



## **FACE MASK DETECTION**

**K. Balaram<sup>1</sup>**

**Dept.of computer science &  
Engineering**

**Dr M.G.R Educational and  
Research Institute  
Chennai ,India**

**rambala629@gmail.com**

**Akula Janardhan<sup>2</sup>**

**Dept.of computer science&  
Engineering**

**Dr M.G.R Educational and  
Reasearch Institute  
Chennai, India**

**janardhanroyal01@gmail.com**

**Bolla Venkata Bhagavan<sup>3</sup>**

**Dept. Of computer science &  
Engineering**

**Dr M.G.R Educational and  
Research Institute  
Chennai, India**

**bvg16091999@gmail.com**

**Shaik Azeez un Nawaz<sup>4</sup>**

**Dept.Of computer science &  
Engineering**

**G. Pullaiah College of Engineering  
and Technology  
Kurnool ,India**

**azeezunnawaz1@gmail.com**

**Mrs. T.Kiruba Devi,**

Asst,Professor ,Dept.Of Computer Science &Engineering

Dr M.G.R Educational and Research Institute,  
Chennai, India

**Dr .G.Victo Sudha George .**

Professor, Dept. Of computer science & Engineering

Dr M.G.R Educational and Research Institute,  
Chennai, India

### **ABSTRACT:**

In order to prevent the spread of CORONA virus, everyone must wear a mask during the pandemic. In these tough times of COVID-19 it is necessary to build a model that detects people with and without mask in real-time as it works as a simple precautionary measure to prevent the spread of virus. If deployed correctly, this machine learning technique helps in simplifying the work of frontline warriors and

saving their lives. A basic Convolutional Neural Network (CNN) model is built using TensorFlow, Keras, Scikit-learn and OpenCV to make the algorithm as accurate as possible. Javascript API helps in accessing webcam for real-time face mask detection. Since Google Colab runs on web browser it can't access local hardware like a camera without APIs. The proposed work contains three stages: (i) pre-processing, (ii) Training a CNN and (iii) Real-time classification. The first part is the Pre-processing section, which can be divided into "Grayscale Conversion" of RGB image, "image resizing and normalization" to avoid false predictions. Then the proposed CNN, classifies faces with and without masks as the output layer of proposed CNN architecture contains two neurons with Soft max activation to classify the same. Categorical cross-entropy is employed as loss function. The proposed model has Validation precision of 96%. On the off chance that anybody in the video transfer isn't wearing a defensive veil a Red shaded square shape is drawn around the face with a dialog entitled as NO MASK and a Green coloured rectangle is drawn around the face of a person wearing MASK.

Keywords: Open CV, CNN, RGB, ML, API. 1.

## **1. INTRODUCTION**

The Globe Wellness Company's China Country Office changed into educated of cases of uncertain etiology of pneumonia in Wuhan, Hubei District, China [1] Until now, several proven instances had been showed in numerous international locations, such as a systematic institution of employees. The Chinese government has really taken several health and health actions, including screening and proscribing population arrivals as well as departures in Wuhan. It is of awesome ardour to nations international to combat versus code.

Epidemiological tests in addition to genetics inputting have sincerely confirmed that COVID-19 is an not possible contamination that can't be resisted. To prevent the spread of air pollution, researchers recommend that everyone cowl their faces in public. For instance, the food keep has a room with the focal point of the professors. The risk of contamination is excessive even though there are drapes on the food save entry and specialists to check the clients' temperature. However, some wellknown stores nonetheless have businesses that do not use covers, that is



a incredible possibility for public protection and safety. This enhances the threat that an inflamed male or female will skip the contamination directly to others.

### **Artificial Intelligence (AI)**

The term "AI" or "artificial intelligence" describes a simulation gadget in a tool of human intelligence advanced to presume in addition to resemble human motions.

It can likewise be made use of on makers that display human-like functions, inclusive of gaining familiarity and also resolving issues.

Creating a clever tool that could cope with any kind of problem all of a surprising isn't the objective of AI, yet a system which could feature as a human

On the other hand, constructing and construction equipments Human imitation no longer appears so exciting. From an avant-garde perspective, whilst we talk approximately AI, we merciless that may perform several features: recognizing human language, doing complex mechanical obligations, addressing complex computer issues.

### **MACHINE LEARNING (ML):**

It is a type of Artificial intelligence (AI) that allows software applications to become more accurate predicting out comes without being explicitly programmed to do so. As an instance, system getting to know formulas create mathematical versions based totally on pattern information, called "schooling details," so predictions or selections may be made without express programming.

Artificial intelligence formulation are utilized in distinctive programs, including e-mail filtering machine as well as laptop vision, where it's far hard or unwise to enlarge conventional formulas to carry out needed responsibilities.

Artificial intelligence is very carefully bearing on computational documents that specialize in making predictions utilising computer systems.

The research looks at of mathematical optimization substances you with techniques, theories, and alert domains in the subject of device domain name. Information mining is pertinent locations of observation that specialize in analyzing seek data via not being watched research.

In its usefulness in agency worries, the study of systems is moreover called looking



ahead to analytics. Mechanical reputation strategies have historically been divided proper into three huge categories, depending on the function of the "mark" or "monitoring" carried out to the attention device.

## LITERATURE SURVEY

Deeper neural networks are more difficult to train. We gift a residual mastering framework to ease the education of networks which are considerably deeper than the ones used previously. We also present analysis on CIFAR-10 with 100 and 1000 layers. The intensity of representations is of valuable significance for lots visible reputation tasks. Solely because of our extraordinarily deep representations, we attain a 28% relative development at the COCO item detection dataset. Deep residual nets are foundations of our submissions to ILSVRC & COCO 2015 competitions, where We additionally gained the first locations at the responsibilities of ImageNet detection, ImageNet localization, COCO detection, And COCO segmentation. Detecting faces with occlusions is a challenging task due to two main reasons: 1) the Absence of massive datasets of masked faces, and 2) the absence of facial cues from themasked regions. To deal with those issues, this paper first introduces a dataset, denoted

as MAFA, with 30, 811 Internet pictures and 35, 806 masked faces. Based on the dataset, we further propose LLE-CNNs for masked face detection, which consist of three major modules. The Proposal module first combines pre-educated CNNs to extract candidate facial areas from the enter photo and constitute them with excessive dimensional descriptors. After that, the Embedding module is integrated to show such descriptors right into a similarity-primarily based totally descriptor via way of means of the usage of regionally linear embedding (LLE) set of rules and the dictionaries educated on a massive pool of synthesized everyday faces, masked faces and non-faces. In this manner, many lacking facial cues may be in large part recovered and the impacts of noisy cues brought with the aid of using varied mask may be significantly alleviated. Finally, the Verification module is integrated to perceive candidate facial areas and refine their positions with the aid of using collectively acting the class and regression duties inside a unified CNN. Experimental effects at the MAFA dataset display that the proposed technique remarkably outperforms 6 state-of-the-arts with the aid of using as a minimum 15.6%.

Face Detection has advanced as a totally famous hassle in Image processing and Computer Vision. Many new algorithms are



being devised the use of convolutional architectures to make the set of rules as correct as feasible. These convolutional architectures have made it feasible to extract even the pixel details. We purpose to layout a binary face classifier that may come across any face gift withinside the body regardless of its alignment. We gift a way to generate correct face segmentation mask from any arbitrary length enter image. Experiments had been achieved on Multi Parsing Human Dataset acquiring imply pixel stage accuracy of 93.884 % for the segmented face mask. We skilled a large, deep convolutional neural community to categorise the 1.2 million high-decision photos withinside the ImageNet LSVRC-2010 contest into the one thousand special classes. On the check data, we accomplished top-1 and top-five mistakes costs of 37.five% and 17.0% that is substantially higher than the preceding state-of-the-art. The neural community, which has 60 million parameters and 650,000 neurons, includes 5 convolutional layers, a number of which might be observed via way of means 1000-way softmax. To make preparing quicker, we utilized non-immersing neurons and an extremely proficient GPU execution of the convolution activity. To diminish overfitting in the completely associated layers we utilized an as of late evolved regularization strategy called "dropout" that

ended up being extremely powerful. We additionally entered a variation of this model in the ILSVRC-2012 rivalry and accomplished a triumphant top-5 test mistake pace of 15.3%, contrasted with 26.2% accomplished constantly best section.

#### REFERENCE :

[1]ALEXEY Bochkovisky, chien-yao wang and Hong Yuan Mark Liao, "Image detection",2020

#### EXISTING SYSTEM:

Government and Public fitness companies are recommending face masks as critical measures to maintain us secure while venturing into public. To mandate the use of facemask, it becomes essential to devise some technique that enforce individuals to apply a mask before exposure to public places. Face mask detection refers to detect whether a person is wearing a mask or not. In fact, the problem is reverse engineering of face detection where the face is detected using different machine learning algorithms for the purpose of security, authentication and surveillance. Face detection is a key area in the field of Computer Vision and Pattern Recognition. A significant body of research has contributed sophisticated to algorithms for face detection in past.

### PROPOSED SYSTEM:

The proposed CNN, classifies faces with and without masks as the output layer of proposed CNN architecture contains two neurons with Softmax activation to classify the same.

Categorical cross-entropy is employed as loss function. The proposed model has Validation accuracy of 96%. If anyone in the video stream is not wearing a protective mask a Red coloured rectangle is drawn around the face with a dialog entitled as NO MASK and a Green coloured rectangle is drawn around the face of a person wearing MASK.

### 3. AN OVERVIEW OF PROPOSED SYSTEM

The work includes additives, the training element in addition to the discovery thing. In the education phase, the COVID-19. Mask dataset was used to educate the design to get a mask detector. In the discovery phase, photographs are gotten in actual-time from the safety video, and after that use the skilled detector to decide whether or not the customers conscious are carrying masks. A caution can be provided if a patron is determined not the usage of a mask.

### Methodology:

We make use of Python scripts, Tensor Drift and moreover CNN as an in depth evaluation framework to enhance the environment-excellent community for spotting face mask. Our goal is to teach a fantastic model of CNN to look if any individual is placing on a mask. This work can right away understand the faces of the masks from any function. RGB enter generates outcome from any familiar picture. The key feature of this option is to extract the abilities from the images and approximate precisely how adorable they belong. The Remove Tech characteristic statistics the photograph and transforms it right into a emblem-new photograph, this is greener than the previous photograph. The photographs size has been diminished to a practical example on this place. In our campaigning for concept, the video digital can create a face mask. To begin, resize the input photo to 100 \* and after that secure the abilities to make a forecast. Upon completing the schooling and studying section, some versions are supplied to us with login accuracy.

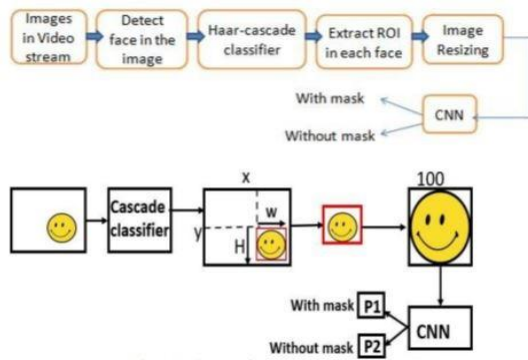


Fig.1. System architecture model.

## MODULES

- Upload Data set
- Build Deep Learning Classifier
- Build Training Module
- Accuracy
- Start Camera
- Person Recognition
- Detection Mask or Un Mask.



Fig.2. Mask detection.

## IMPLEMENTATION

Importing Libraries :

```
# python detect_mask_image.py --image images/pic1.jpeg
```

```
Jpeg # import the vital packages from tensorflow.keras.applications.mobilenet_v2 import preprocess_input
```

```
from tensorflow.keras.preprocessing import image
import imageio as img_to_array
from tensorflow.keras.models import load_model
import numpy as np
import argparse
import cv2
import os
```

## Constructing the Argument and parsing the arguments

```
def  
mask_image():  
  
    ap = argparse.ArgumentParser()  
    ap.add_argument("-i", "--  
image", required=True,  
help="path to input image")  
    ap.add_argument("-f", "--face",  
type=str,  
default="face_detector",  
help="path to face detector  
model directory")  
    ap.add_argument("-m", "--  
model", type=str,  
default="mask_detector.model",  
help="path to trained  
facemaskdetector model")  
    ap.add_argument("-c",  
                    "confidence",  
                    type=float, default=0.5,  
                    help="minimum probability to  
                    filter weak detections")  
    args = vars(ap.parse_args())
```

### LOAD FACEMASK DETECTOR :

```
prototxtPath = os.path.sep.join([args["face"],  
"deploy.prototxt"])  
weightsPath =  
os.path.sep.join([args["face"],  
  
"res10_300x300_ssd_iter_140000.ca  
ffemodel"])  
net = cv2.dnn.readNet(prototxtPath,  
weightsPath)  
  
# load the face mask detector model  
from disk  
print("[INFO] loading face mask  
detector model...")  
model = load_model(args["model"])
```

### WEB CAM

```
st.markdown('<h2 align="center">Detection  
on Webcam</h2>',  
unsafe_allow_html=True)  
st.markdown('<h3 align="center">This  
feature will be available soon!</h3>',  
unsafe_allow_html=True)  
mask_detection()
```

### CONCLUSION

In this research paper, we proposed a changed SSD method to find whether or no longer consumers are putting on mask in the grocery keep. In order to find out whether or no longer clients are using mask, we created the COVID-19-Mask dataset that can deliver information for future researches. At the same time, in order to exactly locate masks in real time, we recommended a mild-weight backbone network and additionally Function Improvement Module, which improves the general detection impact of the formula. We finished a variety of experiments and provided an intensive



evaluation of the performance of our version at the undertaking of face masks detection. Speculative outcomes display that the recommended method can well find whether or now not clients use masks and additionally may be associated with workout.

#### **FUTURE ENHANCEMENTS:**

The present model proposed gives great accuracy for single face with and without mask. For multiple faces also it gives quite good accuracy. It works easily on any mobile device just by switching on the video stream, with no external hardware requirement. Further we will work for improving the accuracy for multiple face mask detection, to classify the faces into three categories that is, With mask, without mask, Improper mask instead of just the two with and without mask class by adding datasets with images of people wearing masks not covering their noses properly and also to detect the masked face using the FaceNet model of Convolutional Neural Network like in so as to further improve our model and add marking attendance feature in it by detecting the face even when the mask is on.

#### **REFERENCES**

- [1] Alexey Bochkovskiy, Chien-Yao Wang and Hong-Yuan Mark Liao, "Yolov4: Optimal speed and accuracy of object detection", 2020.
- [2] Narinder Singh Punn, Sanjay Kumar Sonbhadra and Sonali Agarwal, "Monitoring COVID-19 social distancing with person detection and tracking via fine-tuned YOLO v3 and Deepsort techniques", 2020.
- [3] Mahdi Rezaei and Mohsen Azarmi, "Deepsocial: Social distancing monitoring and infection risk assessment in covid-19 pandemic", Applied Sciences, vol. 10, no. 21, pp. 7514, 2020.
- [4] Farooque Hassan Kumbhar, Syed Ali Hassan and Soo Young Shin, "New Normal: Cooperative Paradigm for Covid-19 Timely Detection and Containment using Internet of Things and Deep Learning", 2020.
- [5] Enoch Arulprakash and Martin Aruldoss, "A study on fight against COVID-19 from latest technological intervention", SN Computer Science, vol. 1, no. 5, pp. 1-3, 2020.
- [6] Dongfang Yang et al., , "A vision-based social distancing and critical density detection



system for covid-19", pp. 24-25, 2020. [7] Zhanchao Huang, Jianlin Wang, Xuesong Fu, Tao Yu, Yongqi Guo and Rutong Wang, "DC-SPP-YOLO: Dense connection and spatial pyramid pooling based YOLO for object detection", Information Sciences, vol. 522, pp. 241-258, 2020, ISSN 002- 0255. [8] Jiahui Yu et al., "Unitbox: An advanced object detection network", Proceedings of the 24th ACM international conference on Multimedia, 2016. [9] Z. Zhao, P. Zheng, S. Xu and X. Wu, "Object Detection With Deep Learning: A Review", IEEE Transactions on Neural Networks and Learning Systems, vol. 30, no. 11, pp. 3212-3232, Nov. 2019. [10] Mohammad Javad Shafiee et al., "Fast YOLO: A fast you only look once system for real-time embedded object detection in video", 2017.