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 [ijirccce@gmail.com](mailto:ijirccce@gmail.com)

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# Automatic COVID Security System Using Convolutional Neural Network

J.Vamsikrishna, N.Vinoth, M.S.Thinaa Srinivas, M.Subbu Vishaleswaran,

Dr.S.Uma Maheswari M.E. Ph.D

UG Student, Dept. of ECE, Panimalar Engineering College, Chennai, India

Professor, Dept. of ECE, Panimalar Engineering College, Chennai, India

**ABSTRACT:** In this project it represents the aim of any place to be free from covid-19 Virus and other contagious diseases. This project will automate the door opening and closing at any public places like Hospitals, Office complexes, shopping Malls, auditoriums, public places, apartments, schools, colleges, places of worship, other public places along with COVID 19 security system. The system will check the whether the person wear mask and also automatic check their body temperature. The proposed design also has automatic sanitization mechanism. This dispenser used is contactless and will spray sanitizer for sanitization of hands while entering into the buildings. As the Covid-19 crisis continues to unfold, washing and sanitization of hands have become an absolute necessity in daily affairs. Automatic sanitizer dispensing systems is a very useful resource in the fight against corona virus and contagious diseases. Thus, once all the conditions such as mask detection , temperature checking and usage of sanitizing mechanism are tested to be positive the door will be opened automatically.

**KEYWORDS:** You Only Look Once(YOLO), Graphics Processing Unit, Tensor Processing Unit.

## I. INTRODUCTION

Corona Virus disease [Covid19] is wreaking havoc in the world. Ever since WHO announced it as a Pandemic disease and many cities are under lockdown, people are not able to step out of their homes and already Millions have lost their lives. The situation now has been under attack and also growing badly. During this disaster time period everyone should raise awareness and naturally should do some oneself activities. By this issue the country's government, social authority and working place should strictly follow necessary rules through continuous measurement and protest people's health. Hereby this germs reaches and viral in any region by one to many and many to million from hand shaking, germs of mouth and exchange accessories with others. On behalf of, nowadays people wearing masks for their own safety are concerned with reducing the flow of germs and the infected number of people reduction. Due to this violent topic we illustrate our work by detecting the mask position of who wears the masks and who are not both in outside and crowded places. Masks are a key measure to suppress transmission and save lives. The computer vision learning is the actual field to identify the image, convert descriptive image, output analyze and machine acquiring. With COVID-19 transmission mainly spreading between people through direct, indirect (through contaminated objects or surfaces), or close contact with infected people via mouth and nose secretions, washing hands with soap and running water is of critical importance. To stop the spread of COVID-19, along with other COVID appropriate behaviors, the practice of hand washing at regular intervals is a must, after coughing or sneezing, when caring for the sick, after using the toilet, before eating, while preparing food and after handling animals or animal waste. Hand washing after touching common surfaces such as doorknobs or handles, or after one comes back home from visiting a public place will keep ourselves and others around us safe. The main objective of our project is to automate the process of COVID-19 precautions such as face mask detection, temperature sensing and sanitizing hands using Deep learning and Embedded to reduce transmission of disease and human error.

## II. RELATED WORK

The proposed framework persistently screens the mask detection, Hand cleaning, Body temperature level checking for the workplace laborers and also for other public places. The software coding done will check for the mask detection and the embedded part attached will check for body temperature. Once both conditions are checked, the controller provides result and then solenoid valve opens when you move your hand under the sanitizing mechanism, permitting you to clean your hand consequently. Each information will be shown in LCD in our proposed design.

The entryway will open only after these three testing process was successfully completed. The DC Motor is mechanized to open the entryway.

### III. PROPOSED BLOCK DIAGRAM

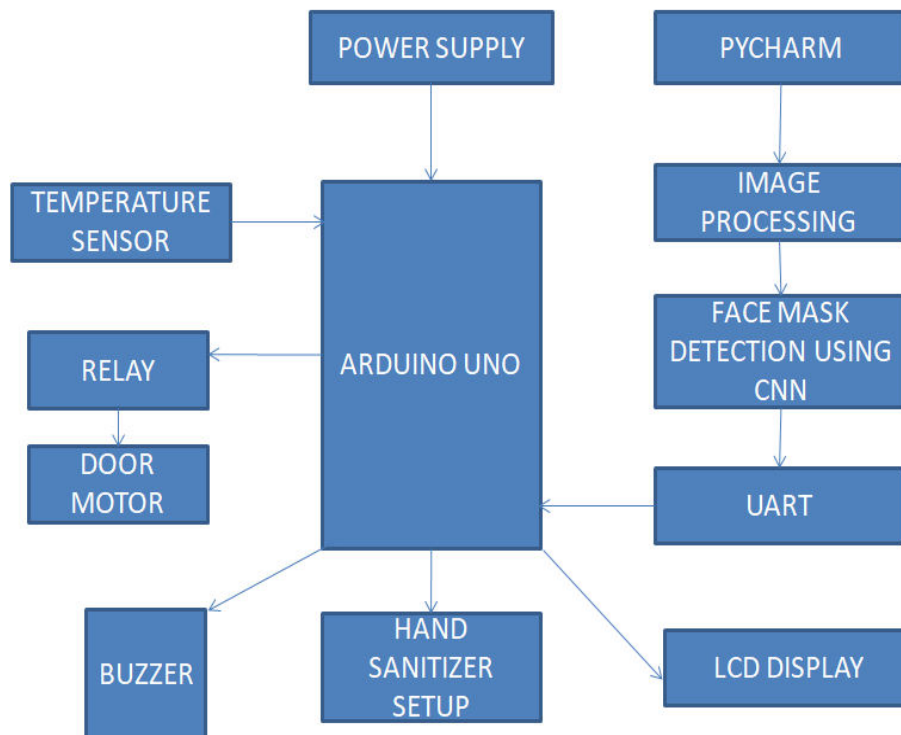


Fig 1. Block Diagram

### IV. PROPOSED METHOD

#### ALGORITHM USED: CONVOLUTIONAL NEURAL NETWORK

The algorithm for face mask detection is as follows:

#### Data Processing:

1. Data Visualization
2. Conversion of RGB image to Gray image
3. Image Reshaping

#### Training of Model:

1. Building the model using CNN architecture
2. Splitting the data and training the model

The trained model detects whether a person wears a mask or not and sends the output to Arduino through UART. Then, non-contact temperature sensor (AM2032) checks the temperature and sends the signal to Arduino. Once both conditions are checked, the controller provides result and then solenoid valve opens when you move your hand under the sanitizing mechanism, permitting you to clean your hand consequently.

#### Automatic Hand Sanitizer Mechanism:

Once Automatic hand sanitizer is triggered to ON, it can be used by placing hands in front of the ultrasonic sensor with a distance of less than 8 cm from the sensor. The HC-SR04 ultrasonic sensor is a sensor that can detect hands via ultrasonic waves. When the ultrasonic sensor detects a hand, the signal from the ultrasonic sensor is then processed and obtained in the Arduino Micro microcontroller. After that, Arduino will send an output signal to the motor driver and indicator lights. The motor driver is used to turn on the pump motor when getting commands from the microcontroller. The motor driver is used because the microcontroller cannot directly turn on the pump motor. When the ultrasonic sensor detects the hand, the green indicator light will light up. This indicates that the hand sanitizer is active and will discharge liquid from the hand sanitizer.

The entryway will open only after these three testing process was successfully completed. The DC Motor is mechanized to open the entryway.

#### IV. RESULTS

After all the setup has been done our custom model is ready for use. The accuracy of first module (Face mask detection) is 96% and accuracy of automatic hand sanitizer is 100% at 5cm-7cm. In future we will add more data to get more accurate result in detection. As far our resources are limited we can't get higher fps rate in video and we will be train and evaluate our model into a better machine. Recently, more object detection architecture i.e. Mask RCNN, Faster RCNN etc are introduced. In future our setup can be made as an compact security robot.

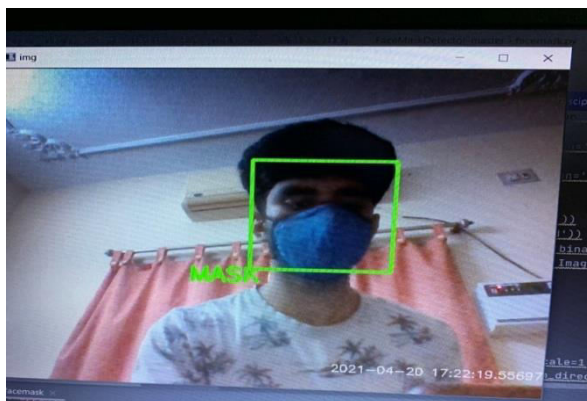


Fig 2.Face Mask Detection

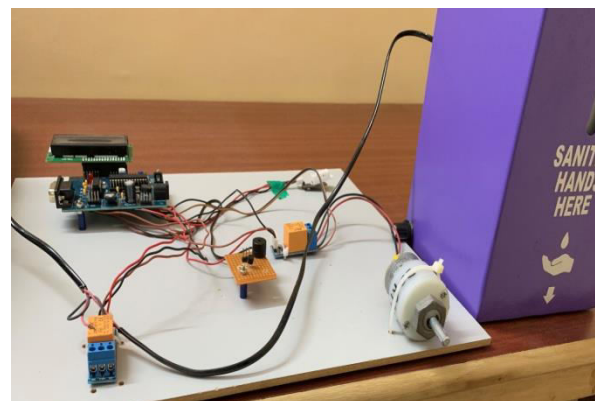


Fig 3.Model

#### V. CONCLUSION AND FUTURE WORK

This system combines the functions of non-contact body temperature, Automatic hand sanitizer and face mask detection using Deep learning technique (CNN) and Embedded. It can be used for a variety of applications. Wearing a mask and sanitizing hands are obligatory at present, considering the Covid-19 crisis. Many public service providers will ask the customers to wear masks correctly to avail of their services. The deployed model will contribute immensely to the public health care system. In future it can be extended to detect if a person is wearing the mask properly or not. The model can be further improved to detect if the mask is virus prone or not i.e. the type of the mask is surgical, N95 or not.

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