



# A Novel Implementation of Covid Safety System with Mask Detection and Temperature sensing

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## ABSTRACT

The purpose of this project is to minimize the spread of COVID or similar transmittable diseases by with the use of advanced technology. In this project we are focusing on checking the presence of face mask, measuring the human body temperature without physical contact, dispensing the sanitizer automatically, counting and restricting the people entry into the building and automatic gate control. We make use of a laser diode and receiver to detect the entrance of a person, when the person is detected at the entrance it will check the face mask using Image Processing and then checks the temperature of the person. If the temperature is less than the predefined temperature the person is allowed entry otherwise the entry is denied. Only a pre-determined number of people are allowed in the room. The allowed number of people actively present in the room can be set/viewed using a Push buttons and LCD. After temperature of the person is checked then it dispenses the Sanitizer automatically.

## INTRODUCTION

Wireless COVID 19 has made a huge impact on the society; the new restriction has been imposed as in the number of users allowed in a particular room in colleges, offices, shops, etc. to maintain social distancing, along with social distancing regular temperature check at entrances of malls, the office is mandatory. In this project we stimulate a room where such necessary precautions are taken, we make use of a laser diode and receiver to detect the entrance of a person, when the project detect entrance, it will check the face mask using Image Processing and then checks the temperature of the person. If the temperature is less than the predefined temperature the person is allowed entry, otherwise the entry is denied. Only a pre-determined number of people are allowed in the room. The allowed number of people actively present in the room can be set/viewed using a Push buttons and LCD. After temperature of the person is checked then it dispenses the Sanitizer automatically. After this the gate opens so that the person enters into to college or building premises.

The overall project idea was to develop Covid safety system for classroom purpose. We thought of monitoring the important things like wearing of facemask and human body temperature. We also thought of implementing social distancing by restricting the person limit inside the room. For human presence sensing at entry and exit points we are using laser and LDR based sensing system. All these sensors and actuators are interfaces to Arduino UNO microcontroller board. Arduino microcontroller is programmed with embedded C program to make it work as per our requirements. ESP32 CAM is used to recognize the facemask and returns that information to Arduino Uno. We are using Google's Teachable Machines algorithms with ESP32.

## METHODOLOGY

The main aim of this project is to check whether a person is wearing a mask, sensing the temperature of the person with no contact and maintain the social distancing by restricting only certain number of persons in the room. Whenever a person enters enter into any premises such as shopping malls, colleges, schools, etc., the motion is detected by the sensors and then the system checks whether the person is wearing mask or not. For facemask detection, we are making use of ESP32 Camera Module with Google's Teachable Machines algorithms. The ESP32-CAM with the ESP32-S microcontroller chip is used as the main board. It collects images by detecting the people who are in focus and in view of the OV2640 camera module. This system is focusing on the essentials of face detection and mask detection on people's faces. We create a neural network model with Tensor Flow and will train it on a dataset of both people who are wearing facemasks. After detection of facemask, the ESP32 sends the Yes or No data to Arduino over serial communication. If the person has the mask on then MLX90614 non-contact sensor checks the temperature. If the temperature is in the considerable range, then it opens the gate and sanitizer is dispensed. After the person enter then the count will be increased by one, if the person leaves then the count is decreased by one. We pre-define only certain number of people onto the premises. The count of the person can be changed by using the buttons. The temperature of the person, count, mask is present or not is displayed in the LCD display.

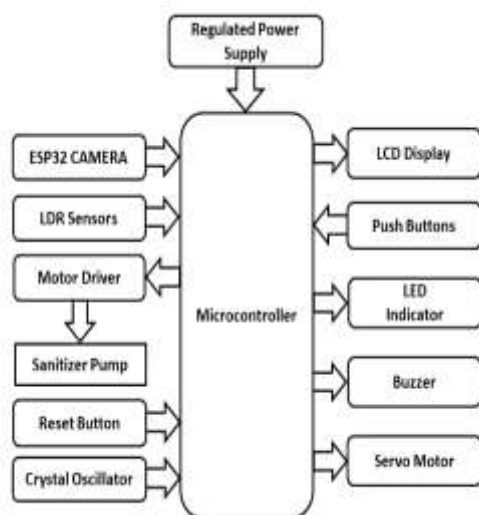


Fig 1: Block diagram of Covid Safety

## ADVANTAGES

- Automatic Monitoring of Various Parameters for COVID Safety.
- Efficient and low-cost design.
- Low power consumption.
- Fast response.
- Non-contact temperature sensing.

- Maintain social distancing norms.

## DISADVANTAGES

- Lightning conditions may affect the image capturing for face mask detection.
- Limited distance monitoring

## RESULT

The Project "COVID SAFETY SYSTEM WITH MASK DETECTION AND TEMPERATURE SENSING" is designed to monitor the important things like wearing of facemask and human body temperature. We also thought of implementing social distancing by restricting the person limit inside the room. All these parameters can be monitored and controlled by employing human resources. However, it is very expensive task and prone to human errors. So, we thought of automating this entire process by using technical knowledge that we acquired during our engineering course. So, for detecting facemask we thought of using Google's machine learning application "teachable machines" using ESP32 CAM hardware. This hardware and software detect the facemask presence and gives information to Arduino microcontroller, which is heart of our project. For body temperature measurement, we thought of using non-contact-based sensor keeping COVID in view. We also thought of using automatic sanitizer dispenser before gate entry.

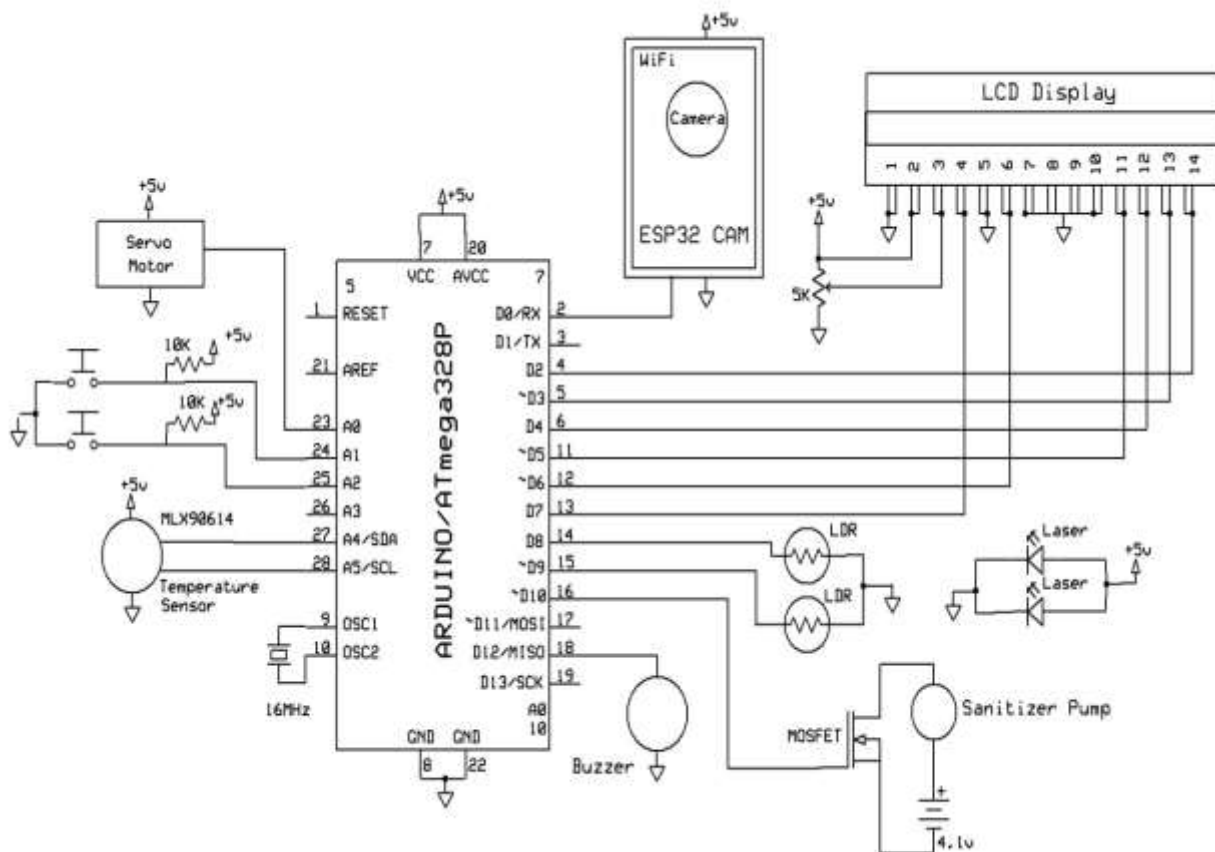


Fig 2: Circuit diagram of Covid Safety System

For body temperature measurement, we thought of using non-contact-based sensor keeping COVID in view. We also thought of using automatic sanitizer dispenser before gate entry. For this, we are using submersible mini-DC pump. For gate operation we are using servo motor which most suitable motor for gates. For human presence, sensing at entry and exit points we are using laser and LDR based sensing system. All these sensors and actuators are interfaces to Arduino UNO microcontroller board. Arduino microcontroller is programmed with embedded C program to make it work as per our idea. Overall, the project was built successfully and operated as per our thoughts.

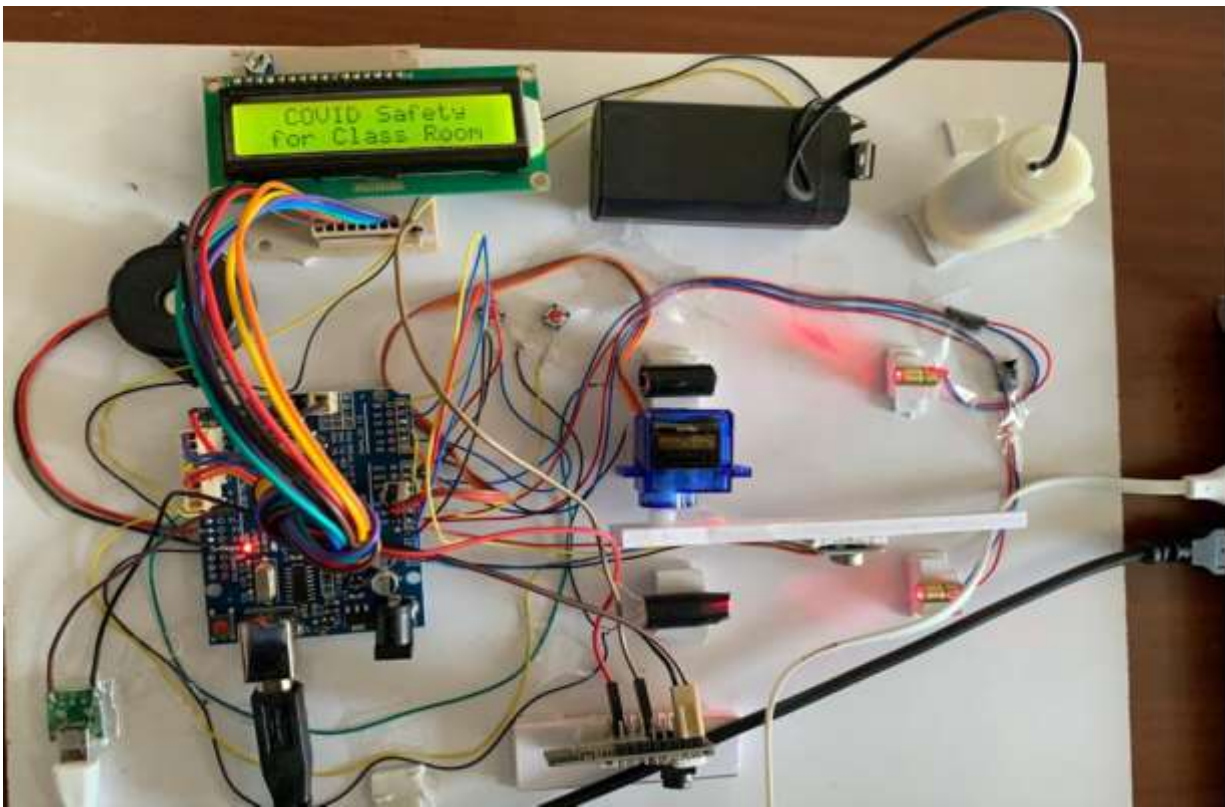


Fig 3: Practical Working of Project

### CONCLUSION:

We had made a system such that it can monitor the temperature of the person and it can check for mask detection. We can also make a specified number of people to enter into a room. The face mask detection will work upon the tensorflow techniques which is linked to the google AI techniques. The techniques depend on the machine learning teachables.

### FUTURE SCOPE:

- This project can be extended by adding a web-based database to store student photos with their in and out timings.
- If their temperature is more than we can suggest them with medical assistance.
- We can add voice-based announcement to this system.
- Mainly intended for educational and shopping malls.
- For an automatic non-contact method of patient's temperature measurement.
  - Automatic Gate control applications.
  - Can be used for public transport systems (Buses and Trains)
  - Time of operation decreases if we get more updates in the components like Arduino and ESP 32 CAM

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