

# Survey Paper on Face Mask Detection

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**Abstract-** The COVID19 cases spread rapidly in December 2019, in Wuhan, China. The World Health Organization (WHO) stated that it's a dangerous virus which spreaded around the globe. Wearing a mask to protect your face has become the new normal. On the prevention side, wearing a mask is essential during outings or meetings. However, some irresponsible people refuse to wear masks. Due to which, development of face mask detector is crucial. This document represents a simplified approach to achieve Face Mask Detection using packages such as Tensor Flow, Keras, OpenCV, Numpy from machine learning. In this article, we propose a system that limits the growth of COVID19 by discovering people who do not carry any face mask in a network of smart cities where every public places are being monitored by closed circuit cameras (CCTV). When an unmasked person is detected, the corresponding authority is informed via the city network.

**Keywords-** Corona virus, Covid-19, Machine Learning, Face Mask Detection, Convolutional Neural Network, Keras, Tensor Flow.

## I. INTRODUCTION

This paper introduces a simplified approach to serve the purpose by using the basic packages of Machine Learning (ML) such as Tensor Flow, Keras, OpenCV and MobileNetV2. The rest of the paper is organized as follows: Section II explores current difficulties faced globally and an overview of major topic for the solution. Section III discusses the nature of Deep neural network and presents the details of the packages incorporated to build the proposed model. Section IV concludes and draws the line towards future works. Section V points towards the sources that has been referred.

## II. PRELIMINARIES OF FACE MASK DETECTION & CNN

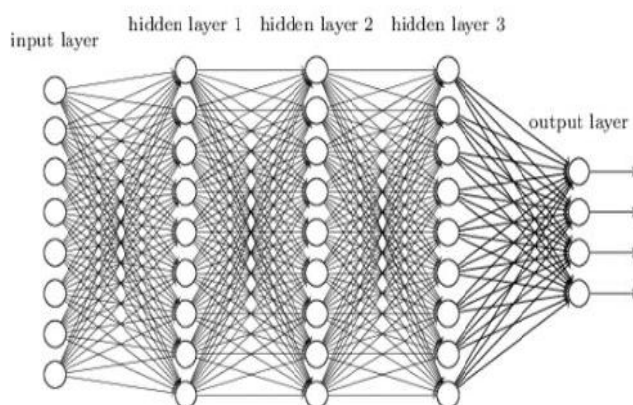
According to the WHO's official Situation Report – 205, globally infected over 20 million people by corona virus disease 2019 (COVID-19) has causing over 0.7milliondeaths. Individuals infected by COVID19 have had a wide range of symptoms reported such as going from minor manifestations to serious illness. Problems of respiration like breath shortness or difficulty in breathing is one of them. Elder people having

lung disease can possess complications from COVID-19 illness because they appear to be at higher risk. Some common human corona viruses that infect public globally are HKU1, 229E, OC43, and NL63. Before debilitating individuals, viruses like 2019-nCoV, SARS-CoV, and MERS-CoV evolve to human corona viruses by infecting animals. Persons having respiratory problems can expose anyone to infective beads. Surroundings of an infected individual can lead to contact transmission as droplets carrying virus may arrive on his nearby surfaces. To curb certain respiratory infections, including COVID-19, wearing a clinical mask is very necessary. The awareness of public whether to put on the mask for source control or aversion of COVID-19 should be there. Potential reasons of interest of the use of masks is in reducing risk from anxious individual during the "pre-symptomatic" period. WHO highly recommends on prioritizing use of medical masks and respirators for health care assistants. Therefore, face mask detection has become an important task in global society. Detecting location of the face and then determining if it has a mask on it or not is involved in face mask detection. The issue is proximately cognate to general detection of object to detect the classes of objects. Face identification categorically deals with distinguishing a specific group of entities i.e. Face. It has numerous applications, such as autonomous driving, education, surveillance, and so on. Techniques for Face Mask Detection Convolutional Neural Networks is a type of deep neural network motivated by bio-logical phenomena. A CNN is composed of several components that includes layers such as convolutional layer, pooling layer, along with fully connected layer, also it learns the spatial patterns of data autonomously and fluidly by the use of back propagation method. The CNN kernels are common across entire image positions, making it incredibly parameter-efficient.

## III. DEEP NEURAL NETWORK

Human brain is the inspiration behind Deep Neural Networks creation. Working far beyond the "if-and-other" conditions, Deep Neural Network software envisions and delivers solutions. There is no of programming and coding to get the output with Deep Neural Network AI. Deep learning neural networks have become an integral part of the digital world, in many industries. There are world famous virtual

assistants like Alexa, Siri, Google Assistant etc. Deep Neural Network AI is transforming the world.



### III. INCORPORATED PACKAGES

#### A. Tensor Flow :

Tensor Flow could be a open-source code model for machine learning and AI. Tensor Flow will be used in varied programming languages, largely in Python, similarly as Java, JavaScript and C++. as a result of this advantage it lends itself to a spread of applications in many alternative sectors. It will be utilized in several tasks however includes a specific concentrateon training and abstract thought of deep neural networks.

But it absolutely was originally developed for big numerical computations while not keeping deep learning in mind. Tensor Flow provides flexibility and control with options like Keras functional and model subclassing API for straightforward prototyping and quick debugging.

#### B. Keras

Keras could be a strong and easy-to-use open offer Python library for developing deep learning models. It covers the efficient numerical computation libraries together with Tensor Flow and permits us to outline and examine neural network models. Keras is is also accustomed productized on smartphones by developing networks or models. Keras is utilized by various well-known organizations like Netflix, Uber, etc. Keras allows customers to supply deep models on iPhone OS and android, web or Java. It in addition allows the usage of distributed coaching of deep learning models on the gathering of graphics process units (GPUs) and tensor processing units (TPUs).

#### C. NumPy

NumPy is additionally referred to as as Numerical Python. It's a Python library also used to work with arrays. different fields of NumPy are matrices, algebra and Fourier transform. Travis Oliphant fabricated it in 2005. it's an opensource project. NumPy arrays are quicker and a lot of compact than Python lists. an array consumes a lot of less memory and is comfortable to use. It uses a lot of less memory to store information and includes a mechanism to specify information varieties. NumPy is also terribly helpful for many mathematical calculations.

#### D. MobilenetV2

MobileNetV2 could be a convolutional neural community structure with a intensity of 53 layers that makes an attempt to hold out nicely on cellular devices. it's most frequently completely supported Associate in Nursing inverted residual type within which there area unit residual connections between the layers of the bottleneck. the center magnification layer uses soft, deep convolutions to eliminate options like nonlinearity. Overall, the MobileNetV2 structure consists of the preliminary degree of complete convolution with 32 filters, attended with the help of victimisation 19 residual bottleneck levels, this pre-educated community will classify photos into m item classes.

#### E. OpenCV

OpenCV stands for OpenSource Computer Vision which is a library of programming features in particular aimed toward real-time laptop vision. Computer-Vision has a main position in self-riding cars, robotics and image correction apps. OpenCV is written in C++ and and its primary interface is in C++. C++ interface appear on the new developments and algorithms. But there are bindings in Java, Python. It's a huge open-source library for the ML as well as image processing. By the usage of it, we will manner images and videos to become aware of objects, faces, or maybe handwriting of a human being. When it's miles united with diverse libraries, consisting of NumPy, python is able to processing the OpenCV array structure for analysis. To Identify image pattern and its diverse features we use vector space and perform mathematical calculations.

### IV. CONCLUSION

In this paper we have given an idea of detecting masks over faces in public places to curtail the community spread of viruses, such as Corona Virus. We concluded this idea can be achieved by using CNN which is a Machine Learning Algorithm, basically performing deep learning based approach.

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