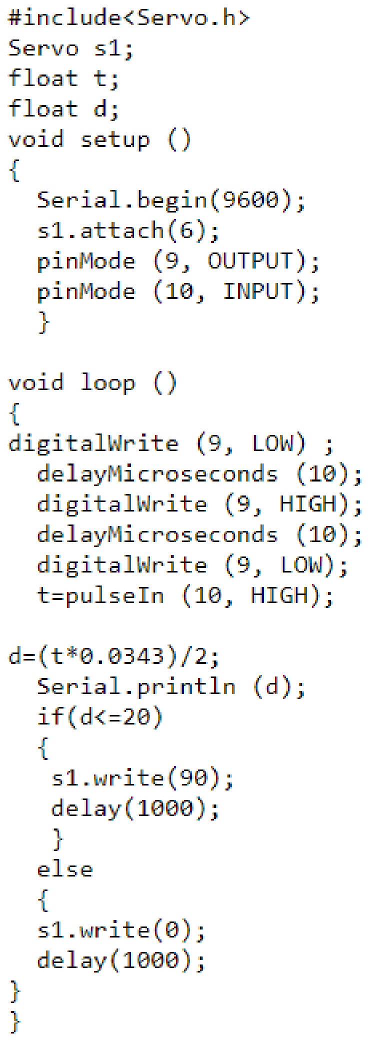
This project in developed under the Don Bosco Institute of Technology ,Mysore Road, Kumbalagodu, Bangalore - 560074, Karnataka, India. 2:03 PM

Under the guidance of :-
Mrs Gowramma G S
Associate professor and HOD
Information Science and Engineering
Don Bosco Institute of Technology 2:03 PM

CHAPTER 7

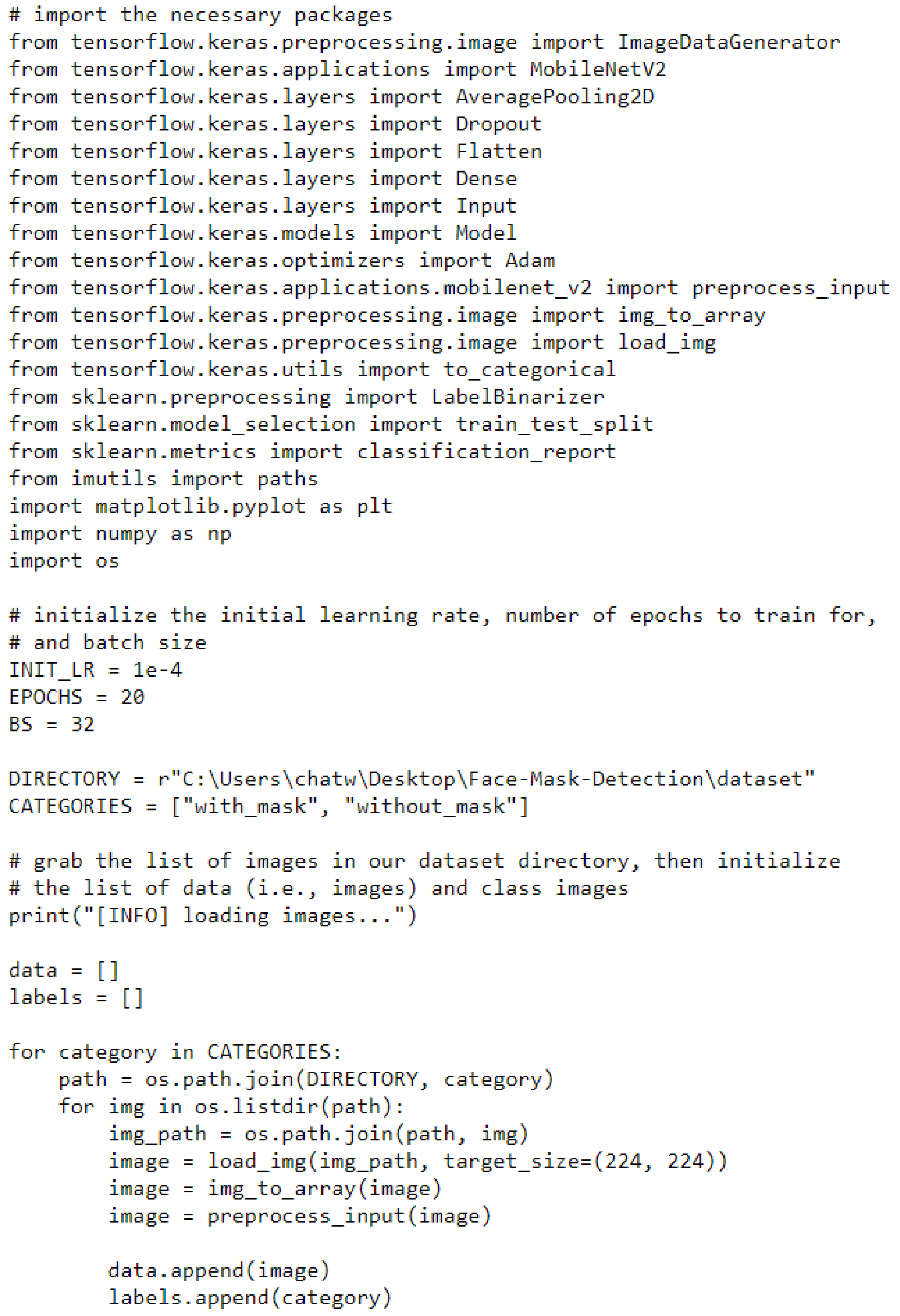
SNAPSHOTS OF CODE

7.1 : Code of Automatic Hand Sanitizer.

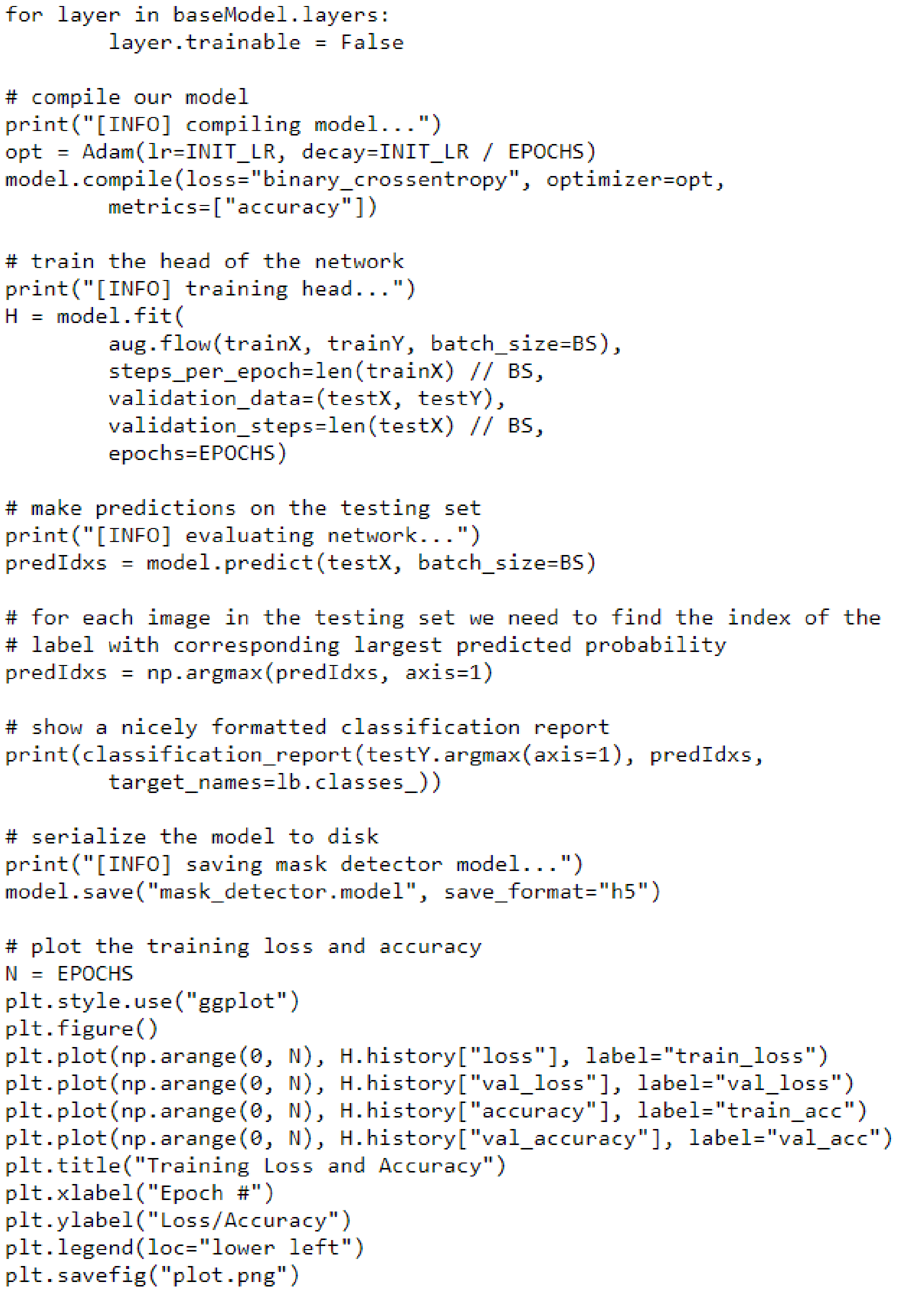


```
#include<Servo.h>
Servo s1;
float t;
float d;
void setup ()
{
  Serial.begin(9600);
  s1.attach(6);
  pinMode (9, OUTPUT);
  pinMode (10, INPUT);
  }

void loop ()
{
digitalWrite (9, LOW) ;
  delayMicroseconds (10);
  digitalWrite (9, HIGH);
  delayMicroseconds (10);
  digitalWrite (9, LOW);
  t=pulseIn (10, HIGH);

d=(t*0.0343)/2;
  Serial.println (d);
  if(d<=20)
  {
   s1.write(90);
   delay(1000);
   }
  else
  {
  s1.write(0);
  delay(1000);
}
}
```

7.2 : Code of Facemask Detection.

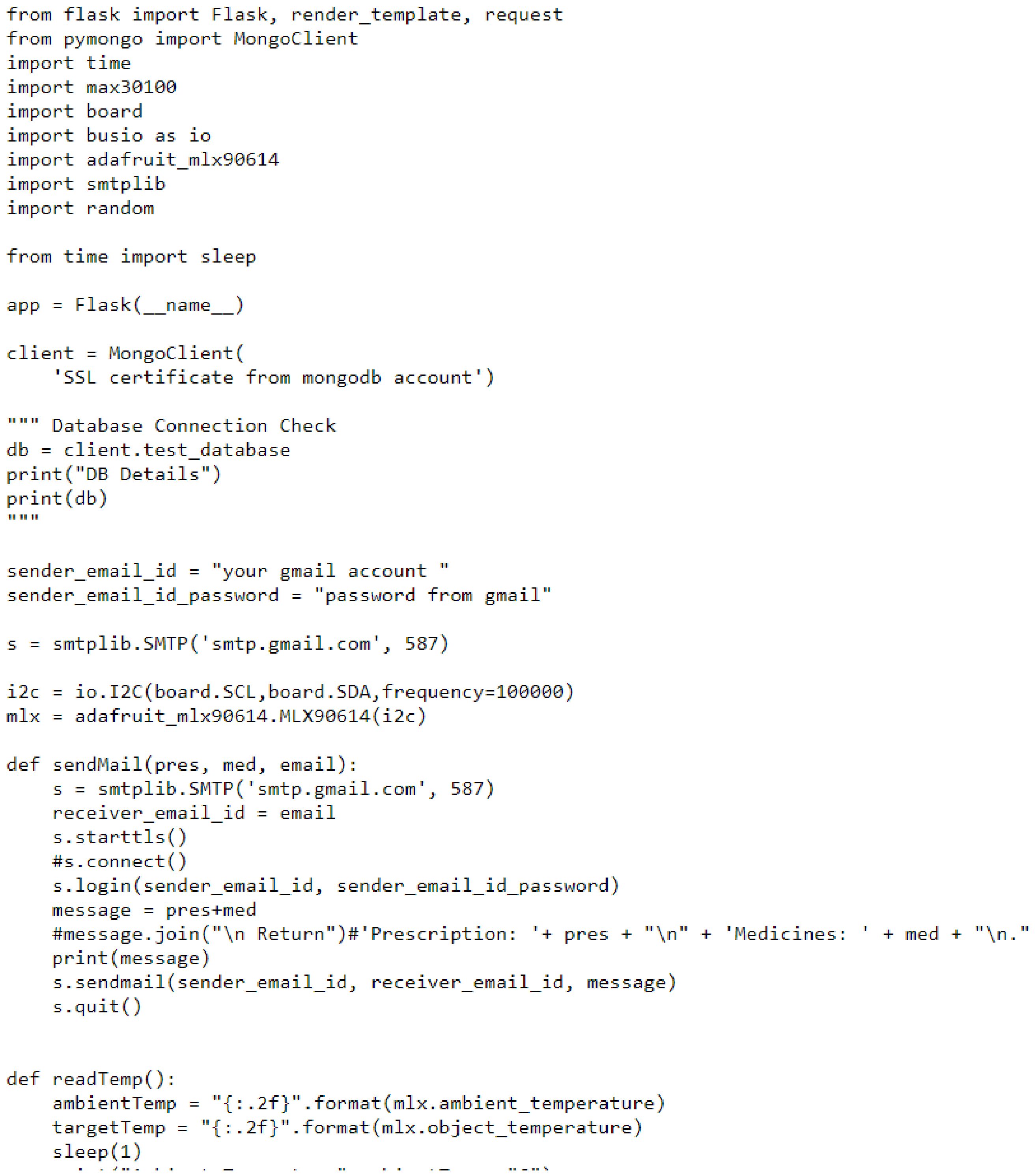


```
# import the necessary packages
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.applications import MobileNetV2
from tensorflow.keras.layers import AveragePooling2D
from tensorflow.keras.layers import Dropout
from tensorflow.keras.layers import Flatten
from tensorflow.keras.layers import Dense
from tensorflow.keras.layers import Input
from tensorflow.keras.models import Model
from tensorflow.keras.optimizers import Adam
from tensorflow.keras.applications.mobilenet_v2 import preprocess_input
from tensorflow.keras.preprocessing.image import img_to_array
from tensorflow.keras.preprocessing.image import load_img
from tensorflow.keras.utils import to_categorical
from sklearn.preprocessing import LabelBinarizer
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report
from imutils import paths
import matplotlib.pyplot as plt
import numpy as np
import os

# initialize the initial learning rate, number of epochs to train for,
# and batch size
INIT_LR = 1e-4
EPOCHS = 20
BS = 32

DIRECTORY = r"C:\Users\chatw\Desktop\Face-Mask-Detection\dataset"
CATEGORIES = ["with_mask", "without_mask"]

# grab the list of images in our dataset directory, then initialize
# the list of data (i.e., images) and class images
print("[INFO] loading images...")

data = []
labels = []

for category in CATEGORIES:
    path = os.path.join(DIRECTORY, category)
    for img in os.listdir(path):
        img_path = os.path.join(path, img)
        image = load_img(img_path, target_size=(224, 224))
        image = img_to_array(image)
        image = preprocess_input(image)

        data.append(image)
        labels.append(category)
```

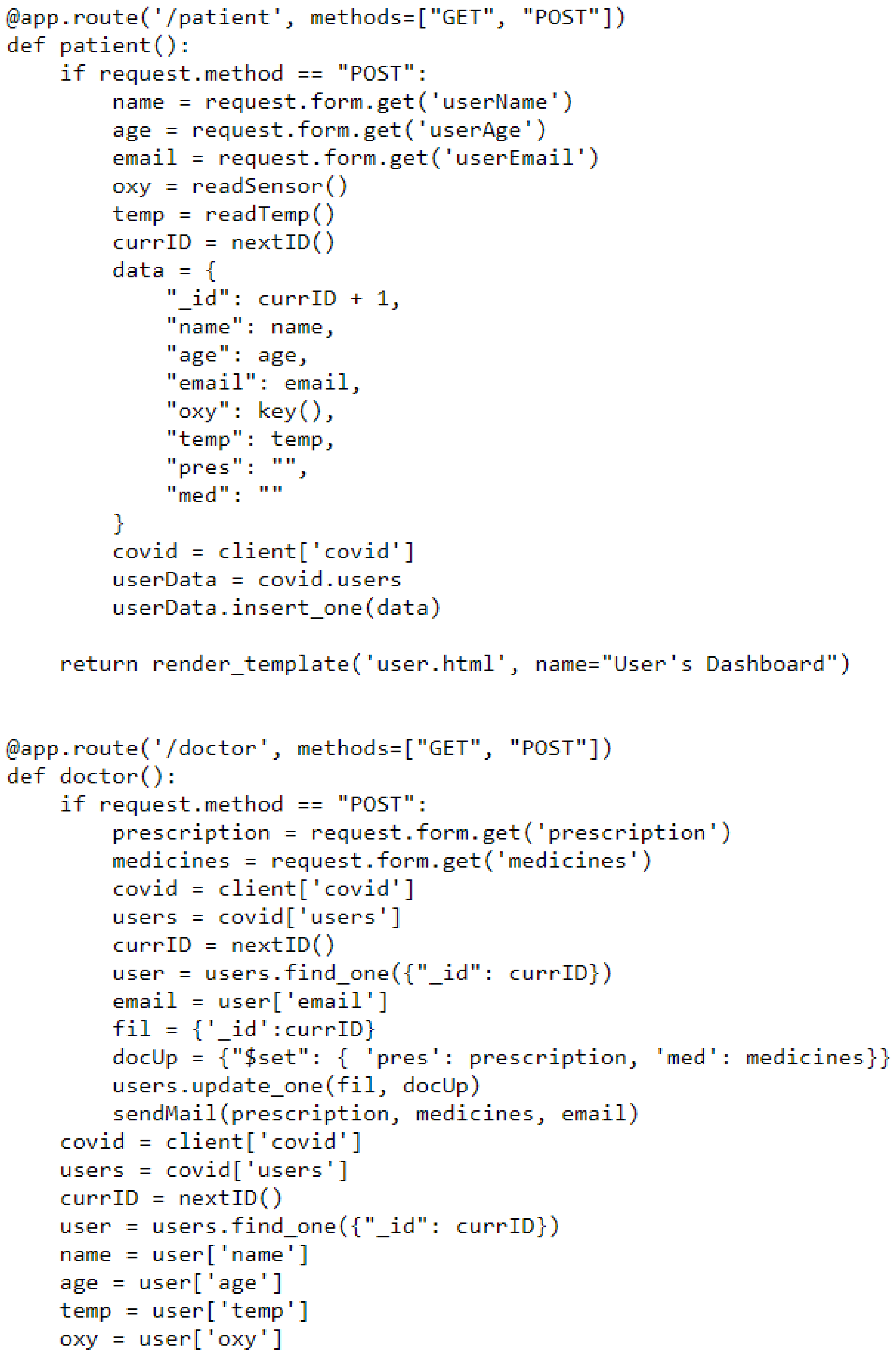


```
for layer in baseModel.layers:
	layer.trainable = False

# compile our model
print("[INFO] compiling model...")
opt = Adam(lr=INIT_LR, decay=INIT_LR / EPOCHS)
model.compile(loss="binary_crossentropy", optimizer=opt,
	metrics=["accuracy"])

# train the head of the network
print("[INFO] training head...")
H = model.fit(
	aug.flow(trainX, trainY, batch_size=BS),
	steps_per_epoch=len(trainX) // BS,
	validation_data=(testX, testY),
	validation_steps=len(testX) // BS,
	epochs=EPOCHS)

# make predictions on the testing set
print("[INFO] evaluating network...")
predIdxs = model.predict(testX, batch_size=BS)

# for each image in the testing set we need to find the index of the
# label with corresponding largest predicted probability
predIdxs = np.argmax(predIdxs, axis=1)

# show a nicely formatted classification report
print(classification_report(testY.argmax(axis=1), predIdxs,
	target_names=lb.classes_))

# serialize the model to disk
print("[INFO] saving mask detector model...")
model.save("mask_detector.model", save_format="h5")

# plot the training loss and accuracy
N = EPOCHS
plt.style.use("ggplot")
plt.figure()
plt.plot(np.arange(0, N), H.history["loss"], label="train_loss")
plt.plot(np.arange(0, N), H.history["val_loss"], label="val_loss")
plt.plot(np.arange(0, N), H.history["accuracy"], label="train_acc")
plt.plot(np.arange(0, N), H.history["val_accuracy"], label="val_acc")
plt.title("Training Loss and Accuracy")
plt.xlabel("Epoch #")
plt.ylabel("Loss/Accuracy")
plt.legend(loc="lower left")
plt.savefig("plot.png")
```

7.3 : Code of IoT Infrastructure of covid – 19 patients.

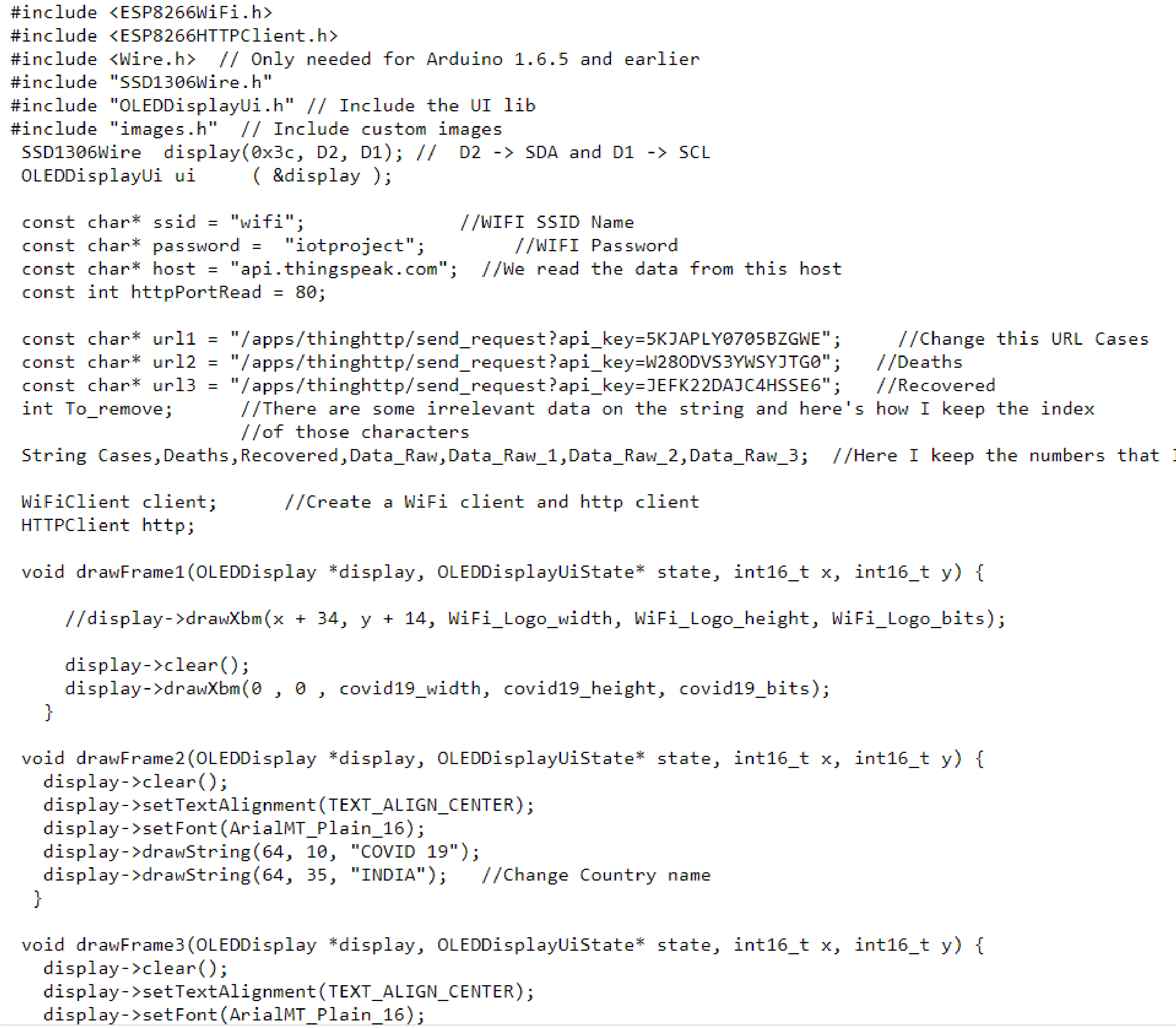


```
from flask import Flask, render_template, request
from pymongo import MongoClient
import time
import max30100
import board
import busio as io
import adafruit_mlx90614
import smtplib
import random

from time import sleep

app = Flask(__name__)

client = MongoClient(
    'SSL certificate from mongodb account')

""" Database Connection Check
db = client.test_database
print("DB Details")
print(db)
"""

sender_email_id = "your gmail account "
sender_email_id_password = "password from gmail"

s = smtplib.SMTP('smtp.gmail.com', 587)

i2c = io.I2C(board.SCL,board.SDA,frequency=100000)
mlx = adafruit_mlx90614.MLX90614(i2c)

def sendMail(pres, med, email):
    s = smtplib.SMTP('smtp.gmail.com', 587)
    receiver_email_id = email
    s.starttls()
    #s.connect()
    s.login(sender_email_id, sender_email_id_password)
    message = pres+med
    #message.join("\n Return")#'Prescription: '+ pres + "\n" + 'Medicines: ' + med + "\n."
    print(message)
    s.sendmail(sender_email_id, receiver_email_id, message)
    s.quit()


def readTemp():
    ambientTemp = "{:.2f}".format(mlx.ambient_temperature)
    targetTemp = "{:.2f}".format(mlx.object_temperature)
    sleep(1)
```

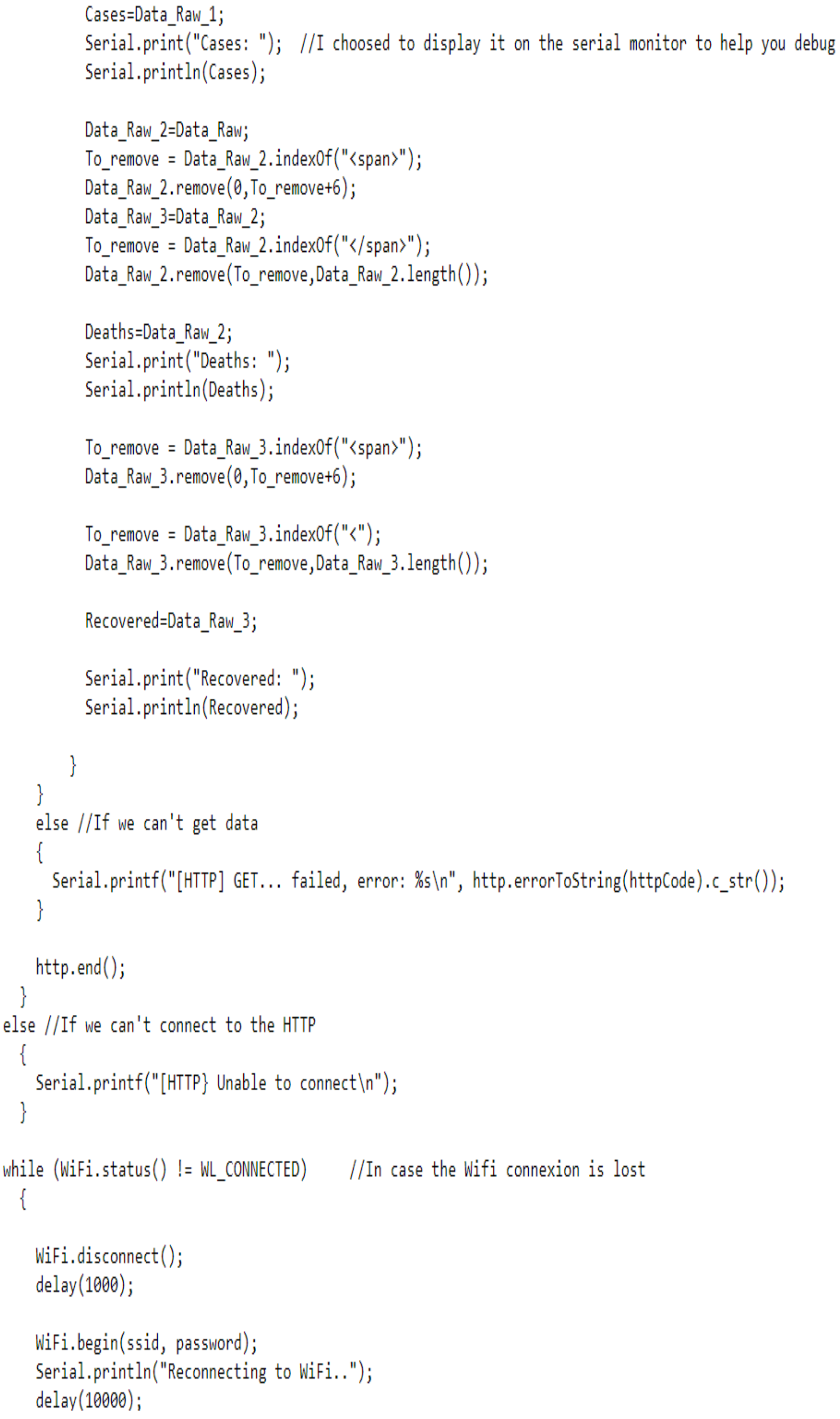


```
@app.route('/patient', methods=["GET", "POST"])
def patient():
    if request.method == "POST":
        name = request.form.get('userName')
        age = request.form.get('userAge')
        email = request.form.get('userEmail')
        oxy = readSensor()
        temp = readTemp()
        currID = nextID()
        data = {
            "_id": currID + 1,
            "name": name,
            "age": age,
            "email": email,
            "oxy": key(),
            "temp": temp,
            "pres": "",
            "med": ""
        }
        covid = client['covid']
        userData = covid.users
        userData.insert_one(data)

    return render_template('user.html', name="User's Dashboard")


@app.route('/doctor', methods=["GET", "POST"])
def doctor():
    if request.method == "POST":
        prescription = request.form.get('prescription')
        medicines = request.form.get('medicines')
        covid = client['covid']
        users = covid['users']
        currID = nextID()
        user = users.find_one({"_id": currID})
        email = user['email']
        fil = {'_id':currID}
        docUp = {"$set": { 'pres': prescription, 'med': medicines}}
        users.update_one(fil, docUp)
        sendMail(prescription, medicines, email)
    covid = client['covid']
    users = covid['users']
    currID = nextID()
    user = users.find_one({"_id": currID})
    name = user['name']
    age = user['age']
    temp = user['temp']
    oxy = user['oxy']
```

7.4 : Corona Live Status in OLED Display



```
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
#include <Wire.h>  // Only needed for Arduino 1.6.5 and earlier
#include "SSD1306Wire.h"
#include "OLEDDisplayUi.h" // Include the UI lib
#include "images.h"  // Include custom images
 SSD1306Wire  display(0x3c, D2, D1); //  D2 -> SDA and D1 -> SCL
 OLEDDisplayUi ui     ( &display );

 const char* ssid = "wifi";              //WIFI SSID Name
 const char* password =  "iotproject";        //WIFI Password
 const char* host = "api.thingspeak.com";  //We read the data from this host
 const int httpPortRead = 80;

 const char* url1 = "/apps/thinghttp/send_request?api_key=5KJAPLY0705BZGWE";     //Change this URL Cases
 const char* url2 = "/apps/thinghttp/send_request?api_key=W28ODVS3YWSYJTG0";   //Deaths
 const char* url3 = "/apps/thinghttp/send_request?api_key=JEFK22DAJC4HSSE6";   //Recovered
 int To_remove;      //There are some irrelevant data on the string and here's how I keep the index
                     //of those characters
 String Cases,Deaths,Recovered,Data_Raw,Data_Raw_1,Data_Raw_2,Data_Raw_3;  //Here I keep the numbers that I

 WiFiClient client;      //Create a WiFi client and http client
 HTTPClient http;

 void drawFrame1(OLEDDisplay *display, OLEDDisplayUiState* state, int16_t x, int16_t y) {

     //display->drawXbm(x + 34, y + 14, WiFi_Logo_width, WiFi_Logo_height, WiFi_Logo_bits);

     display->clear();
     display->drawXbm(0 , 0 , covid19_width, covid19_height, covid19_bits);
   }

 void drawFrame2(OLEDDisplay *display, OLEDDisplayUiState* state, int16_t x, int16_t y) {
   display->clear();
   display->setTextAlignment(TEXT_ALIGN_CENTER);
   display->setFont(ArialMT_Plain_16);
   display->drawString(64, 10, "COVID 19");
   display->drawString(64, 35, "INDIA");   //Change Country name
  }

 void drawFrame3(OLEDDisplay *display, OLEDDisplayUiState* state, int16_t x, int16_t y) {
   display->clear();
   display->setTextAlignment(TEXT_ALIGN_CENTER);
   display->setFont(ArialMT_Plain_16);
```



```
     Cases=Data_Raw_1;
     Serial.print("Cases: ");  //I choosed to display it on the serial monitor to help you debug
     Serial.println(Cases);

     Data_Raw_2=Data_Raw;
     To_remove = Data_Raw_2.indexOf("<span>");
     Data_Raw_2.remove(0,To_remove+6);
     Data_Raw_3=Data_Raw_2;
     To_remove = Data_Raw_2.indexOf("</span>");
     Data_Raw_2.remove(To_remove,Data_Raw_2.length());

     Deaths=Data_Raw_2;
     Serial.print("Deaths: ");
     Serial.println(Deaths);

     To_remove = Data_Raw_3.indexOf("<span>");
     Data_Raw_3.remove(0,To_remove+6);

     To_remove = Data_Raw_3.indexOf("<");
     Data_Raw_3.remove(To_remove,Data_Raw_3.length());

     Recovered=Data_Raw_3;

     Serial.print("Recovered: ");
     Serial.println(Recovered);

    }
  }
  else //If we can't get data
  {
   Serial.printf("[HTTP] GET... failed, error: %s\n", http.errorToString(httpCode).c_str());
  }

  http.end();
 }
else //If we can't connect to the HTTP
 {
  Serial.printf("[HTTP} Unable to connect\n");
 }

while (WiFi.status() != WL_CONNECTED)     //In case the Wifi connexion is lost
 {

  WiFi.disconnect();
  delay(1000);

  WiFi.begin(ssid, password);
  Serial.println("Reconnecting to WiFi..");
  delay(10000);
```

CONCLUSION AND FUTURE ENHANCEMENT

Conclusion

Continuous health monitoring by monitoring patient’s health by observing SpO2 and Temperature readings, Provides medicine support to the patients from the NGOs for free or order through apps. Provides food to the patient from NGOs for free or order through apps. Providing touchless hand sanitizer machine Face Mask Detection and Alerts Provides time to time update on the status of Covid-19

Future Enhancement

There can be several future advancements that can be associated with this project and some are described as follows: The system can be further expanded for a proper checkup of patients and connection with the NGO and food delivery as well as medicine delivery. A proper ecosystem where we can monitor patient’s health continuously.

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