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Automatic Temperature and Mask Scan Entry System for COVID-19 Prevention

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ABSTRACT: The present scenario of COVID-19 demands an efficient face mask detection application. The main goal of the project is to implement this system at entrances of colleges, airports, hospitals, and offices where chances of spread of COVID-19 through contagion are relatively higher. Reports indicate that wearing face masks while at work clearly reduces the risk of COVID-19 transmission. It is an object detection and classification problem with two different classes (Mask and Without Mask). A hybrid model using deep and classical machine learning for detecting face mask will be presented. A dataset is used to build this face mask detector using Python. While entering the place everyone should scan their face and then enter ensuring they have a mask put on face. If anyone is found to be without a face mask, beep alert will be generated. As all the workplaces are opening. The number of cases of COVID-19 are still getting registered throughout the country. If everyone follows the safety measures, then it can come to an end. Hence to ensure that people wear masks while coming to work we hope this module will help in detecting it.

KEYWORDS: Detection, COVID -19,Mask,NoMask,Pandemic,Safety.

I. INTRODUCTION

A new strain of virus was identified in humans, known as novel coronavirus, which was never previously been identified in humans. Coronaviruses are a wide group of viruses which cause illness that range from basic colds to infections like Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome. The first infected patient of coronavirus was found in December 2019. The habit of wearing face masks while stepping out is rising due to the COVID- 19 corona virus epidemic. Before Covid-19, masks were worn by people to protect their health from air pollution. Scientists have concluded that wearing face masks works on decreasing COVID-19 transmission. In 2020, the rapid spread of COVID-19 led the World Health Organization to declare COVID- 19 as a global pandemic. The virus spreads through close contact of humans and in crowded/overcrowded places. Among them cleaning hands, maintaining a safe distance, wearing a mask, refraining from touching eyes, nose, and mouth are the main, where wearing a mask is the simplest one. Unfortunately, people are not following these rules properly which is resulting in speeding the spread of this virus. The solution can be to detect the people not wearing mask and informing their authorities. The face mask detection is a technique to find out whether the person is wearing a mask or not. In medical applications Deep learning techniques are highly used as it allows researchers to study and evaluate large quantities of data. Deep learning models have shown great role in object detection.

These models and architectures can be used in detecting the mask on a face. Here we introduce a face mask detection model which is based on computer vision and deep learning. The proposed model can be integrated with computer or laptop cameras allowing it to detect people who are wearing masks and not wearing masks. The model has been put together using deep learning and classical machine learning techniques with Open CV, tensor flow and keras. We have introduced a comparison between three machine learning algorithms to find the most suitable algorithm that yields the highest accuracy.

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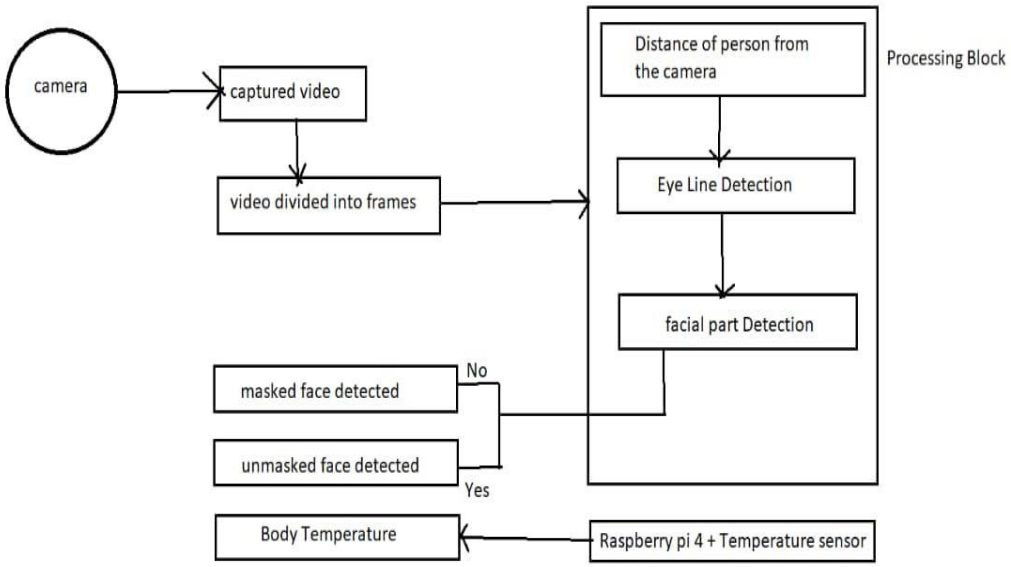
The spread of COVID-19 virus has reduced but it is still not over. If everyone follows all the safety measures, then it can come to an end. This will help in lowering the cases to such a level that COVID19 virus can vanish from everywhere.

II. RELATED WORK

As Countries around the Globe are Reopening, living with the Novel Coronavirus is becoming the new way of life. But to Stop the Spread of the Virus we need to separate people having the Coronavirus from the Rest. According to the CDC, fever is the leading symptom of the Coronavirus with up to 83% of Symptomatic Patients showing some signs of fever. Many Countries are making Temperature Check-up's and Masks mandatory for Schools, Colleges, Offices, and other Workplaces. Currently, Temperature check-ups are done manually using Contactless Thermometer. Manual check-ups can be Inefficient, Impractical (in places with a large footfall), and Risky. To test the real-time scenario, we deployed it on one of the rooms to test how possibly it could be used and the results were pretty affirmative. 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 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 temperature of the person if the temperature is less than the set temperature the person is allowed entry otherwise the entry is denied. Only a pre-determined number of people are allowed in the room. Temperature sensor: An infrared thermometer is a thermometer which inverts temperature from a portion of the thermal radiation sometimes called black body radiation emitted by the object being measure.

III. SYSTEM ARCHITETURE



System Architecture

Fig :System Architecture

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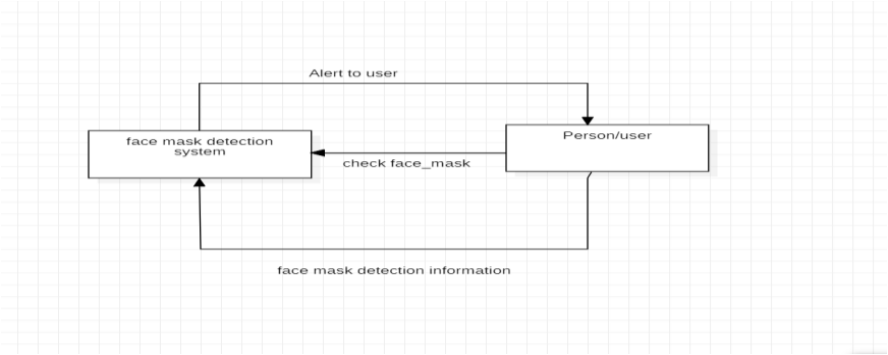
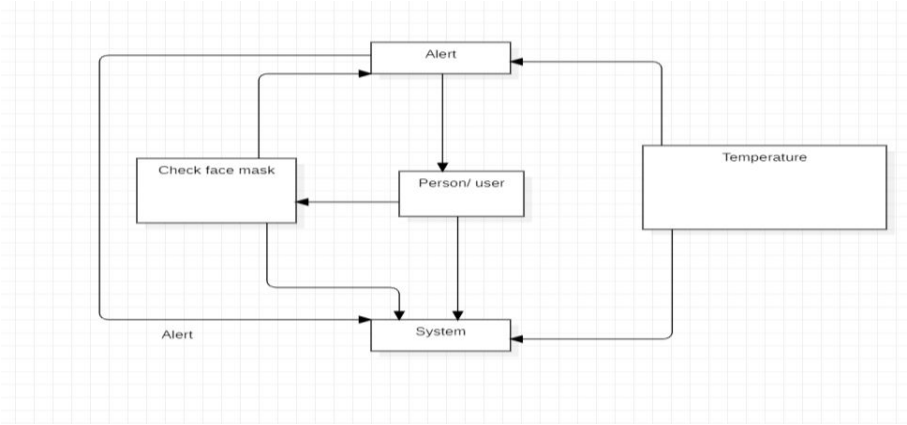
B.System Flow
Data Flow Diagram:

- DFD Diagram Level-0:



DFD Diagram Level-0

- DFD Diagram Level-1:



DFD Diagram Level-1

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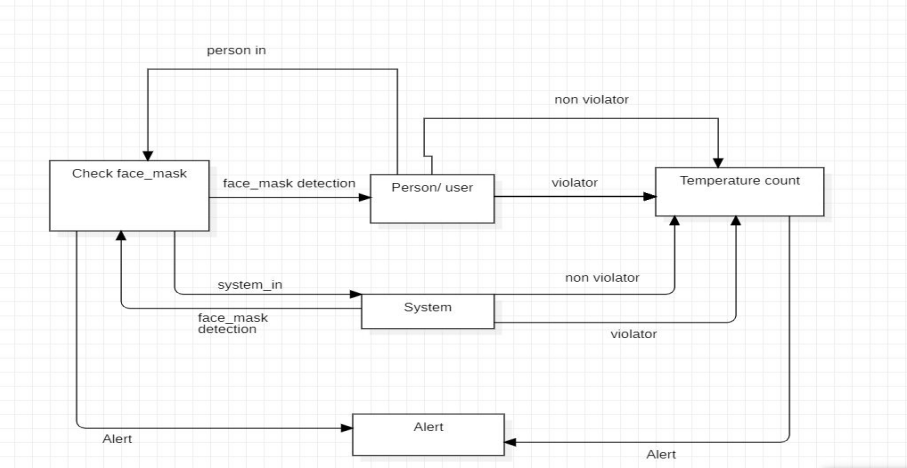

DFD Diagram Level-1

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III. RESULTS

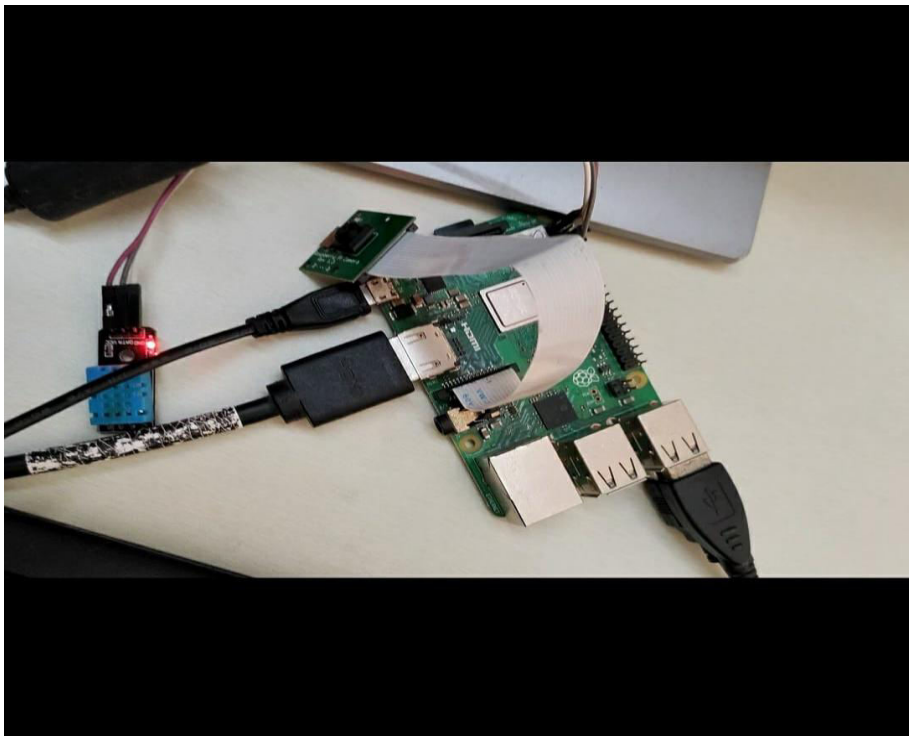

Fig : Board Connections

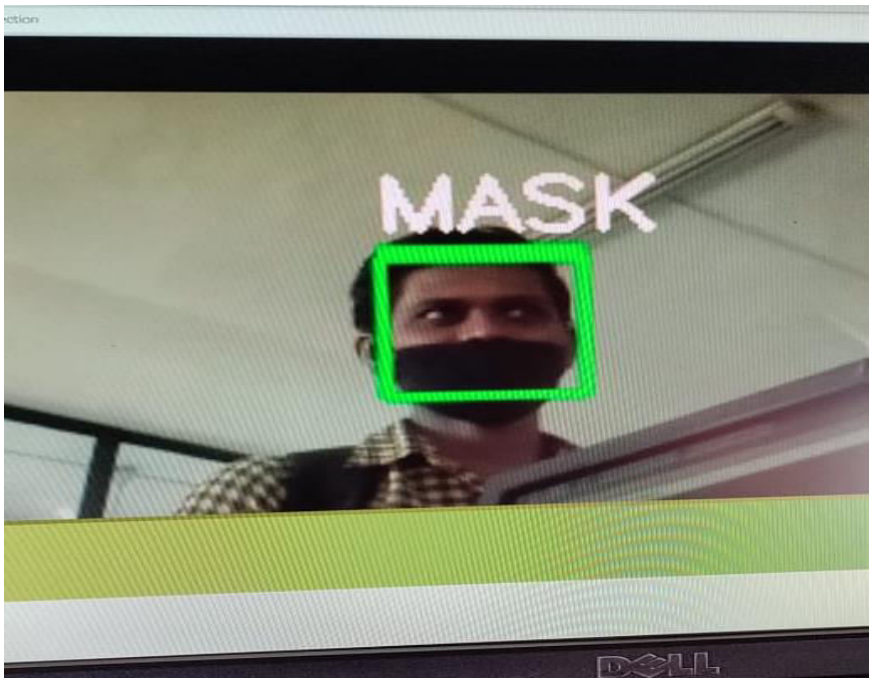

Fig : Face with mask

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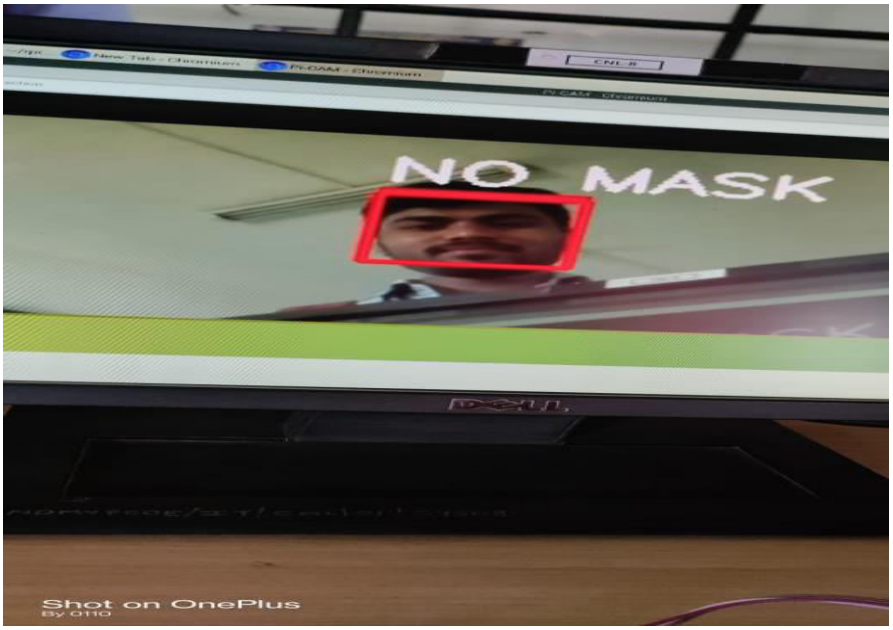

Fig:Face with no mask

IV. CONCLUSION AND FUTURE WORK

New developments and the availability of smart technologies force to the creation of new models, which will help meet the needs of developing countries. In this work, an IoT-enabled smart face mask and temperaturedetection is developed to monitor body temperature and detect face masks that can enhance public safety. This will help to reduce manpower while also providing an extra layer of protection against the spread of Covid-19 infection. The model uses a real-time deep learning system using Raspberry pi to detect face masks, and temperature detection as well as monitor the count of people present at any given time. The device performs excellently when it comes to temperature measurement and mask detection, the trained model was able to achieve a result of 97 percent. The test results demonstrate a high level of accuracy in detecting people wearing and not wearing facemasks, as well as it also generates alarms monitored and recorded. Furthermore, there are numerous techniques to enhance performance to improve results. Future development will include improving the accuracy of these steps, using a combination of various features, and improving performance, as well as producing a mobile app with a user friendly interface for monitoring. As a result, authorities will be able to take immediate action following pandemic safety standards.

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