

FMD using modern tools and techniques of Data science

¹Boini sri sushmitha

¹UG, Dept. of Computer science Engineering, Mallareddy Engineering College for Women.

Abstract

The 2019 year is a pandemic year, because many people were deceased worldwide due to corona virus disease. By contacting each person to another person this disease was spread very fast and widely. So far there are a no medicines and vaccines to prevention of COVID-19. So if want to stop the spreading of corona virus we need to follow the two instructions such as maintain the social distance and wearing the face mask according to WHO. But rather than maintaining social distance by not wearing face mask only more chances are there to spread the corona virus. Therefore WHO and government authorities are recommended to all countries people need to wear the face mask to prevent the corona virus transmissions. Due to maintaining social distancing and contact transparent behavior the authority people cannot observing that people keep the face mask or not. So that to overcome this problem, the automatic face mask detection system should be implement mostly in crowded area where as super markets and shopping mall, etc. In this system, we are proposing the face mask detector (FMD) method with deep learning algorithm which is called convolutional neural network. In this system, for preparation of face mask detector model we are using with_mask and without_mask images as dataset. The experiment results represent that the high detection precision and good performance of the proposed algorithm.

Keywords: - CNN algorithm, face mask, WHO, Dataset Collection.

1. INTRODUCTION

Now a day's every one wearing face mask to prevent corona virus transmission. Therefore many countries are following the rule such as "NO MASK, NO ENTRY". So that face masks detection is an import task in the super market and any crowded areas. In the medical field, wearing the mask is mitigating spreading of corona virus from an infected person whether they have symptoms or not. Before pandemic year, the people are used to wear the mask to protect their health from air pollution and not getting the any infections. Therefore the scientist recommended to wearing the mask is preventing the spread of corona virus. However, the auditing of large groups of people is applicable with more strenuous. So that, auditing process involves the detection of anyone who is not wearing a face mask. In this system, we are introducing face mask detection model with deep learning techniques. If we integrated this system with the cameras of super market stores then it can

detect the people who are wearing the face mask or not.

2. RELATED WORK

Problem Statement

In the crowded area like shopping malls, super markets and purchase area, etc. are belongs to the personnel intensive place, therefore the corona virus infected possibility is very high. Mainly in super markets at the entry point the security guard will be check the temperature and masks of customer. But even in few super markets, some people are not wearing the mask, so at that time if any one infected person is there then high possibilities are there to spread corona virus to all. So that in this system we concentrate on face mask detection with CNN of deep learning technique. Here the face mask detector, automatically detect whether the customer was wear the mask or not.

Contribution

The contribution of this system is we collected the with_mask and without_mask dataset from internet

resources to build the face mask detection model with CNN classifier of deep learning algorithm. This face mask detector can be used for face mask detection from input image and we also worked on live streaming webcam to face mask detection.

3. IMPLEMENTATION

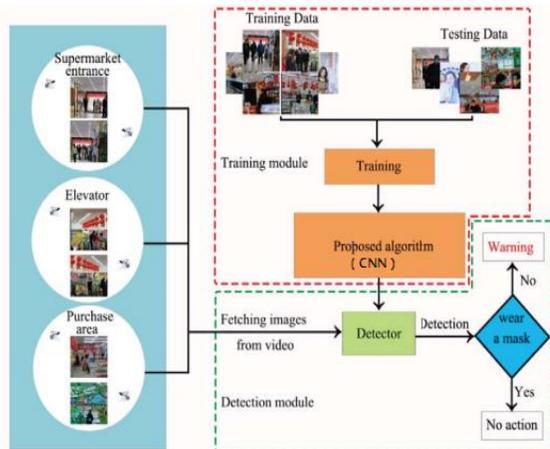


Figure.1 System Architecture

The figure.1 depicts about face mask detection model. From the figure.1 it can build the classification model with training dataset and testing dataset and deep learning algorithm. Later the images are fetching from videos at different public places such as elevators and super markets etc. Finally apply the detection model to detect the persons are wearing the mask or not.

Dataset Collection:

In this system, we are collected training dataset from internet resources. This dataset contains two classes which names are with_mask and without_mask with 1,376 images. Among them the with_mask class has 690 images and without_mask class has 686 images. The figure.2 shows the face mask detection training dataset.

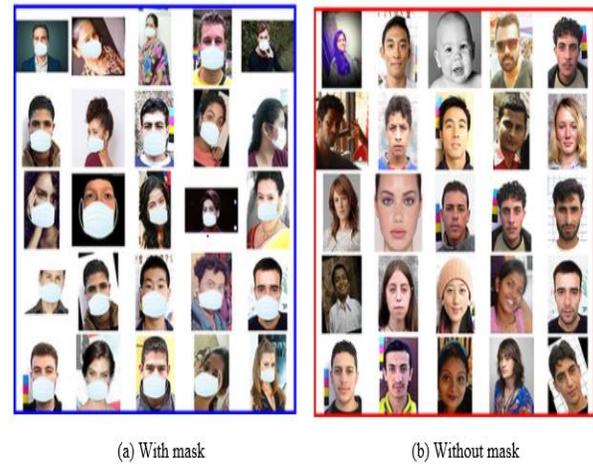


Figure.2 face mask detection dataset
Build the Training Model:

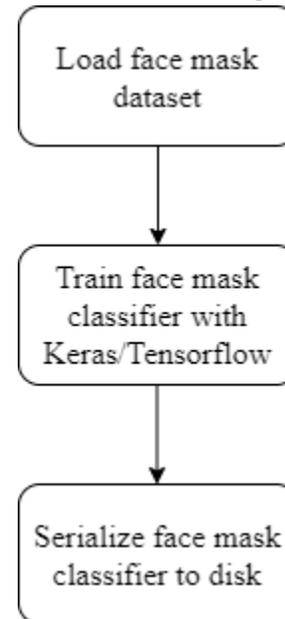


Figure.3 Train face mask detector (FMD)

From the figure.3, this system can build the training network model. First, it can load the face mask dataset which is containing face mask and no mask images. These images are feed to training classifier (CNN) with help of Tensorflow and Keras frameworks to train the model file. After built the training model can be store in local disk with name was *mask_detector.model* file.

Applying the Face Mask Detector

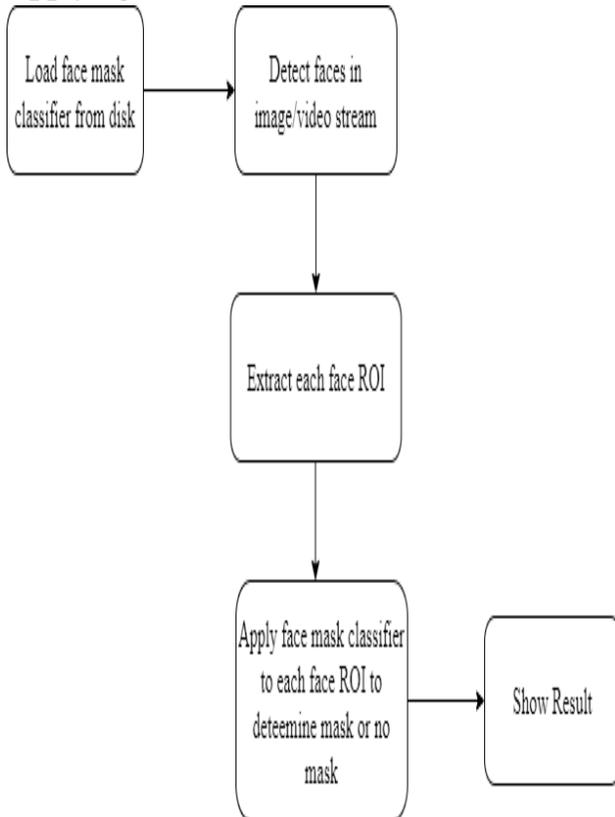


Figure.4 Detection of face mask

From the figure.4, this system can apply the face mask detection system. Here it can load the face mask detector model file and extract the face Region of Interest features from the input image to detect the faces, later apply the face mask classifier model on detected face image to predict or detection of mask or no mask result.

System Methodology:

Here we are discussing about face mask detection system how it was built with help of Keras and Tensorflow. As well as it is discus about how does it detect the faces from input image and feed the face ROI images to face mask detector model and finally how does the face mask detector model predict or detect the mask and no mask classes or results as output. The below snippets are shows the entire system application implementation.

4. EXPERMENTAL RESULTS

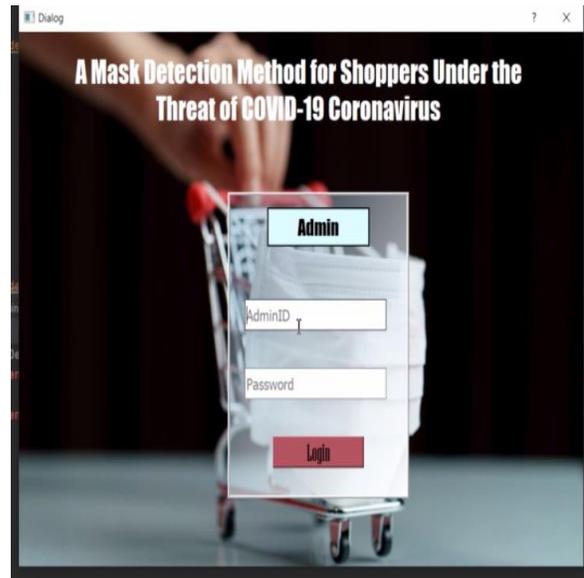


Figure.5 Main Dialog box

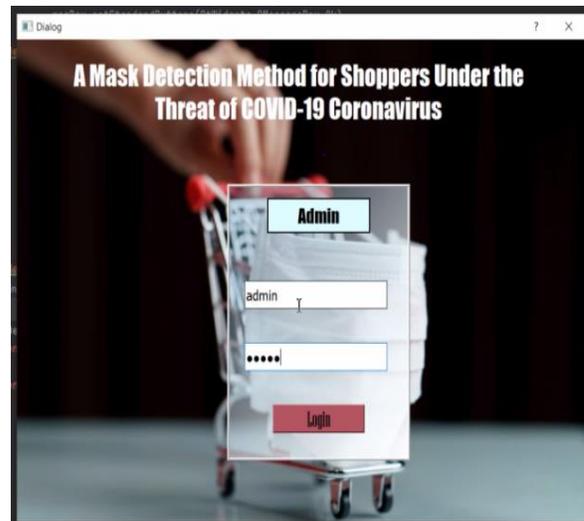


Figure.6 Admin Login Dialog box

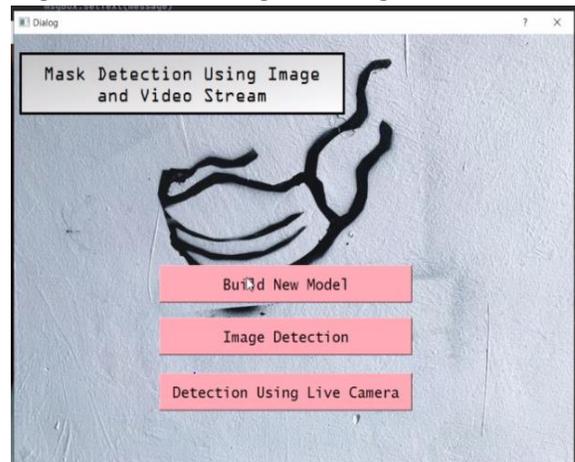


Figure.7 Admin Home Dialog box

```
[INFO] compiling model...
[INFO] training head...
Epoch 1/10
WARNING:tensorflow:From /usr/local/lib/python3.8/dist-packages/tensorflow/python/util/trace.py:104: tf.nn.conv2d is deprecated and will be removed in a future version.
Instructions for updating:
Use tf.nn.conv2d, which has the same broadcast rule as tf.nn.conv2d.
2022-04-24 18:45:17.353844: I tensorflow/core/framework/op_allocator.cc:11] Allocation of 15404672 exceeds 10% of system memory.
2022-04-24 18:45:20.726531: I tensorflow/core/framework/op_allocator.cc:11] Allocation of 15895472 exceeds 10% of system memory.

1/24 [.....] - ETA: 13.89 - loss: 0.7397 - acc: 0.51930212-04-24 18:45:26.514935: I tensorflow/core/framework/op_allocator.cc:11] Allocation of 15404672 exceeds 10% of system memory.
2022-04-24 18:45:27.340756: I tensorflow/core/framework/op_allocator.cc:11] Allocation of 15895472 exceeds 10% of system memory.

2/24 [.....] - ETA: 13.24 - loss: 0.4499 - acc: 0.6329212-04-24 18:45:39.630888: I tensorflow/core/framework/op_allocator.cc:11] Allocation of 15404672 exceeds 10% of system memory.

3/24 [.....] - ETA: 9.18 - loss: 0.4694 - acc: 0.4638
```

Figure.8 Training networking model file

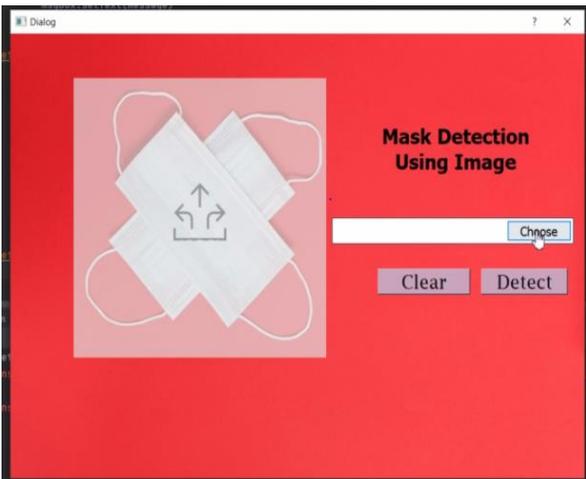


Figure.9 Face Mask detection with Image

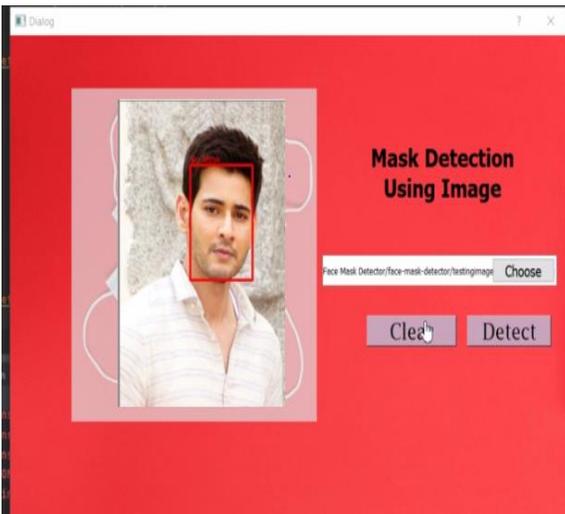


Figure.10 Face Mask detection with Input Image

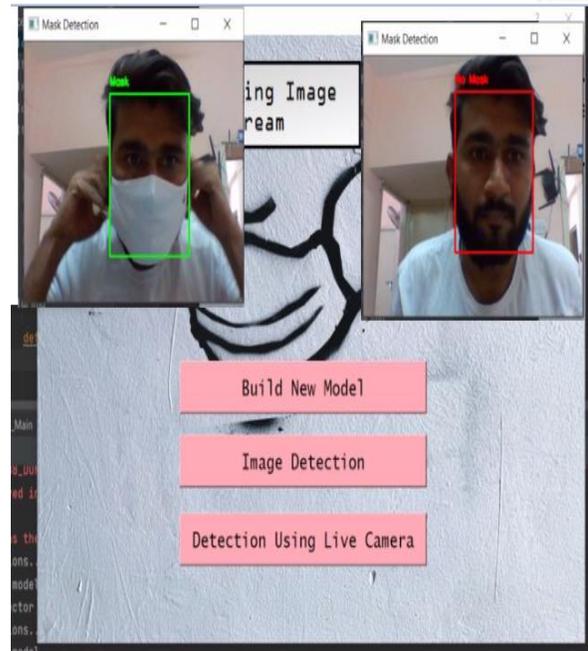


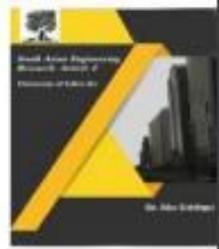
Figure.11 Face Mask detection with Live camera

5. CONCLUSION

In this system, we proposed the face mask detection scheme to detect the customers whether they were wear the mask or not in super market. In order to face mask detection we are trained the network model with CNN algorithm which is belonging to deep learning techniques. Here we have used with_mask and without_mask images of dataset to train the face mask detection network model. With the system experimental results conclude that our proposed algorithm is providing a very high face mask detection precision.

6. REFERENCES

- [1] Naveen S, Shihana Fathima R, Dr. R.S Moni, 2016 International Conference on Communication Systems and Networks.
- [2] Gayatri Deora, Ramakrishna Godhula and Dr. Vishwas Udpikar “Study of Masked Face Detection Approach in Video Analytics”. 2016, IEEE Conference on Advances in Signal Processing.
- [3] Arti Mahore, Meenakshi Tripathi “Detection of 3D Mask in 2D Face Recognition System Using DWT and LBP”. 2018, IEEE 3rd International Conference on Communication and Information System.



- [4] C. T. Nguyen, Y. M. Saputra, N. Van Huynh, N.-T. Nguyen, T. V. Khoa, B. M. Tuan, D. N. Nguyen, D. T. Hoang, T. X. Vu, E. Dutkiewicz et al., “Enabling and emerging technologies for social distancing: A comprehensive survey,” arXiv preprint arXiv:2005.02816, 2020.
- [5] M. Greenstone and V. Nigam, “Does social distancing matter?” University of Chicago, Becker Friedman Institute for Economics Working Paper, no. 2020-26, 2020.
- [6] P. A. Rota, M. S. Oberste, S. S. Monroe, W. A. Nix, R. Campagnoli, J. P. Icenogle, S. Penaranda, B. Bankamp, K. Maher, M.-h. Chenet et al., “Characterization of a novel coronavirus associated with severe acute respiratory syndrome,” *science*, vol. 300, no. 5624, pp. 1394–1399, 2003.
- [7] S. Feng, C. Shen, N. Xia, W. Song, M. Fan, and B. J. Cowling, “Rational use of face masks in the covid-19 pandemic,” *The Lancet Respiratory Medicine*, 2020.
- [8] A. Kumar, A. Kaur, and M. Kumar, “Face detection techniques: a review,” *Artificial Intelligence Review*, vol. 52, no. 2, pp. 927–948, 2019.
- [9] B. QIN and D. Li, identifying facemask-wearing condition using image super-resolution with classification network to prevent COVID-19, May 2020.
- [10] A. Nieto-Rodriguez, M. Mucientes, V.M. Brea, System for Medical mask detection in the operating room through facial attributes, *Pattern Recognition Image Anal. Cham* (2015) 138-145.
- [11] N. Ozkaya, S. Sagioglu “Intelligent face Mask Prediction System”. 2008, IEEE International Joint Conference on Neural Networks.