

AUTOMATIC DOOR OPENING SYSTEM WITH COVID-19 SAFETY MEASURES

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Keywords

COVID-19, ResNet, Mobilenet, Mask, Temperature..

Introduction

COVID-19 pandemic has rapidly affected our day to day life disrupting world trade and movements. Wearing a protective face mask has become a new normal. Body temperature is also linked with COVID since the high body temperature shows early signs of COVID. Nowadays it is mandatory to wear a mask in public areas, which prevents the spread of COVID virus. Especially have to wear masks because the immunity of young people is less than adults. So, in this proposed project a system is proposed where the system checks for the body temperature, checks if the student is wearing masks or not.

The first step is Loading of trained sample input file, this is generated by training a dataset consist of both a person is wearing a mask or not. To detect the Face, initialize the video/webcam for capturing an image and face images can be read using OpenCV and ResNet. The face mask is detected using MobileNet with accuracy it show "mask" or "no mask". After the Face mask detection, the temperature of the person is measured using a temperature sensor. LM35 is used as a temperature sensor. If the body temperature is normal, the door will be opened otherwise the door will remain closed. A buzzer is set in order to indicate the temperature rise of the person as an alert and servo motor is used to operate the open/close door system controlled by arduino. The above procedure is repeated once again for other person.

Objective

- (a) Detect the person or object using OpenCV and ResNet.
- (b) Recognize the mask using Machine learning with the help of MobileNet.
- (c) Detection of body temperature using temperature sensors.
- (d) Implementation of Door Opening or Closing System (model)

Methodology

- (a) The first step is Loading of Trained sample input file, this is generated by training the dataset consist of both a person is wearing a mask or not.
- (b) To detect the face, initialize the video/webcam for capturing an image and face image can be read using OpenCV and ResNet.
- (c) The face mask is detected using Mobile Net with accuracy it shows “mask” or “no mask”.
- (d) After the face mask detection, the temperature of the person is measured using the LM35 temperature sensor.
- (e) If the body temperature is normal, the door will be opened otherwise the door will remain closed.
- (f) A buzzer is set in order to indicate the temperature rise of the person as an alert and servo motor is used to operate the open/close door system controlled by arduino.

Results and Conclusion



Fig 1: Identifying person wearing mask to open door.

Fig 1, shows the person not wearing the mask. A bounding box is drawn over the face of the person with label “No Mask” and accuracy (i.e. 94.05%). Then it will send a warning message on screen “Please wear a mask” until the person wear a mask. Further steps are not carried, hence the door remains closed.

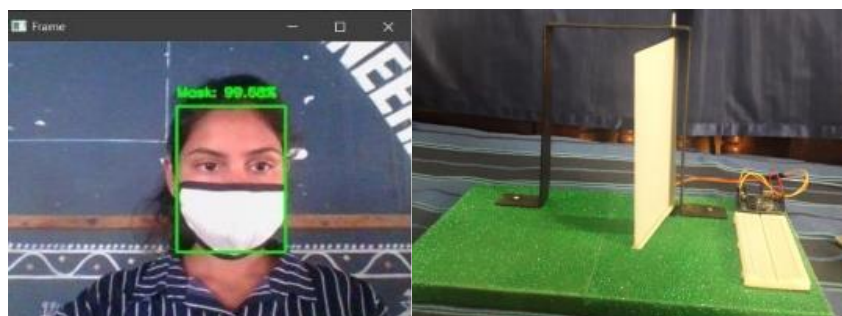


Fig 2: mask identified and opening of door.

Fig 2, shows the person wearing the mask. A bounding box is drawn over the face of the person with label “Mask” and accuracy (i.e.96.03%). Since the person is wearing mask. It will proceed to further step which check the temperature of a person. If the temperature is below the threshold value, the door will be opened. If condition fails buzzer will beep as an

alert signal.

Conclusion

COVID-19 pandemic has rapidly affected our day-to-day life disrupting world trade and movements. Body temperature is also linked with COVID, since the high body temperature shows early signs of COVID. Nowadays it is mandatory to wear a mask in public areas, which prevents the spread of COVID virus. In this proposed project a system checks if the Person is wearing mask or not by using machine learning technique in order to recognize and classify the face mask with accuracy and also checks for the body temperature using temperature sensors. Based on result provided by the temperature sensor , the door will be actuated accordingly. This proposed project will definitely help in preventing spread of COVID.

Scope for future work

The future scope of the project is to make sure that the recognition of the face mask is computed also the body temperature of the person is checked. In this project, a deep learning-based solution is used for identifying masks over faces before entering into social gathering in order to reduce Coronavirus spread. This proposed system can be deployed in public places like schools, colleges, multinational companies, religious places to prevent and slow down the transmission of virus.