FACE MASK DETECTION USING TENSORFLOW

COVID-19 pandemic has rapidly affected our day-to-day life. Wearing a protective face mask has become a new normal. In future, many public service providers will ask the customers to wear masks correctly to avail their services. Therefore, face mask detection has become a crucial task to help society. The proposed method detects the face from the image correctly and then identifies if it has a mask on it or not. As a surveillance task performer, it can also detect a face along with a mask in motion. The purpose has been achieved by using some basic Machine Learning packages like TensorFlow, Keras,Convolutional Neutral Network. Face mask detection involves detecting the location of the face and then determining whether it has a mask on it or not. In face detection method, a face is detected from an image that has several attributes in it.

Analysis:

Here our dataset consists of 1376 images with 690 images with people wearing face masks and the rest 686 images with people who do not wear face masks.

We have used TensorFlow here where TensorFlow, an interface for expressing machine learning algorithms, is utilized for implementing ML systems into fabrication over a bunch of areas of computer science, including sentiment analysis, voice recognition, geographic information extraction, computer vision, text summarization, information retrieval, computational drug discovery and flaw detection to pursue research. In the proposed model, the whole Sequential CNN architecture (consists of several layers) uses TensorFlow at backend. It is also used to reshape the data (image) in the data processing.

The proposed method consists of a cascade classifier and a pre-trained CNN which contains two 2D convolution layers connected to layers of dense neurons.

Data preprocessing involves conversion of data from a given format to a much more user friendly, desired and meaningful format. The proposed method deals with image and video data using NumPy and OpenCV.

Also, the total number of images in the dataset is visualized in both categories – ‘with mask’ and ‘without mask’. And converted the RGB image to Gray image as modern descriptor-based image recognition systems regularly work on grayscale images. Then resized the images and coverts the image into the NumPy matrix. And lastly, splitted it into train set, validation set, and test set.

The test size is set to 0.1 i.e. 90% data of the dataset undergoes training and the rest 10% goes for testing purposes. Next, the images in the training set and the test set are fitted to the Sequential model. Here, 20% of the training data is used as validation data. The model is trained for 20 epochs (iterations) which maintains a trade-off between accuracy and chances of overfitting.

Inference:

The model is trained, validated and tested upon dataset. Corresponding to the dataset, the model have a accuracy up to 95.77%.