PREDICT WHETHER A PERSON IS WEARING A MASK OR NOT

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ABSTRACT

After the breakout of the worldwide pandemic COVID-19, there arises an intense need for safety mechanisms, face masks being the primary one. According to the World Health Organization (WHO), the corona virusCOVID-19 pandemic is causing a worldwide fitness epidemic, and the maximum success protection degree is wearing a face mask in public places. Convolutional Neural Networks (CNNs) have developed themselves as a dominant magnificence of picture recognition fashions. This study pursuits to take a look at and take a look at the device getting to know talents for detecting and recognizing face masks worn with the aid of human beings in any given video or picture or in real-time. It may be used as an entry control tool by registering a business enterprise's employees or college students with their faces and then recognizing people after they approach or depart the premises with the aid of recording their photos with faces.

Keywords : Convolutional Neural Network , keras algorithm and sequential model.

I.INTRODUCTION

The global has not yet fully Recover from this pandemic and the vaccine which can successfully treat Covid-19 is but to be determined. However, to reduce the effect of the pandemic at the united states of america's economic system, numerous governments have allowed a restricted wide variety of financial sports to be resumed as soon as the variety of new cases of Covid19 has dropped under a positive stage. As those nations cautiously restarting their monetary sports, concerns have emerged concerning place of work protection within the newpublish-Covid-19 environment . To lessen the possibility of contamination, it is suggested that human beings must wear masks and hold a distance of as a minimum 1 meter from every other. Deep learning has gained extra interest in item detection and become used for human detection purposes and expand a face mask detection device which can discover whether or not the individual is wearing mask or no longer. This may be done through evaluation of the class consequences via reading actual-time streaming from the Camera. In deep mastering initiatives, it to be schooling statistics set. It is the actual dataset used to teach the version for performing numerous actions.

II.OBJECTIVE

The proposed technique uses the Keras algorithm and CNN Model. Based on the performance and accuracy of the result of the binary classifier might be indicated by means of displaying a green rectangle superimposed across the segment of the face indicating that the individual at the webcam is wearing a mask, or a crimson rectangle indicating that the person on camera isn't sporting a mask along with face identification of the individual.

III.RELATEDWORKS

- S.Shivaprasad, has introduce Deep learning, OpenCV, TenserFlow, as well as Keras are used in the study strategy (2021)to aid in the faces detection having masks. With the support of this method, safety is ensured.A technique for face perception has employed the MobileNetV2 and CNN framework is classifier; it is lightweight and the fewer parameters, which likely utilized in embedded devices (Onion Omega2 and Raspberry Pi) to perform authentic mask identification. The accuracy of the approach utilised in this study is 0.96, and the F1-score is 0.92. The data that used by several scientists which can be to create more sophisticated models, like face recognition, facial patterns, and facial characteristics for detection method.(12)
- Prathmesh Deval , In 2021, contemplate developing a detection system for face masks connected with digital healthcare services. By used OpenCV, toget access to the live video stream and also for image pre-processing. For face detection, Haar-Cascade will be used, as it is a very effective face detection method. Figure depicts the system's design, which demonstrates how it works automatically to avoid the expansion of COVID19. The research uses advanced learning algorithms to recognise various facial features and determine whether or not person is employing the face mask. The system deals with Face Mask detection in real-time and also helps in reducing the transmission rate. The system also provides few digital facilities for receptionists and doctors.(8)
- Jansi Rani SellaVeluswami , In 2021 were introduce the proposed model of trained database over 11,000 images of faces either with or without masks, employing various deep learning techniques. A SSDNET model is being installed for face detection, the output of which is passed to a custom-made Lightweight CNN for mask detection. On basis of two distinct testing datasets, the model obtains a remarkable accuracy of both as 96%. This model will help out the agencies and health officials fight the global pandemic. The drawback of CNN include the need for huge datasets (i.e., hundreds too thousands of images) and their accurate note, which can be a sensitive technique that requires domain specialists.(4)

- The very first CNN-focused on two-stages of object detection algorithm in convolutional neural networks. R-design CNN's is embraced of three distinct blocks. The authors utilized a selective search technique to create about 2000.0 class-independent regional ideas by every source image during the first step. To retrieve a feature vectors of the specification of length from every zone in a suggestion, and they utilized CNN having five-5 convolutional layers (Conv.) as well as double fully connected-layers-FC inside the second blocks. Eventually, each region plan is fed into a separate CNN to retrieve specific length feature vectors. The final blocks usedlinear-support vector machinefor a given category to classify the each of region proposition used.(7)

- Chenchen Zhu 2017, suggested Contextually Multi-Scaled Region-focused Convolutional Neu-ral Networks (CMS-RCNNs) to address various hard issues such as significant facial occlusions, in-credibly lower resolutions, intense illumination, highly pose changes, video or image compression errors. Proposed networks, like region-based CNNs, have a component of regional proposal and a region-of-interest (RoI) detecting components. However, outside of those networks, two major shares for improving state-of-the-art facial recognition performance.(1)

- K. Wang, In 2016 was proposed deep cascade convolutional network method that used Fast-R-CNN, in the researches they used Detection Date Set and Benchmark method and Annotated Face in-the-Wild method in a dataset for testing part. For image input, the beginning stage starts by Lower Stage Classifi-cation Networks which scan the whole image in numerous scales with the 95% reject of detection windows, resize image and put it in Lower Stage Calibration Networks form size adjusttion and nearby faces. The high abandon place was in the Higher Stage of Classification Net-works, afterwards adjust by Higher stage Calibration Networks for spatial locations uses Fast-R-CNN Networks.(5)

- Rongqiang Qian, 2016 , suggested an existing road proposed detection system using CNN, detection system comprises of two phases: first, there are a huge amount of candidate zones that can comprise intended objects and all these objects shall be passed to Fast R-CNN having the process steps.(10)

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- Huaizu Jiang 2017,the Faster R-CNN has beensuggested. It is comprised of two modules. The Fast-R-CNN detector seems to be second one, and its aim is to clear ideas. So they employed the wider face of database were used to comprises of 12,880 images with 159,424 faces. On three specification datasets, the results shows cutting-edge face identification performance, and through RPN, certain convolutional layers can be used without expanding the computational overhead.(3)

- Wenqi Wu 2018, proposed a face detector with variable scales (DSFD) relying on Faster R-CNN. The novel network can magnify facial detection accuracy while also acting as a real-time Faster R-CNN. To obtain the human face ROI, first effective multitask region proposal network is created, which is paired with increasing face detection. The anchor is used the facial landmarks to derive a human face concept. Then, determined by the proposal scale, a Fast R-CNN of parallel-type network is presented. By FDDB dataset, 500 images generated randomly, the tested experiments in Tables contrast DSFD, baseline technique actual Faster R-CNN, MXnet, and UnitBox. The suggested method obtains a 96.69% recall rate with 130.0ms for processing aimage frame, whereas actual Faster R-CNN as well as MXnetutilise 140.0ms and 230.0ms, respectively, underneath the 700 false positives discrete score.(13)

- Ren et. al. suggested Faster-R-CNN, yet They've switched to a region proposal network as a replacement for the proposal approach. The RPN is a fully convolutional net-work that gets every size image as an input as well as outputs a bunch of rectangular aspirant object recommendations. Every object concept has an objectness scoring rate that determines whether or not the proposal comprises an object. (11)

- Francois Chollet presents an interpretation of Inception modules in convolutional neural networks as being an intermediate step in-between regular convolution and the depthwise separable convolution operation.Image classification dataset comprising 350 million images and 17,000 classes.Considering the Xception architecture has same number of parameters as Inception V3, the performance gains are not due to increased capacity but rather to a more efficient use of model parameters.(2)

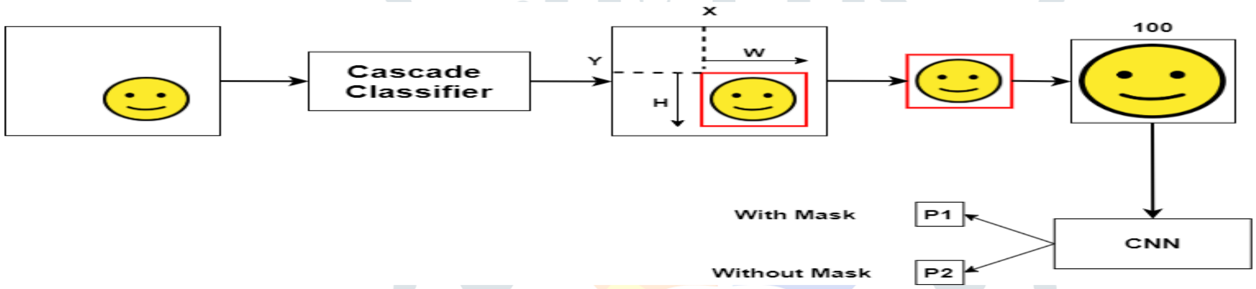
IV.METHODOLOGY

3.1.1 PROPOSED SYSTEM

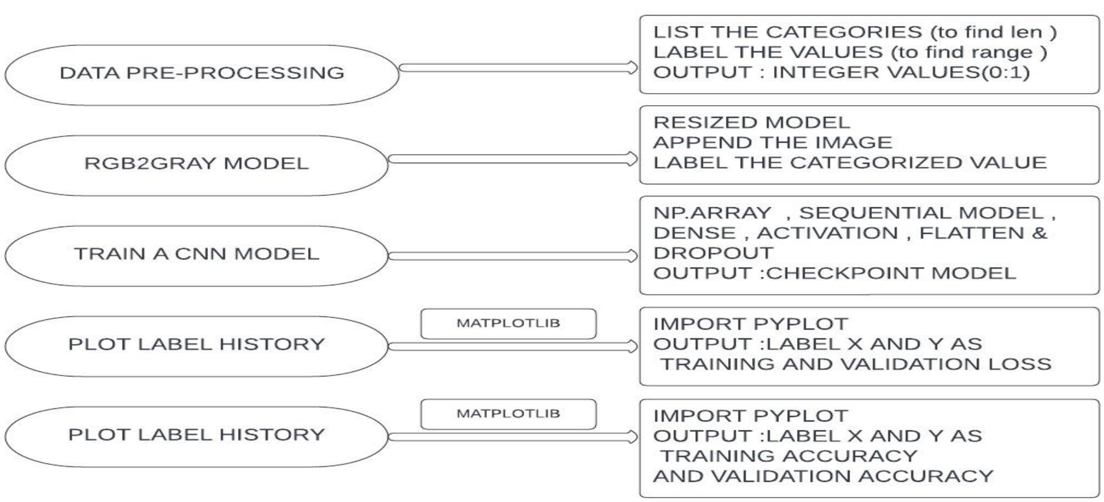
- The imported image is captured from a webcam(dataset).
- The images(frames) from the dataset is loaded.
- Face pictures are cropped , resized (W*H=100) and then change the color once they were loaded.
- Normalization is then done to normalize the pix from 0-255 to the 0-1 range(array).
- Training the convolution neutral network architecture.
- Browse the images to label the accuracy of the categories to mentionthe layers.

Finally plot the values of x label and y label to know the level of training accuracy in visualization.

(fig 1 below)-[ref:14]



3.2 WORK FLOW



3.2.1. DATA PREPROCESSING

- **The main motive is to reduce the sound effects, difference of clarification that appears, color identification , setup background , and path orientation** .
- The recognition of frames(images) were determined by the quality and lighting condition etc.

- Here, import cv2 and include data path to list the categories and label the value of 0 and 1 for mask and without mask for OUTPUT.

3.2.2. RGB2GRAY MODEL

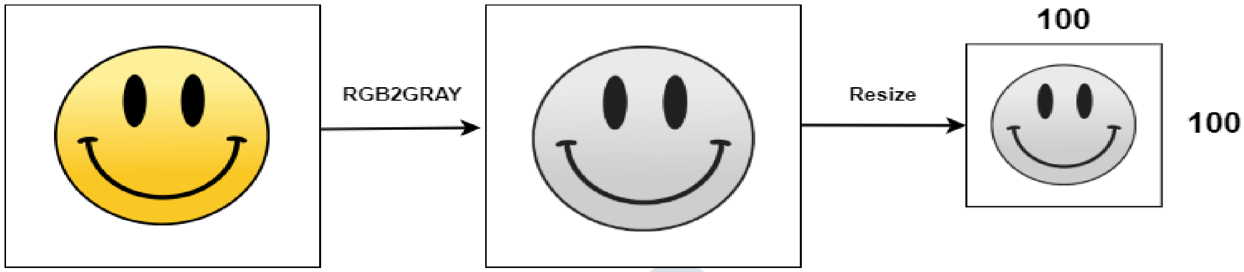


Fig 2-[ref:14]

- Converting the image into gray scale.
- Resizing the gray scale into 100*100 size.
- To fixed common size for all the image in the dataset.
- To appending the image and label the categorized into the list of dataset.

3.2.3. TRAIN A CNN ARCHITECTURE

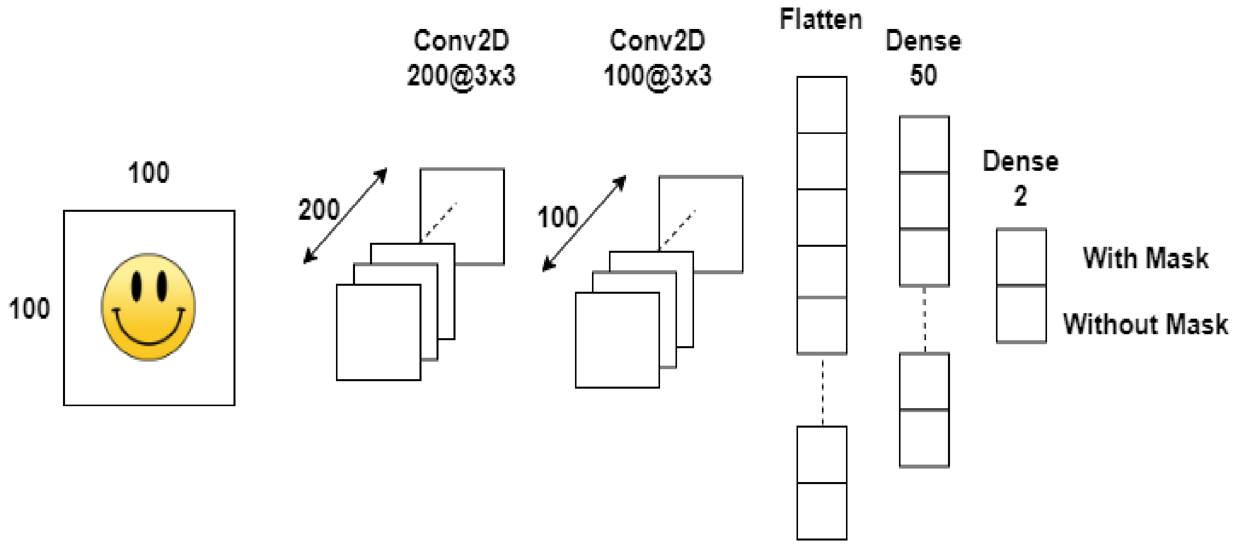


Fig 3-[ref:14]

- Using Sequential model to arrange the layers into order.
- Using Dense layer to define the relationship between the values of the data.
- Using Activation layer is help to decide whether a neuron should be activate or not .
- Using flatten layer is to transform the resultant into 2D arrays of pooled-features to the single long continuous-linear-vector images.
- Using Dropout layer is to preventing NN from over-fitting.
- Using checkpoint model is to evaluate the CPM on test data to call-back the function to save and get the output.

OUTPUT

```
checkpoint = ModelCheckpoint('model-{epoch:03d}.model',monitor='val_loss',verbose=0,save_best_only=True,mode='auto')
history=model.fit(train_data,train_target,epochs=20,callbacks=[checkpoint],validation_split=0.2)
```

```
Train on 990 samples, validate on 248 samples
Epoch 1/20
990/990 [==============================] - 93s 94ms/step - loss: 0.7326 - accuracy: 0.5626 - val_loss: 0.5822 - val_accuracy:
0.6290
Epoch 2/20
990/990 [==============================] - 93s 94ms/step - loss: 0.5465 - accuracy: 0.7253 - val_loss: 0.4429 - val_accuracy:
0.8185
Epoch 3/20
990/990 [==============================] - 93s 94ms/step - loss: 0.3708 - accuracy: 0.8354 - val_loss: 0.2568 - val_accuracy:
0.9032
Epoch 4/20
990/990 [==============================] - 95s 96ms/step - loss: 0.2679 - accuracy: 0.8970 - val_loss: 0.1807 - val_accuracy:
0.9476
Epoch 5/20
990/990 [==============================] - 93s 94ms/step - loss: 0.1917 - accuracy: 0.9303 - val_loss: 0.2207 - val_accuracy:
0.9315
Epoch 6/20
990/990 [==============================] - 93s 94ms/step - loss: 0.1749 - accuracy: 0.9343 - val_loss: 0.1249 - val_accuracy:
0.9597
Epoch 7/20
990/990 [==============================] - 95s 96ms/step - loss: 0.1238 - accuracy: 0.9576 - val_loss: 0.1258 - val_accuracy:
0.9637
Epoch 8/20
990/990 [==============================] - 94s 95ms/step - loss: 0.1037 - accuracy: 0.9616 - val_loss: 0.1243 - val_accuracy:
0.9516
Epoch 9/20
990/990 [==============================] - 94s 95ms/step - loss: 0.0893 - accuracy: 0.9687 - val_loss: 0.1095 - val_accuracy:
0.9556
Epoch 10/20
990/990 [==============================] - 94s 95ms/step - loss: 0.0540 - accuracy: 0.9828 - val_loss: 0.1193 - val_accuracy:
0.9597
Epoch 11/20
990/990 [==============================] - 92s 93ms/step - loss: 0.0399 - accuracy: 0.9899 - val_loss: 0.1278 - val_accuracy:
0.9677
Epoch 12/20
```

3.2.4. SPLIT THE TRAIN DATA

- Splitting the trained dataset, it records the image with help of CNN model.
- To get output of test size value from sklearn model.

```
In [19]: from sklearn.model_selection import train_test_split

         train_data,test_data,train_target,test_target=train_test_split(data,target,test_size=0.1)
```

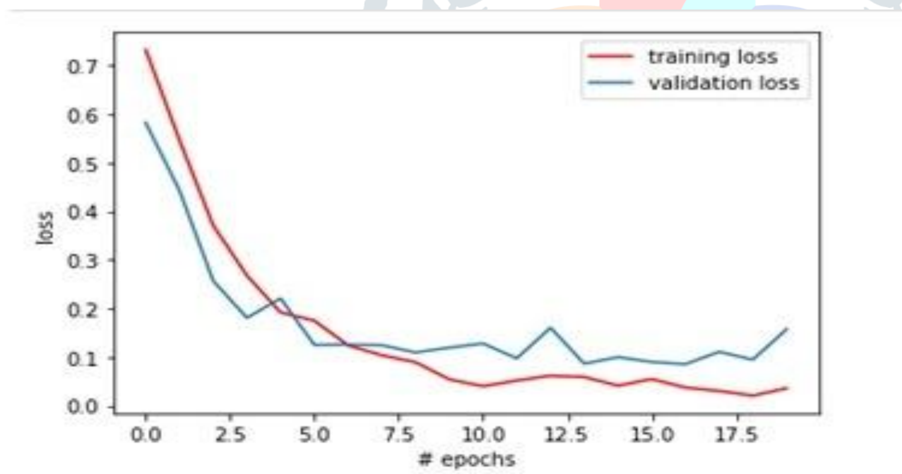
Sklearn model_selection is almostly used for split the data into targets to achieve the size value accurately with the help of

- ➢ Train data
- ➢ Test data

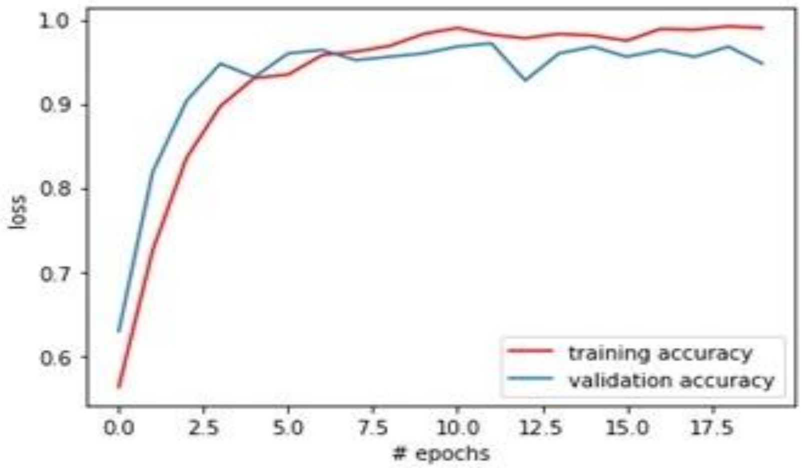
3.2.5. PREDICT THE RESULT

- ➢ Import pyplot from matplotlib :
- ➢ To show plot (history)

  Markthe values of training and validation to modify losses in graph as OUTPUT.



- ➢ Import pyplot from matplotlib :
- ➢ To show plotting history of training and validation to measure accuracies in graph as OUTPUT.



V.CONCLUSION AND FUTURE WORKS

- In this work ,the face masks detection is used keras to records to detect the folks with face mask and without face masks with properly efficiency and sent an intimation through texted format to authority by IoT. It's overall performance is sincerely properly in pictures and detection results have been also quite excellent. This detection also can be used for video circulate or digital camera fed inputs. To get progressed overall performance and Jupyter of better variation along with 4GB or 8GB RAM can be used to enforce the detection algorithm.

- The Future development of the task is deliberate to involve the identity of a person and sent the intimation thru a voice message to the people cellular who have been no longer carrying face masks. This may be carried out in workplaces and institutions by means of education the database with personnel pictures or students snap shots and with the aid of face reputation the character is recognized through which the cellular wide variety and different details of the person is obtained from database and subsequently it'll be clean to inform that precise individual or beneficial for taking any movements regarding no longer sporting face mask . The proposed model can also be more desirable through together with diverse parameters like peoples be counted, social distance and temperature dimension. This undertaking can be very useful and may be implemented in hospitals, airports, faculties, colleges, workplaces, stores, shops, theaters, temples, apartments and so on.

VI.REFERENCES

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- sentdex
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