FACE MASK DETECTION USING CONVOLUTION NEURAL NETWORKS

Srividya*1, Pavan Vallapu*2, Charan Sai Bodakuntla*3,
Jessika Thatikayala*4

*1,2,3,4Affiliated To JNTUH, Dept. Of CSE, CMR Technical Campus, Hyderabad, Telangana, India.

ABSTRACT

During the pandemic, everyone must wear a mask to prevent the spread of CORONA virus. In these difficult times of COVID-19, it is critical to develop a model that recognises persons wearing and not wearing masks in real-time as a simple preventive approach to avoid virus spread. This machine learning technology, when used appropriately, assists frontline fighters in simplifying their work and saving their lives. To make the method as accurate as possible, TensorFlow, Keras, Scikit-learn, and OpenCV are used to build a simple Convolutional Neural Network (CNN) model. The JavaScript API makes it possible to access a webcam in order to recognise a face mask in real time. Because Google Colab operates on a web browser, it is unable to access local hardware such as a camera without the use of APIs. The proposed work contains three stages: (i) pre-processing, (ii) Training a CNN and (iii) Real-time classification.

Keywords: Face Mask Detection, Convolutional Neural Network, Mobilenetv2, Coronavirus Precaution.

I. INTRODUCTION

This study presents a method for detecting whether or not a face mask is worn in offices or any other workplace with a large number of workers. For this, we employed convolutional neural networks. The model was trained on a real-world dataset and successfully tested using live video streaming. The model’s accuracy is further tested using several hyper parameters and many humans at various distances and frame locations. A red coloured rectangle is drawn around the face of everyone in the video stream who is not wearing a protective mask, and a dialogue labeled NO MASK is displayed. A green rectangle is drawn around the face of someone wearing MASK in a similar way.

II. METHODOLOGY

As the output layer of the proposed CNN architecture has two neurons with SoftMax activation to classify the same, the suggested CNN architecture classifies faces with and without masks. As a loss function, categorical cross-entropy is used. Validation accuracy for the suggested model is 96 percent. A red coloured rectangle is drawn around the face of anyone on the video stream who is not wearing a protective mask, with a dialogue labeled NO MASK, and a green coloured rectangle is drawn around the face of someone who is wearing a MASK.

III. MODELING AND ANALYSIS

Figure 1: Architecture
It's harder to train deep neural networks. We provide a residual learning approach for training networks that are much deeper than previously utilized networks. Instead of learning unrefereced functions, we explicitly reformulate the layers as learning residual functions with reference to the layer inputs. We present extensive empirical evidence demonstrating that residual networks are simpler to optimize and can gain accuracy from significantly higher depth. We assess residual nets with a depth of up to 152 layers on the ImageNet dataset, which is 8 times deeper than VGG nets but still has lesser complexity. On the ImageNet test set, an ensemble of these residual nets scores 3.57 percent error.

IV. RESULTS AND DISCUSSION

We can tell if a person is wearing a mask or not by looking at his face. A green color rectangle appears on the screen if a mask is identified on the person's face; a red color rectangle appears on the screen if no mask is detected or if the individual is not wearing a mask.

Figure 2: Face Mask Detection Image 1

Figure 3: Face Mask Detection Image 2
V. CONCLUSION

Face detection is conducted, and faces in the image are categorized as with mask or without mask using the two labels that were stated, one for color and the other for title. At the top of the image, the accuracy percentage is shown in white.

VI. REFERENCES


