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Face Mask Detection System using MobileNetV2

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***Abstract*— COVID-19 pandemic brought about by Covid is continually spreading everywhere. The effect of COVID has fallen on practically all advancement areas. The medical care framework goes through emergency. Measures have been taken to forestall the spreading of this infection where wearing a cover is one of them. In this paper, we proposed a framework that will recognize individuals who are not wearing veil where every one of the public spots are observed by CCTV cameras. The facial covering identification framework is created with an AI calculation: MobileNetV1. The means for building the model are gathering the photographs of individuals wearing veils and not wearing covers or taking typical pictures of individuals and make custom CV content to include veils them , then pre-handling the information and dividing the information, testing and afterward executing the model. The model can recognize individuals who are wearing cover or not wearing veil at an exactness going 98.71-99.90 percent.**

Catchphrases — COVID-19,FaceRecognition,MobileNetV2, Machine Learning, Computer Vision.

I. INTRODUCTION

As the COVID cases are rising step by step and, surprisingly, after lockdown still many individuals meander around roads without wearing veil, implies lockdown isn't the main answer for forestall Coronavirus development, so we want a legitimate framework to screen who is wearing cover or not wearing cover since individuals can't remain at home since they need to go about their business, bring in cash to deal with their family and in light of that occasionally many individuals neglected to wear veil. At this point, there are a few antibodies accessible in numerous nations yet at the same time it doesn't imply that we are 100 percent protected from Coronavirus.

Individuals are constrained by regulation to wear a veil any place they speak with others and in the public places .The public authority rebuff those individuals who rebel and don't utilize a facial covering in the public spot.

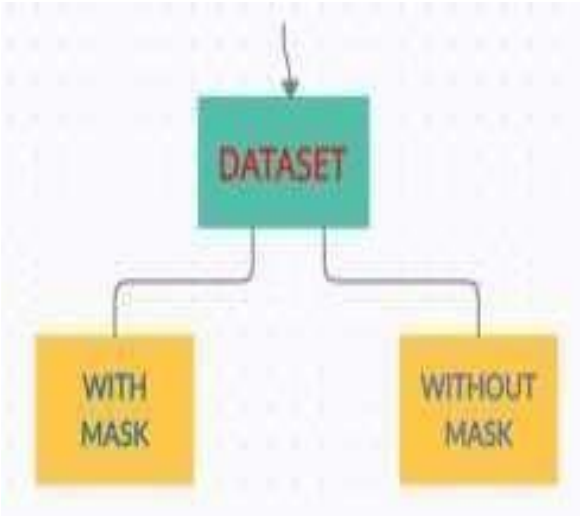
Specialists confronted numerous hardships in observing anenormous populace. Therefore, the authorities need a solution to this problem and to control the implementation of the law and solution is to use face mask detection system to detect people who disobeys and not wear a mask.

This paper presents facial covering discovery framework that can be utilized by individuals in home or openly puts and so forth. Presently what it can do is it can catch the picture of an individual right then and there who isn't wearing veil and send it to the power, it can illuminate the specialists by means of any mail administration. It tends to be utilized in homes, the event that any individual isn't wearing veil then the entryways won't open. The sent model in this study can be carried out on cameras to identify individuals who are not wearing veil.

II. METHOD

In this review, the facial covering recognition framework is sent with the AI calculation through the picture arrangement strategy i.e MobileNetv1. It is a technique in view of CNN(Convolutional Neural Network) that is created by Google with further developed execution and more productivity .

The review is led on dataset of individuals. Wearing covers and not wearing veils utilized for the. preparation, approval and testing stage so the model can be carried out on the dataset. The model is conveyed by following advances: (1) information assortment, (2) preprocessing information, (3) dividing the information, (4) form the model, (5) test the model, and (6) execute the model. The means are displayed in Figure 1.



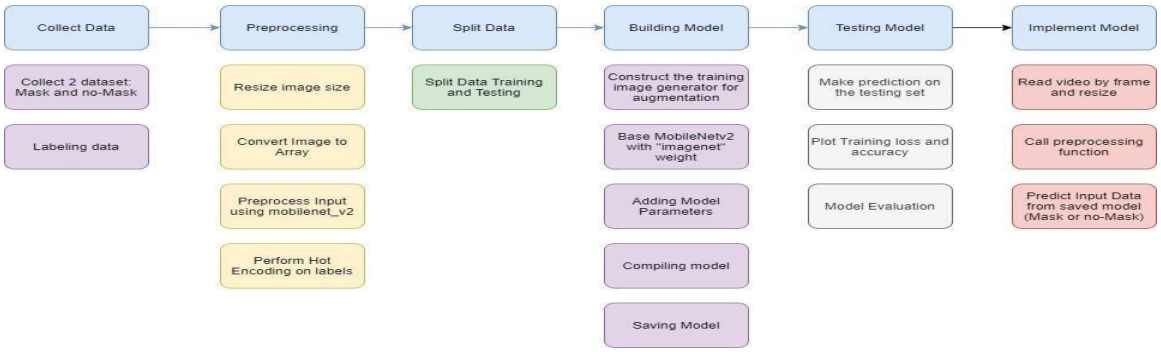


Fig. 1. Steps in building the model

III. RESULT AND DISCUSSION

A. Building Face Mask Detection Model

1. Collecting Data:-

The advancement of the Face Mask Detection model start with gathering the pictures for example information. The model is preparedon this information of individuals who wear veils and who don't wear covers. The model will identify individuals wearing veil and not wearing cover.

For building the model, we utilized kaggle dataset containing manypictures of individuals wearing veil and not wearing cover.

What we can do is we can collect the images of people manually or we take the normal images of

people and create the custom CV script to add masks on them. Begin with a picture of individual without cover ,then, at that point, apply face discovery to register the jumping box area of face, separate face Region of Interest (ROI) ,get picture of a veil, and adjust it on top of the face appropriately. Rehash the means for all pictures.

The accompanying stage is to name the dataset. The dataset assembled is then named into two social events; with and without cover. After the data is set apart into two social occasions. The instance of the data is as shown in fig [2] and fig [3].

Fig 2. Without mask

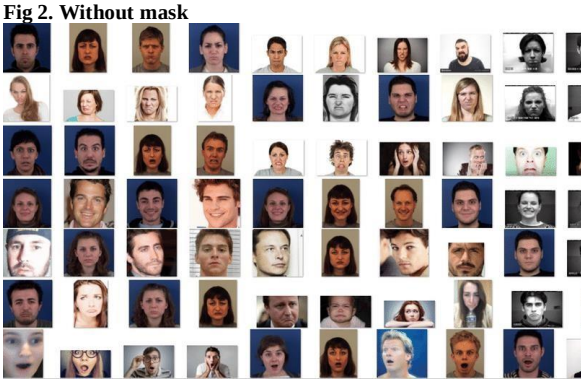


Fig 3. With mask

2. Pre-processing.

The pre-handling stage should be done before the preparation and testing of the information. There are 4 stages in the preprocessing stage: (1) resizing pictures size by 224 X 224px, (2) convert all pictures to cluster, (3) preprocess input utilizing MobileNetV1, and afterward perform one-hot encoding on names.

In this cycle, every one of the pictures are resized with 224 X 224 px and changed over into exhibit and afterward scaled in scope of [-1,1]. Then one-hot encoding is performed

To convert our classes to binary format.

By this we get our changed dataset. The picture will be utilizedto pre-process the info utilizing MobileNetV1.

The one-hot encoding is applied on marks in light of the fact that many AI calculations can't work on information name straightforwardly. They require all information and result factors to be numeric, including this calculation. This is the twofold order issue.

3. Splitting the Data.

After the pre-processing phase, the data is split into two batches i.e. 70 percent training data, and the rest 30 percent is testing data. Each batch is containing imagesof both of with-mask and without-mask people.

4. Building the Model.

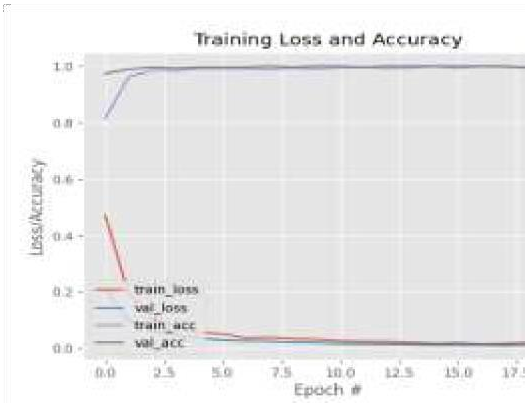
The following stage is to assemble the model. There are 6 stages in building the model for example building the preparation picture generator for expansion, the base model with MobileNetV1, adding model boundaries, gathering the model, train the model, and to save the model (.h5) for the expectation interaction.

5. Testing the Model.

To guarantee that the pre-arranged prepared model is anticipating great, there are a means to test the model. The first step is to make forecasts on the testing set. The outcome for 20 cycles in checking the precision and misfortune in the it is displayed in Table 1 to prepare period of model.

Table I. loss and accuracy in 20 iterations

Epoch	Loss	Accuracy	Val_loss	Val_acc
1/20	0.6165	0.7127	0.2091	0.9746
2/20	0.2332	0.9501	0.0980	0.9891
3/20	0.1206	0.9813	0.0634	0.9964
4/20	0.0814	0.9825	0.0462	0.9928
5/20	0.0669	0.9892	0.0362	0.9964
6/20	0.0539	0.9910	0.0296	0.9964
7/20	0.0383	0.9924	0.0262	0.9964
8/20	0.0434	0.9841	0.0255	1.0000
9/20	0.0405	0.9930	0.0215	0.9964
10/20	0.0387	0.9839	0.0202	1.0000
11/20	0.0267	0.9946	0.0176	1.0000
12/20	0.0205	0.9987	0.0165	0.9964
13/20	0.0255	0.9924	0.0151	1.0000
14/20	0.0201	0.9973	0.0141	1.0000
15/20	0.0174	0.9984	0.0132	1.0000
16/20	0.0161	0.9960	0.0127	1.0000
17/20	0.0143	0.9993	0.0126	1.0000
18/20	0.0162	0.9977	0.0115	1.0000
19/20	0.0176	0.9944	0.0132	0.9964



From Table 1, we can see that the precision is expanding from the second age and misfortune is fundamentally diminishing.

Fig. 2. Graph of Training Loss and Accuracy

6. Implementing the model.

The model is fundamentally carried out in the live transfer video. The video peruses edge to outline, then, at that point, the face recognition calculation applies to each casing.

Assuming that a face is distinguished, it continues further. From identified outlines containing appearances of individuals, preprocessing will be done including resizing the picture size, changing over it into cluster, pre-handling input utilizing MobileNetV1.

The subsequent stage is to anticipate input information from the saved model(.h5). Anticipating the information picture that has been handled utilizing a formerly constructed prepared model(.h5).

The video outline is likewise marked that the individual is wearing a cover or not alongside the precision.

Fig.3 with mask.

	Precision	Recall	F1-Score	Support
With mask	1.0	1.0	1.0	138
Without mask	1.0	1.0	1.0	138
Accuracy			1.0	276

Table II. Model Evaluation

The table then can be displayed in the diagram displayed inFigure 2.

At the point when the exactness line become steady, it implies thatit doesn't require for all the more no. of emphasess for expanding the precision of the model. The following stage is to assess the model as displayed in Table 2.

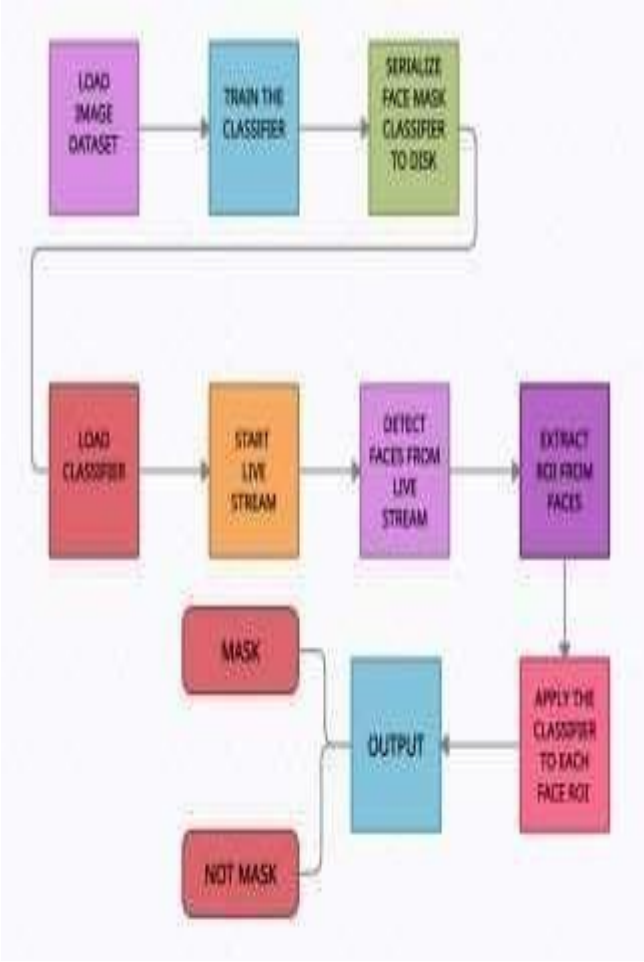


Fig. 4 without mask.

IV. ARCHITECTURE DIAGRAM

The picture dataset is stacked and afterward prepared and afterward the saved model is utilized to recognize regardless of whether individual is wearing covers from live stream.

V. RESULT

The model is successfully deployed can be seen in fig .3 and fig. 4.

VI. CONCLUSION

All in all, a model is sent utilizing AI for facial covering discovery. After the preparation, approval, and testing period of the model. It can identify and give the precision of recognizing veils.

VII. REFERENCES

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