

# Face Mask Detection System using Open CV–Python and Machine Learning

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**Abstract:-** In this paper we are representing the methodology of face mask detection generation using human. And through masks, people are protected from epidemics like corona. And people are saved from this epidemic. In earlier times people used to use masks to keep their face beautiful, but in today's time people use masks. To avoid disease like corona. And through this paper, we ask to make people aware that everyone should use masks and protect themselves from dangerous diseases like corona. We have provided security to the people through Face Mask Detection Project. And we have used opencv-python in our project to read the faces of the people. And we have used tensorflow package to read the mask in our project. And how many people have put on masks and how many people have not, all this is read by my project.

**Keywords:-** Face mask detection system, machine learning, opencv-python, tensorflow package, deep learning, One-stage detector, Two-stage detector.

## I. INTRODUCTION

Face mask detection system refers to detect whether a person is wearing a mask or not. If a person keeps on wearing a mask, then my project reads it and if a person has not applied a mask, then reads it and tells it. And through Face Mask Detection System, we can find out which person has not applied the mask and this is my face mask detection system security based. The Face Mask Detection System project is used to detect the face in a large company. And angle person has come with mask and angle person is not wearing mask: This can be easily known through my project. And to develop this project, we used machine learning and python and also used opencv-python.

Where the mask is detected using various machine learning algorithms for the purpose of security, authentication and surveillance. Face detection systems are a major area in the field of computer vision. A significant body of research has contributed to algorithms for mask detection in people.

And we have uploaded some image without mask and some image with mask in our project.

We have used machine learning concept to read the mask. And have used some important packages which have opencv-python, tensorflow, numpy, imutils, scipy, matplotlib, keras. Face masks are easily read through these packages.

The Numpy package is used to read the number of masks.

The mask has a means to protect it from diseases like corona. If you wear a mask, then the green colored rectangle will appear in my project.

And if you don't wear mask, then my project will read your face and print no mask. In this research paper, we have told how to solve the problem of face mask detection. And how to check the mask. For this, we have made a program, whose mask will be checked by using the camera. And those who will not keep wearing masks and those who will continue to wear masks, they will be read on camera.

To deal with this problem, we do not need any guard or person who keeps an eye on the people. We can integrate a camera that continuously clicks pictures of humans and from there detects whether they are wearing a face mask or not.

## II. RELATED WORK

In face mask detection, we have used an algorithm so that we can easily read the mask on the face. And in face mask detection, we have used some math matrix concepts. With which we can easily read the face mask. And our system tells us which person mask is used and angle person mask is not used. If a person mask is not used, then my system will print the mask and detect it in red color. And if a person is wearing a mask, then my system will detect the mask and print the face in green color.

- The face mask detection system has been researched to read the masks of the people. And a personal room is used in the system from which the face mask of the people is easily read. And the purpose of this research is to read the face masks of the people. In the face mask detection system, 225 \* 225 pixels read the face. System develops Raspberry Pi-based real-time Facemask recognition that alarms and captures faces.
- In this paper, measures have been taken to avoid diseases like corona by taking face masks. And machine learning concept has been used in it. So that the face mask can be easily detected and disease like corona can be avoided. And in this paper we want to tell about the activity of the people and how to avoid diseases like corona. If people come out of the house, they must wear masks. Such people can avoid diseases like corona.
- In this paper, we have included two proposed models. In which the first is designed for convenience. And the second component has to be designed. Medical face masks are read from Yolov2. And the two medical face mask data sets have been combined into one. And from this research the data set is examined.
- **Tensorflow:-** In this paper we talked about TensorFlow Framework. Tensorflow is an open source framework. Which is done in machine learning concept. And

Tensorflow is a Python library. And the library is used to develop it for big projects. And through this tensorflow application can also be developed. And TensorFlow is called the core open source library. And this is done in machine learning and deep learning. And we have done this frame work in the face mask detection system software. Tensorflow is develop by google brain team. .

- **Keras:-** In this paper, we will also tell about the bra of Keras library. keras is an open-source high-level neural network library. This is done with the Python programming language. It was developed by one of the Google engineers, François Cholet. The TensorFlow library is used to control the Keras library. Keras works on library network. It only supports a combination of convolutional networks and recurrent networks. Keras is an open source library. It has been developed from the Python program. It is done with machine learning and deep learning. When we develop a project, then we link the Keras library in our project. With which my project works on the network. And It is easy to identify the user through the Keras library.



Fig. 1: Keras logo

- **OpenCV:-** Opencv is a library for Python. Which is used to detect the face. And this is done with machine learning. And it is used to recognize his face. And using this library, you can also detect the face of the animal. This is from the concept of machine learning. And opencv represents an algorithm. With which the face is easily recognized. Openasv has more than 2550 computer vision and machine learning algorithms, which are used in image and video processing-related problems. It can be done with Python, C++ and Java languages. And with it supports Windows, Linux operating systems.
- **Deep learning:-** Deep learning is an artificial intelligence. And it makes it read the person's brain with machine learning. And the project of machine learning is developed during deep learning. And deep learning is an important learning. And deep learning is a subset of machine learning. Deep leraning is known as Deep Neural.
- **Learning or Deep Neural Network:-** Deep learning uses an indexed algorithm whereas machine learning uses a linear algorithm. There is not much difference between deep learning and machine learning, the work of both is the same. By using deep learning, we can develop the biggest projects. And in today's time, the biggest companies are using Deep Learning. In which all the company of the

phone which includes deep learning. And during deep learning, face recognition and speech recognition are done. Deep learning gives fast Deep learning thinks like humans. That is why it is eaten like nooran. Hence it is often also called Deep Neural Learning and Deep Neural Networking.

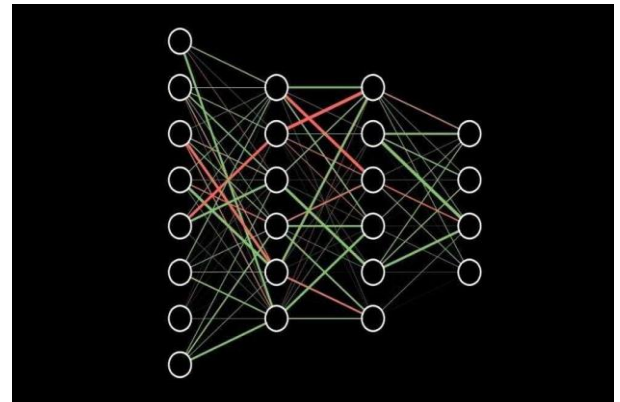
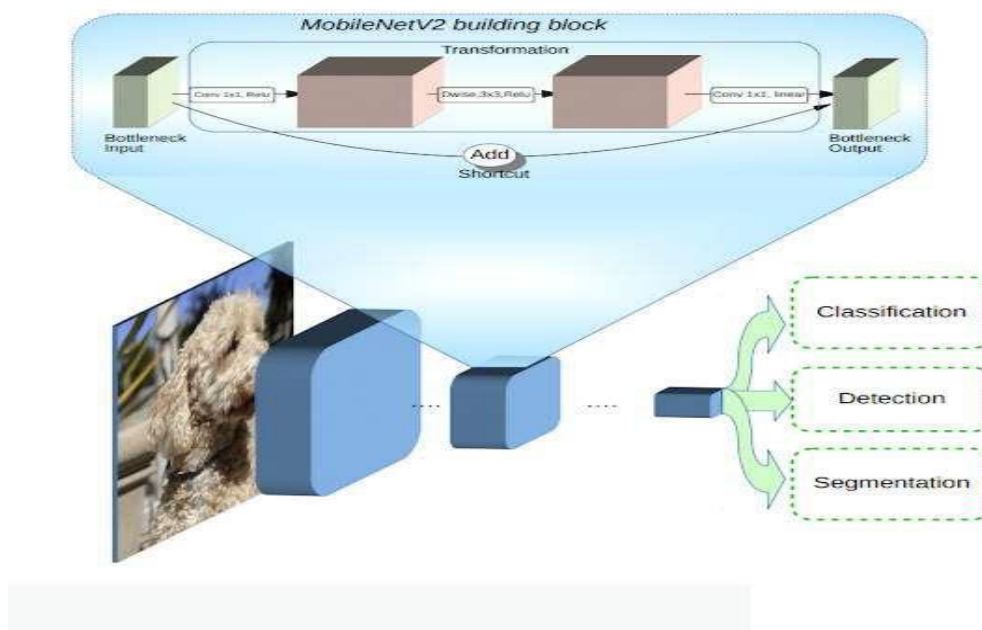


Fig. 2: Deep Learning

- **MobileNetV2 :-** In this paper, we will tell about the use of mobilenetv2. Today's time Mobilenetv2 provides more power than the next time. It is a pleasure to tell us about it. And Mobilenetv2 is an improvement of Mobilenetv1. this mobile Object Detection, Semantic Segmentation and advances mobile visual recognition. This is known as part of mobilenetv2 tensorflow-slim image classification library. Mobilenetv2 is used to read the face in the mobile.



Mobile Netv 2

Fig. 3: Mobilenet

- **Dataset:** We have used dataset created by Pragma Bhanwari in our project. And there are two folders in this dataset.
  - without\_mask
  - with\_mask
- **with\_out\_mask :-** The Without Masks folder has a total of 1800 images without masks. Images are detected through deep learning to people without masks.



Fig. 4: Without mask images

**with\_mask :-** There is a total of 1700 images in the with mask folder. In which all the images are masked. The logo of the mask is detected through deep learning. And through deep learning, it can be ascertained that the cone mask is applied and the angle mask is not applied.



Fig. 5: With mask images

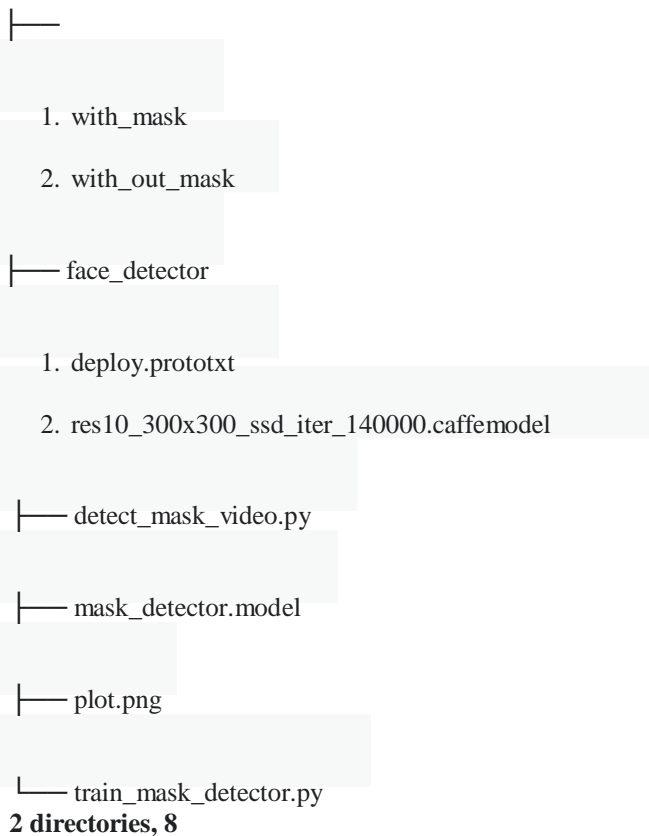
- To find out the target, Pragya Bhanwari created the dataset and the person who is wearing a mask detects it from the image of the mask. And those who have not applied a mask, match the image without the mask. This shows that the mask has been applied. And the angle mask is not applied.
- **Implementation:-** We first read the face mask of the people, then we detect the face of the people by using opencv .And then we use ROI to identify people by their eyes and mouth. And from this we find out that the angle mask has been applied and the mask has not been applied.

Next. We need the image to wear a mask. By which we find out the mask and match the mask or IMA with the one without the mask, so that we know who is wearing a mask or who is not wearing a mask.

If you use a set of images to create an artificial dataset of people wearing masks, you cannot "reuse" images without masks in your training set.

The structure of project.

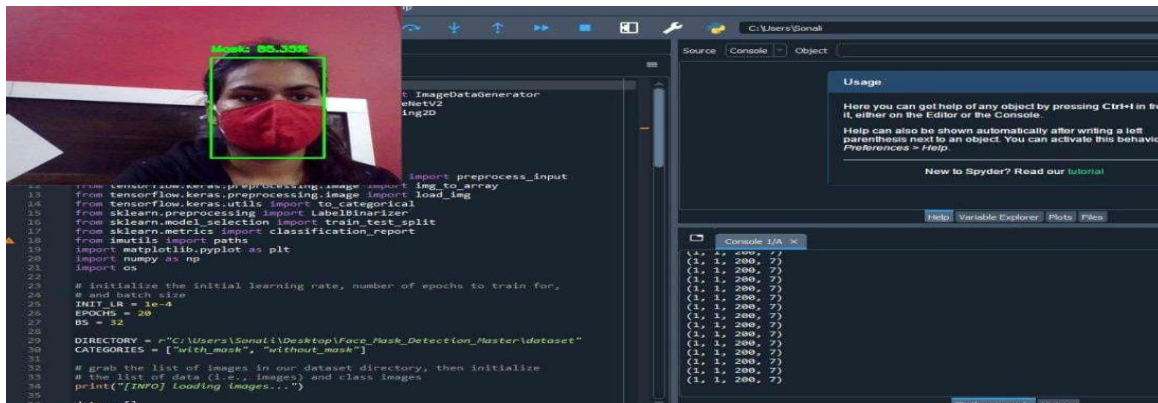
**Face-Mask-**





### III. RESULTS

- When a person wears a mask, then the 'mask' comes through in my project. And it is seen in green color.



With\_mask

Fig. 6: Code implementation mask detected

- When a person does not apply a mask, then in my project the 'no mask' comes through white. And it is seen in red color

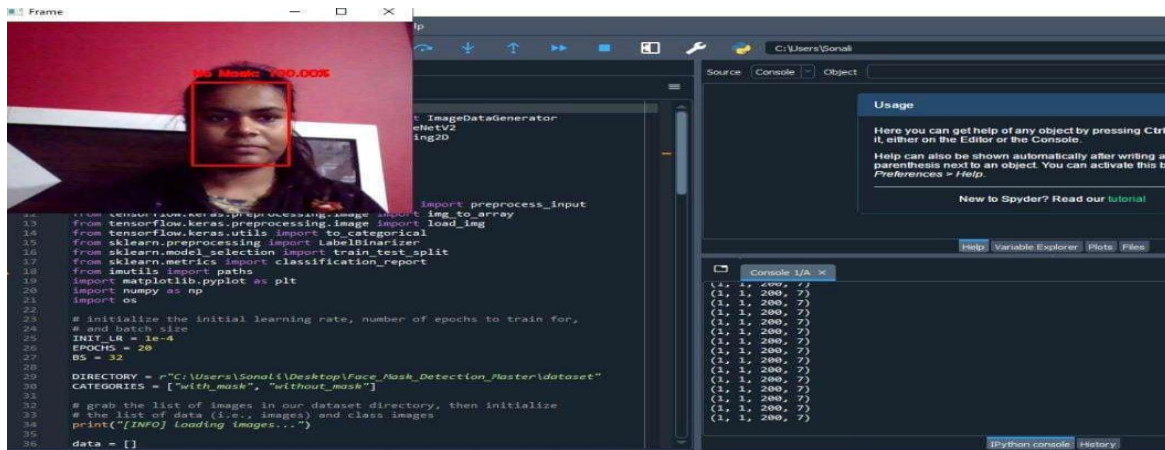


Fig. 7: Code implementation face mask not detected

### IV. CONCLUSION

In this paper, we will tell about a project named Face Mask Detection System using Opencv-Python. And through this project we can recognize people without masks. And this project can be done in a big company. And it can be used in the capacity room. And this project can also be done in the bank. And through this project we can digest how many people have put on masks. And how many people have not put on masks. We have used opensv-python, tensorflowets package to create this project. And the dataset has also been done to him. The total in the data set is 36009 images. In which 1900 images are without masks. And 1700 image masks have been applied.

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