

# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“Jnana Sangama”, Belgaum-590018, Karnataka



A project phase-I report on

## **“Using Dynamic Models to Showcase Pandemic Prevention Measures Empirical COVID-19”**

Submitted in fulfillment for the requirements of VII semester degree of

**BACHELOR OF ENGINEERING**

in

**INFORMATION SCIENCE AND ENGINEERING**

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**2020-2021**

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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), MANOJ KUMAR O(1DB16IS025)** in partial fulfillment of the requirements for the VII Semester degree of **Bachelor of Engineering in Information Science and Engineering** of Visveshwaraya 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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## ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mention of the people who made it possible, whose constant guidance and encouragement crowned the efforts with success.

I would like to profoundly thank **Management of Don Bosco Institute of Technology** for providing such a healthy environment for the successful completion of Project work.

I would like to express my thanks to the Principal **Dr. Hemadri Naidu T** for their encouragement that motivated me for the successful completion of Project work.

It gives me immense pleasure to thank **Prof. Gowramma G S**, Associate Professor, Head of Department for her constant support and encouragement.

Also, I would like to express my deepest sense of gratitude to **Prof. Gowramma G S** and **Mr. Shankara Gowda S R**, Assistant Professor, Department of Information Science & Engineering for their constant support and guidance throughout the Project work.

I would also like to thank the Laboratory System Administrator **Mr. Rangaswamy**, Department of Information Science & Engineering and all other teaching and non-teaching staff of Information Science Department who has directly or indirectly helped me in the completion of the Project work.

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## **ABSTRACT**

Corona virus disease (COVID-19) is an infectious disease caused by a newly discovered corona virus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow). People with low immunity, such as the elderly, pregnant women, and patients with chronic diseases, are prone to severe acute symptoms after contracting COVID-19. SARS-CoV-2 is mainly transmitted via droplets, touching (including self-infection caused by contaminated hands), and short-distance transmission of respiratory aerosols of different sizes. Currently, SARS-CoV-2 is mainly spread via droplets. These people need constant monitoring and support

Our project mainly focuses on the monitoring of patients 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

A person from the diagnosis center collect the blood samples and send them to the lab for further testing. This blood sample is sent to the doctor. All the data collected will be sent to the doctors who prescribe medicines, these medicines are then delivered to the patient house. This project helps by being a one solution too all the complications faced by the patients during their quarantine time.

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## Chapter 1

### INTRODUCTION

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 useful feature

### 1.2 Problem Statement

There is a lot of complication faced by patients tested positive for the virus. There is no proper device which helps in constant monitoring for COVID-19 patient and reporting their real-time health conditions. 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. And when the patient is tested positive nobody is there to cater some patients with the food and medicine and there is No conventional channel for food delivery for the covid-19 patients. There is no 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 and being fined for the same. No ecosystem helps in catering to the basic needs of the patient during their quarantine period.

## 12 Aims and Objective of the Project

1. The main goal of our project is to design an ecosystem. It provides a complete solution for the patient suffering from covid-19 precaution and checkup.
2. Monitors patient health by observing SpO2 and Temperature readings and sends these readings to the laboratory. Lab report in turn sent to the doctor and the doctor verify and send a prescription report to the patient.
3. Patient Sends requirement of Medicine to NGO or order from medical Store.
4. Patient Sends requirement of Food to NGO or order from Online app.
5. Automatic hand sanitizer machine.
6. Face Mask Detection and Alerts
7. Live Corona Status.

## 13 Existing System

1. 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.
2. Zomato,swiggy is a delivery-oriented system that allows clients to order food from multiple restaurants at the same time
3. 1MG and MedPlus allows patients to order medicine and other toiletries from the website which is delivered to the doorstep
4. There are specialized labs that are working on Covid testing
5. Officials who penalize people for not wearing a mask

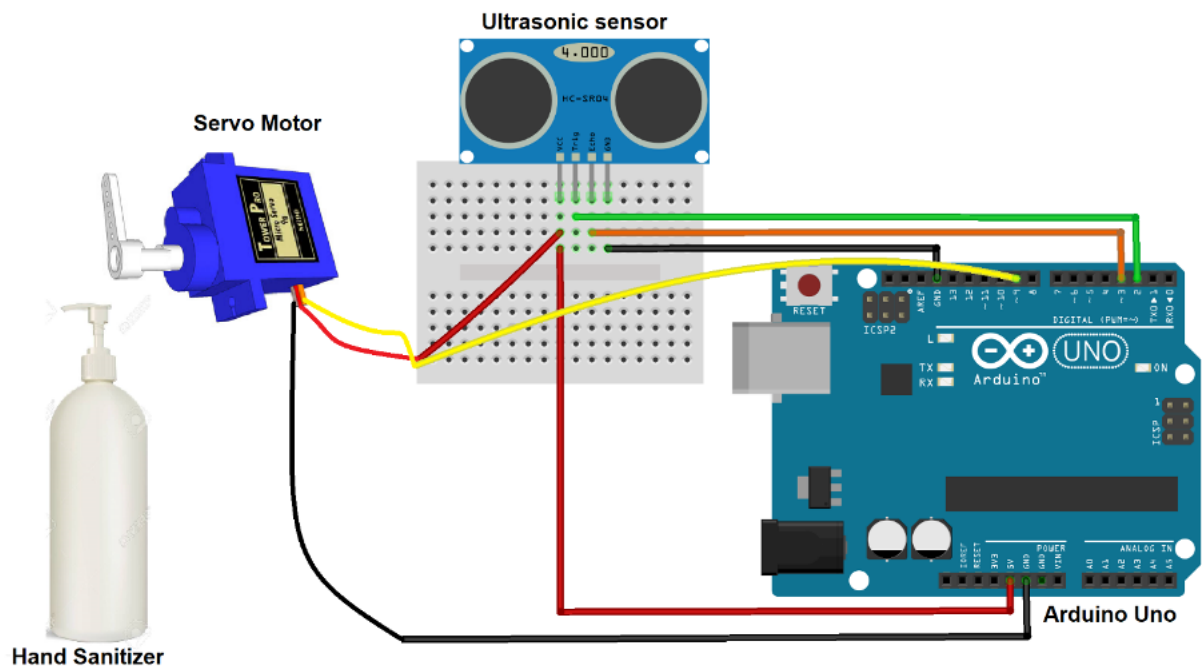
### 1.3.1 Disadvantages of Existing System

1. Many people 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.
2. Zomato and swiggy do not deliver in the contaminated zone and the orders are being canceled
3. Medicine is not easily available in remote areas and in areas that are contaminated
4. There is a communication gap between the doctors and the testing labs
5. It is unnecessary wastage of manpower to penalizing people for not wearing a mask

## 1.4 Proposed System

1. A touchless system that dispenses sanitizer
2. Connecting patient with the food delivery chain
3. Making easy availability of medicines to the covid patients by door-delivery
4. Ecosystem which seamlessly connects the patients with all the essential needs which act as one solution to all the complications faced by the patients
5. Detects people who are not wearing a mask and alerts them

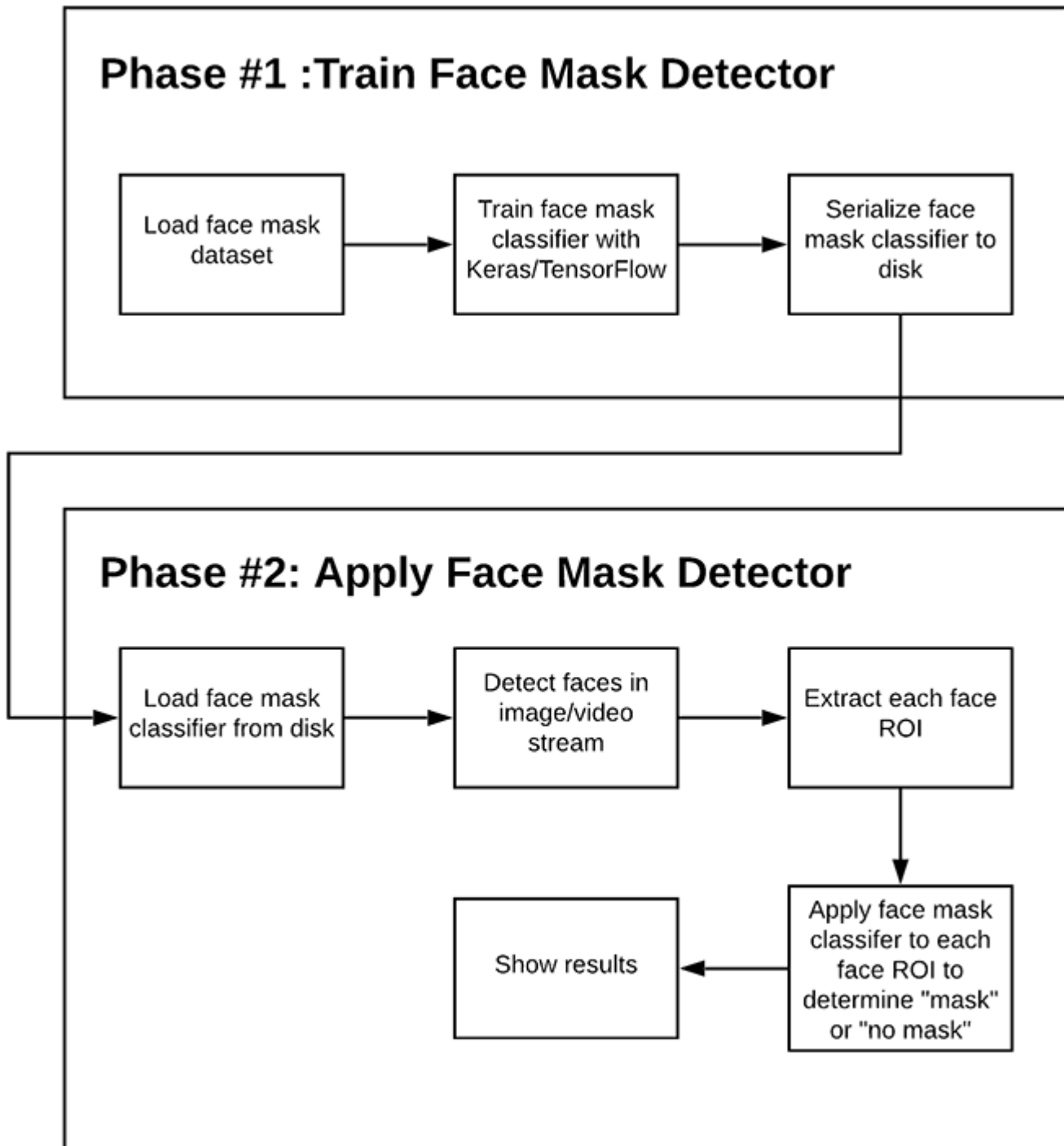
### 1.4.1 Block Diagram



## Automatic Hand Sanitizer

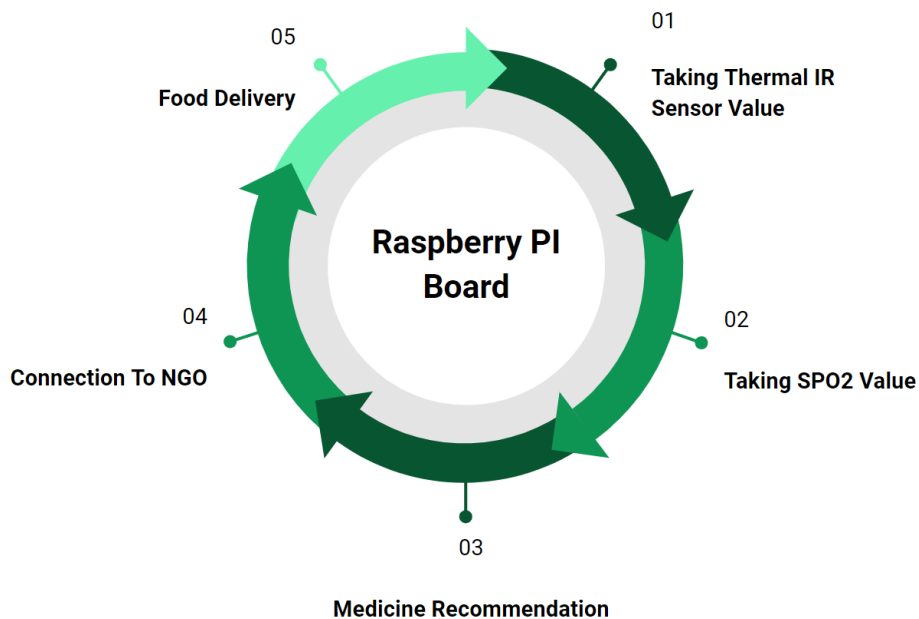






**Fig-Face Mask Detection**

### 1.4.2 Data Flow Diagram



### 1.4.3 Advantages of Proposed system

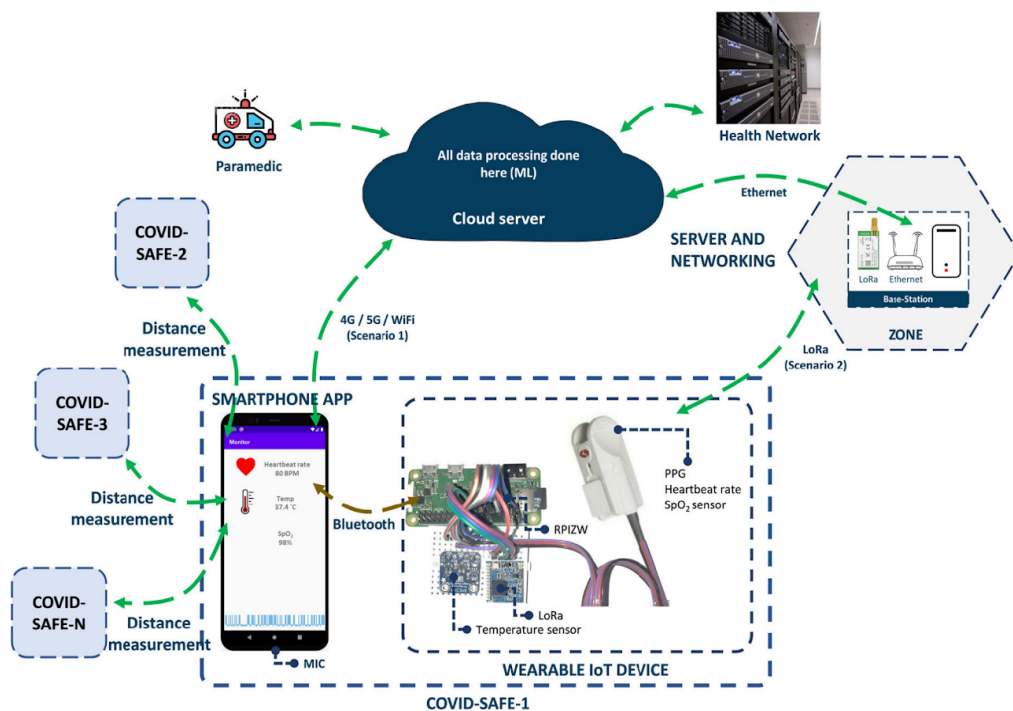
1. Prevents the contact of the pump handle, which decreases the chances of viral transmission
2. Seamless connection between the patients and the food delivery chain
3. Bridges the gap between the patients in quarantine and the medicine delivery
4. It is a one-stop solution to all the challenges faced by the patient who has quarantine themselves and the patients staying in the contaminated zone
5. Helps people by alerting them to wear a mask and prevents them from paying a penalty

## 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.

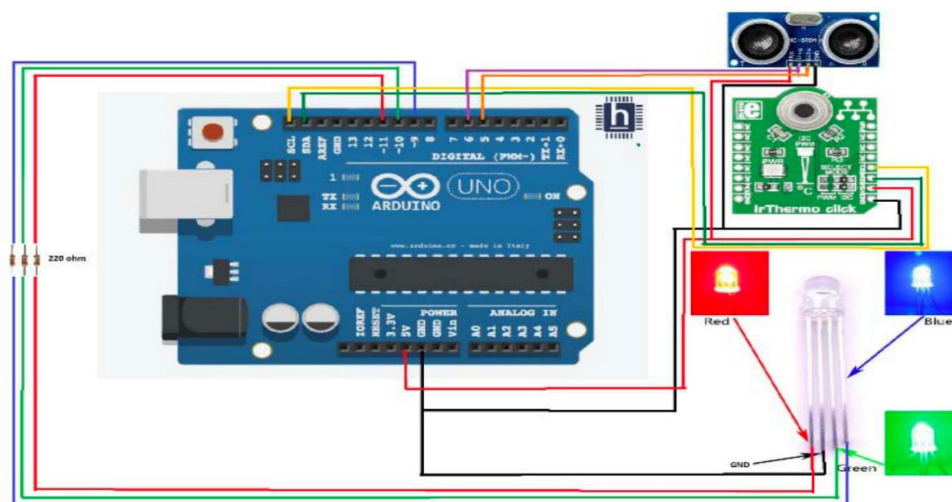


Fig. 3. Schematic of the proposed solution

#### 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.

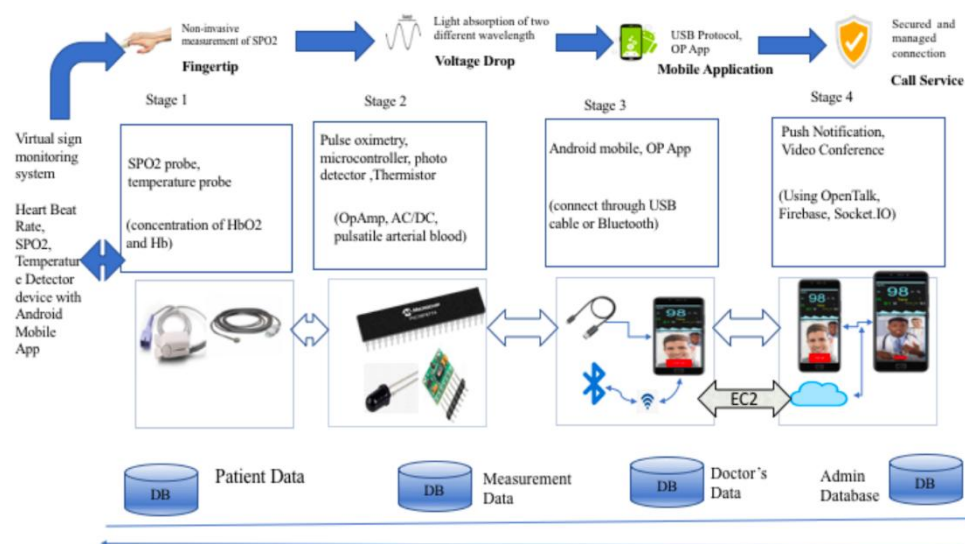
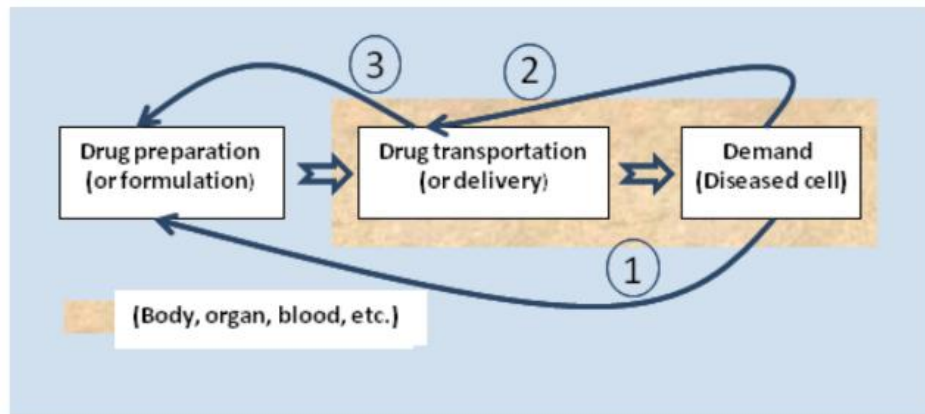


Figure. 1. The architecture of the proposed system

#### 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





## 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 Modeling Language (UML) illustration of the use case diagram. The specification is created for the system behavior to remove the ambiguity. Along with this, the Z/EVES tool is used for the evaluation of Z specifications for the demonstration.

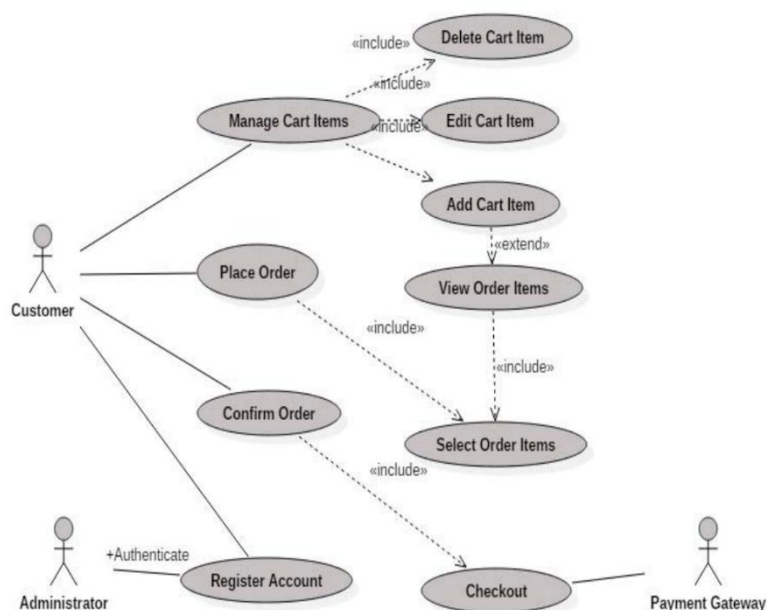


Figure. 1. Use Case diagram for Food Ordering System

## 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 LED's 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

## 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 overdetection, 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 has 96% classification and detection accuracy.

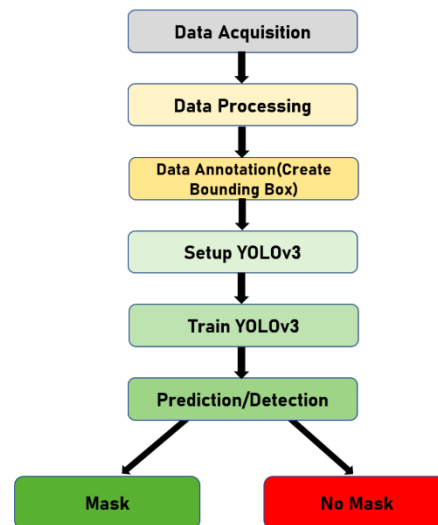


Fig. 1. Workflow Structure.

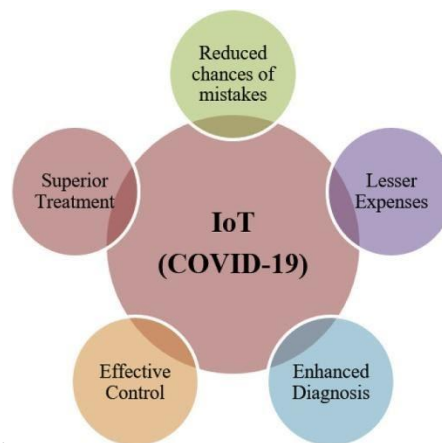
## 9. Detection and Tracking Contagion using IoT-Edge Technologies: Confronting COVID-19 Pandemic

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

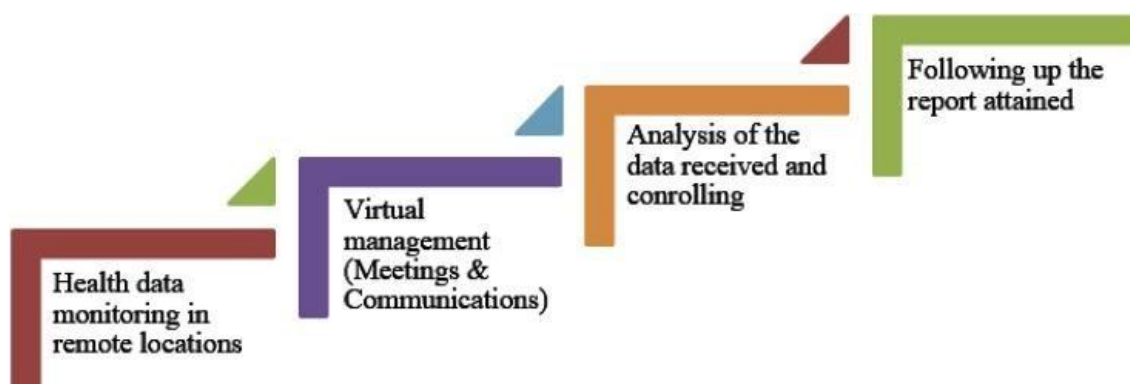
### METHODOLOGY

IoT is an innovative technology that ensures that all infected persons due to this virus are quarantine. During quarantine, it is helpful for a proper monitoring system. All high-risk patients are tracked easily using the internet-based network. This technology is used for biometric measurements like blood pressure, heartbeat, and glucose level shows the critical merits of IoT for COVID-19 Pandemic. With the successful implementation of this technology, we can see an improvement in the efficiency of medical staff with a reduction in their workload. The same can be applicable in the case of the COVID-19 pandemic with



lesser expenses and mistakes.

IoT is an innovative technological platform to fight with COVID-19 pandemic and can fulfill significant challenges during the lock-down situation. This technology is helpful to capture the real-time data and other necessary information of the infected patient shows the significant processes used by IoT for COVID-19.



In the first step, IoT is used to capture health data from various locations of the infected patient and manage all the data using the virtual management system. This technology helps control the data and follow up on the report attained.

As discussed, the internet of things concept utilizes the interconnected network for the effective flow and exchange of data. It also enables the social workers, patients, civilians, etc. to be in connection with the service benefactors for discussing any issue and cooperation. Therefore, by employing the proposed IOT tactic in the COVID-19 pandemic, the effective tracing of the patients, as well as the suspicious cases, can be completely assured. The symptoms related to the coronavirus are now known to most of them, civilians. By developing a well-informed group of a connected network, the identification of the cluster can be made out significantly. Some particular smartphone-based applications can also be developed so that the needy ones can get benefited out of them. The proper reporting of the symptoms and the recovery must be up-to-dated to the controller, i.e. doctors, physicians, caretakers, etc. so that the impressive move can be opted out to optimize the overall quarantine period.

IoT provides an extensive integrated network for health-care to fight with COVID-19 pandemic. All medical devices are connected to the internet, and during any critical situation, it automatically conveys a message to the medical staff. Infected cases can be handled appropriately in a remote location with well-connected teledevices. It handles all cases smartly to provide ultimately strengthened service to the patient and health-care. IoT seems to be an excellent way to screen the infected patient. In health-care, this technology is helpful to maintain quality supervision with real-time information

## **1.1 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 the software.

## 1.2 Requirements

### 1.2.1 Functional Requirement

1. Need continuous WIFI connection to get an update
2. The system needs to be connected with NGO
3. Connection with the Medical store and to help in getting the medicine
4. Connects with the restaurants and helps in getting the food delivered

### 1.2.2 Non Functional Requirement

1. This project is easy to use and it connects the NGO to the food delivery chain and the medical stores.
2. Scalability and maintainability is one the major factor to reach out with end to end functionality
3. It has components that have to be learned for using

### 1.2.3 Hardware Requirements

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

### 7.1.1 Software Requirements

- Open CV
- Python IDE
- Anaconda
- Things Speak
- Blynk cloud

## 7.2 Description About modules: -

### 7.2.1 Open CV

It is a library of programming functions mainly aimed at real-time computer vision. It is developed by Intel research center and subsequently supported by Willow 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.



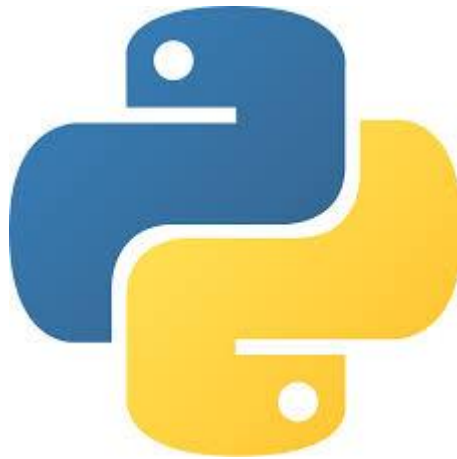
### 3.3.2 Python IDE

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 auto-completion)
- 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 Anaconda

**Anaconda** is a distribution of the Python and R programming languages for scientific computing (data science, machine learning applications, large-scale data processing, predictive analytics, etc.), that aims to simplify package management and deployment. The distribution includes data-science packages suitable for Windows, Linux, and macOS. It is developed and maintained by Anaconda, Inc., which was founded by Peter

Wang and Travis Oliphant in 2012. As an Anaconda, Inc. product, it is also known as **Anaconda Distribution** or **Anaconda Individual Edition**, while other products from the company are Anaconda Team Edition and Anaconda Enterprise Edition, both of which are not free



### 3.3.4 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 ioBridge in 2010 as a service in support of IoT 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 ThingSpeak documentation 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.



### 3.3.5 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 outgoing commands



## 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. The theory overlaps 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 taking 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 a 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 modeling software systems and is increasingly used for high designing non-software systems and organizations.

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

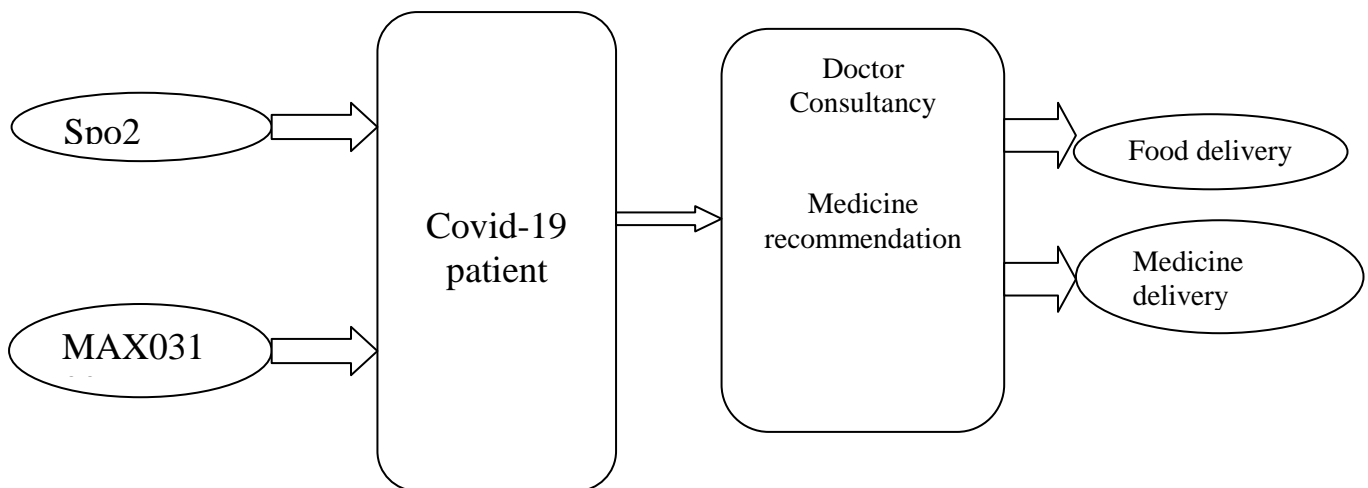
The design of the system is perhaps the most critical factor affecting the quality of the software. The objective of the design phase is to produce the overall design of the software. It aims to figure out the modules that should be in the system to fulfill all the system requirements inefficient manner.

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 an internal data source or external data sink via an internal process. DFD provides no information about the timing of the processor about whether the process will operate in sequence or parallel.



## 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 masks

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 Pseudocode

Pseudocode 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. Pseudocode 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, where convenient, or with compact mathematical notations. The purpose of using pseudocode 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 the planning of computer program development, for sketching out the structure of the program before the actual coding takes place. No standard for pseudocode syntax exists, as a program in pseudo code is not an executable program. Pseudocode 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.

## 5.1 Module Description

The Project is divided into 6 different modules:

### Monitoring spo2 and temperature

Step 1. taking value of spo2 sensor

Step 2. taking a value of the temperature sensor

Step 3. connecting both sensor and transmitting the sensor value into the microcontroller

Step 4. Those value sent into the server

Step 5. From the server, it gets into the respective need



### Medicine requirement

Step 1, taking all the value from the sensor

Step 2. If anything goes wrong

Step 3. Connect with doctors

Step 4. Medicine recommendation

### Food delivery

Step 1, taking all the value from the sensor

Step 2. If anything goes wrong

Step 3. Connect with restaurants

Step 4. Food delivery

### Hand sanitizer

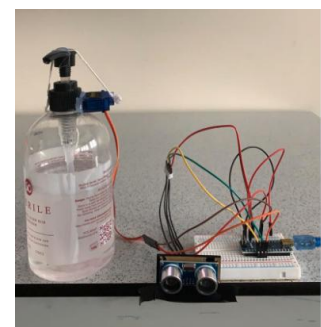
Step 1. Taking value from the ultrasonic

Step 2. If the distance is less

Step 3. Apply a mechanical force with the help of servo motors

Step 4. The mechanical force will apply to the sanitizer bottle

Step 5. Than sanitizer comes out



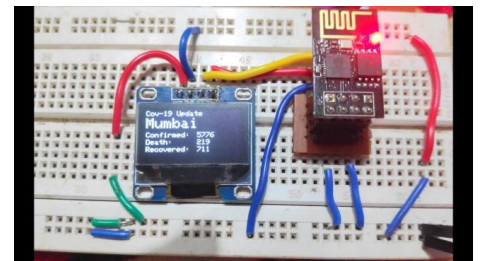
### Face mask detection

- Step 1. Taking image dataset
- Step 2. Training the module from the dataset
- Step 3. Apply the trained module
- Step 4. Take the live stream video
- Step 5. Detect the face mask
- Step 6. If no mask than give a pop-up



### Live corona status

- Step 1. Visit website <https://www.mohfw.gov.in/>
- Step 2. Making the API for the active, discharge, death cases
- Step 3. Putting the API in the ESP8226
- Step 4. ESP8226 is connected with an OLED display
- Step 5. ESP8226 is connected with WIFI to access the live status



## **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.

## BIBLIOGRAPHY

- [1]S. S. Vedaiei et al., "COVID-SAFE: An IoT-Based System for Automated Health Monitoring and Surveillance in Post-Pandemic Life," in IEEE Access, vol. 8, pp. 188538-188551, 2020, doi: 10.1109/ACCESS.2020.3030194.  
<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9220167&isnumber=8948470>
- [2]S. Singh, P. Raj, R. Kumar and R. Chaujar, "Prediction and forecast for COVID-19 Outbreak in India based on Enhanced Epidemiological Models," 2020 Second International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, India, 2020, pp. 93-97, doi:0.1109/ICIRCA48905.2020.9183126.  
<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9183126&isnumber=9182787>
- [3]Vulpe, C. Lupu and C. Mihai, "Research on infrared body temperature measurement – virus spreading prevention," 2020 12th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), Bucharest, Romania, 2020, pp.14, doi:10.1109/ECAI50035.2020.9223195. <https://ieeexplore.ieee.org/abstract/document/9223195>
- [4]S. Natarasan and P. Sekar, "Design and Implementation of Heartbeat Rate and SpO2 Detector by Using IoT for Patients," 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC), Coimbatore, India, 2020, pp. 630-636, doi: 10.1109/ICESC48915.2020.9155925.<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9155925&isnumber=9155547>
- [5]R. X. Yin et al., "Understanding drug delivery from a system perspective: Concept and demonstration," 2017 IEEE 12th International Conference on Nano/Micro Engineered and Molecular Systems (NEMS), Los Angeles, CA, 2017, pp. 698-701, doi: 10.1109/NEMS.2017.8017116.<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8017116&isnumber=8016956>
- [6]P. Saratha, G. V. Uma and B. Santhosh, "Formal Specification for Online Food Ordering System Using Z Language," 2017 Second International Conference on Recent Trends and Challenges in Computational Models (ICRTCCM), Tindivanam, 2017, pp. 343-348doi: 10.1109/ICRTCCM.2017.59.<https://ieeexplore.ieee.org/document/8057561>
- [7].M. M. Srihari, "Self-Activating Sanitizer With Battery Imposed System For Cleansing Hands," 2020 Second International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, India, 2020, pp. 1102-1105, doi: 10.1109/ICIRCA48905.2020.9183347.<https://ieeexplore.ieee.org/document/9183347>



[8]M. R. Bhuiyan, S. A. Khushbu and M. S. Islam, "A Deep Learning Based Assistive System to Classify COVID-19 Face Mask for Human Safety with YOLOv3," 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT), Kharagpur, India, 2020, pp. 1-5, doi: 10.1109/ICCCNT49239.2020.9225384.

<https://ieeexplore.ieee.org/document/9225384>

[9]M. U. Ashraf, A. Hannan, S. M. Cheema, Z. Ali, K. m. Jambi and A. Alofi, "Detection and Tracking Contagion using IoT-Edge Technologies: Confronting COVID-19 Pandemic," 2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE), Istanbul, Turkey, 2020, pp. 1-6, doi: 10.1109/ICECCE49384.2020.9179284.

<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9179284&isnumber=917>