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# Identifying Human Emotions with Pictures by Wearing Masks.

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**ABSTRACT:** Wearing face masks is one amongst the essential means to forestall the transmission of certain respiratory diseases like COVID-19. Although acceptance of such masks increases within the hemisphere, many people feel that social interaction is stuffed with wearing a mask. within the current experiment, we tested the impact of face masks on the readability of emotions. In with respect to expression analysis, different studies showed that we are aloof from being perfect in assessing the spirit of our counterpart just by inspecting the face without knowing the context of a scene or without information about the dynamic evolvement of the seen expression. There is, for example, a comparatively high consensus that covering the lower face parts yields reduced performance in assessing a contented emotion for other emotional states, however, there are quite contradictive results to be found within the literature, e.g., for fear detection there's even evidence that a partial coverage of the face might cause better performance thanks to fading out irrelevant or deceptive information in faces. Specific varieties of occlusions might interfere with different emotions: as an example, the mouth seems important for the detection of happiness and fear, but the eyes are more relevant for anger, fear, and sadness. These different paradigms operate with very different stimuli and that they were used with samples from different populations. Taken together, they are doing not enable immediate conclusions but about the particular impact of face masks on the reading of various emotions.

**KEYWORDS:**Emotions, faces, masks, accuracy, COVID-19, pandemic.

## I. INTRODUCTION

The purpose of this paper is to point how India and several other countries across the planet have undergone a worldwide pandemic situation. Although several other pandemics are recorded within the past, the high rate of transmission of certain respiratory diseases like COVID-19 has marked its place effectively in around 218 countries and territories. Amidst this chaos wearing face masks has become one in every of the essential means to stop the transmission of those viruses. The acceptance of wearing masks has had variant opinions among the people, as face masks also cover, per definition, a serious a part of the external body part, which might crucially affect social interaction. Clearly, wearing face masks is one among the effective strategies to avoid contact with the virus. Wearing face masks is indicated in many scenarios, mostly in clinical contexts, when being infected by certain respiratory diseases or in times of epidemics where the danger of potential transmission through air passages must be reduced. Face masks don't only have an immediate positive medical impact in terms of preventing the virus from spreading to people who are most vulnerable and that they even have positive societal effects as wearing masks allows for relaxing other preventive measures like strict isolation and quarantining. However, face masks also cover, per definition, a significant a part of the face, which may crucially affect social interaction. In with relevancy expression analysis, different studies showed that we are off from being perfect in assessing the spirit of our counterpart just by inspecting the face without knowing the context of a scene or without information about the dynamic evolvement of theseen expression. There is, as an example, a comparatively high consensus that covering the lower face parts yields reduced performance in

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assessing a cheerful spirit for other emotional states, however, there are quite contradictive results to be found within the literature, e.g., for fear detection there's even evidence that a partial coverage of the face might cause better performance thanks to fading out irrelevant or deceptive information in faces. Specific styles of occlusions might interfere with different emotions: as an example, the mouth seems important for the detection of happiness and fear, but the eyes are more relevant for anger, fear, and sadness. These different paradigms operate with very different stimuli and that they were used with samples from different populations. Taken together, they are doing not enable immediate conclusions but about the particular impact of face masks on the reading of various emotions.

## II. METHODOLOGY

**To capture the video of people in a live meeting/appearance and extract relevant frames from the video:**
Video Capturelibraryofpythonisemployedforcapturingvideo,andOpenCV,imutilsandnumpyareusedforimageprocessing.

**Todetect faces wearing masks from the image frames:**
CNNbasedfacedetection model inTensorFlow is employedtoseek outfaces fromtheframes.

**Toidentifyfacialemotionsof people wearing masks using their images:**
Facial emotions are identified using Convolution Neural Network for extracting features from the image and convert it to lower dimension and Tensor Flow to detect people.

**To predict the human emotion after analysing the image with high accuracy that they are depicting positive or neutral emotions:**
AI technology and algorithms are used to briefly explain the accuracy analysis with the help of dynamic display images and graphs. of recognition of human emotions by wearing a mask and not wearing a mask. The accuracy rate of detecting a person with a facemask is 80-90% depending on the digital capabilities.

## III. MODELINGANDANALYSIS

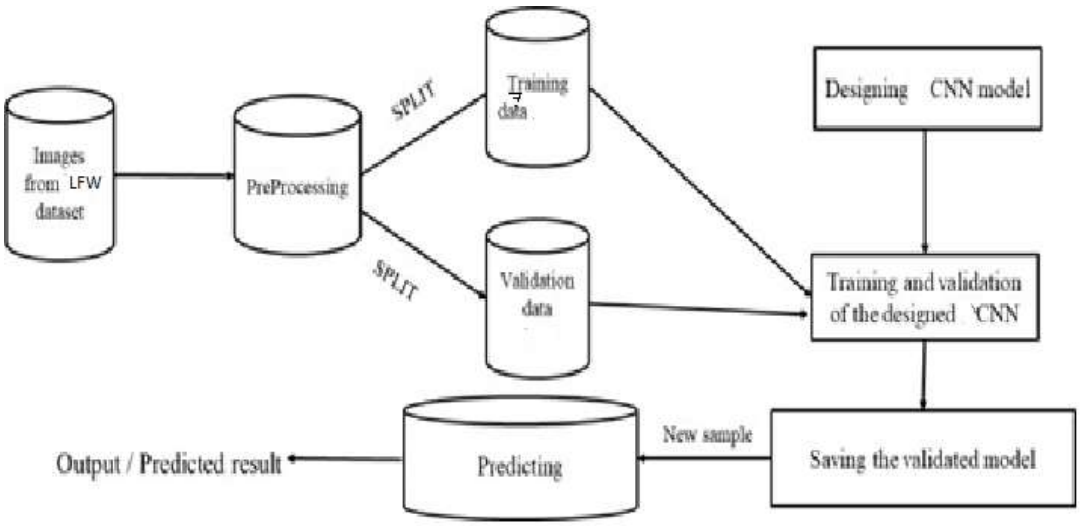


**Figure1:**SystemArchitecture

The system architecture clearly explains the entire system. The architecture consists of the following entities.

System architecture is the conceptual model that defines the structure, behaviour, and more view of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structure and behaviours of that system. The model is trained and validated with datasets. After training themodel issaved. Now thenew inputdataisgiventothesavedmodelandpredicted.

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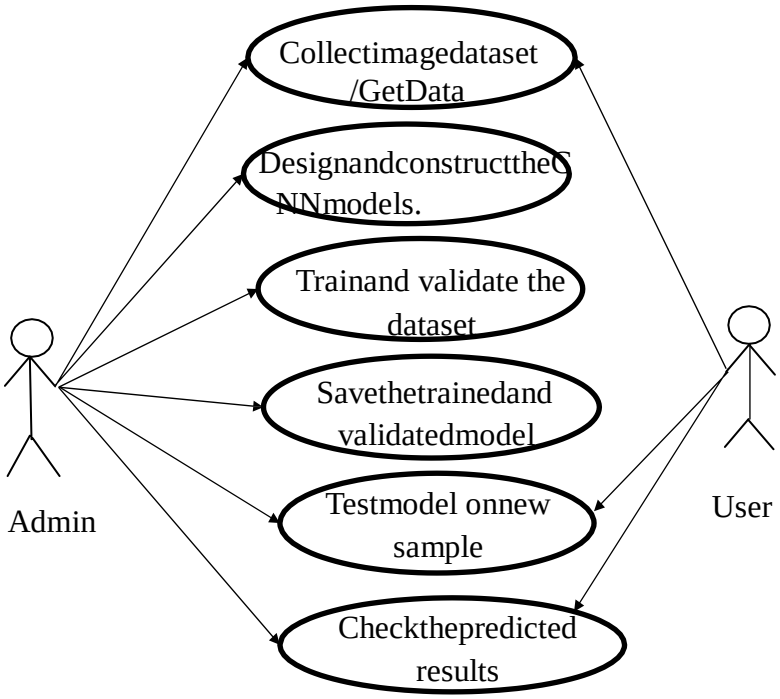


**Figure2:**UseCaseDiagram

A use case diagram in the Unified Modelling Language (UML) is a type of behavioural diagram defined by and created from a Use-case analysis. A use case is a diagram showing the various user roles and the way those users interactwith the system and at its simplest it is a representation of a user's interaction with thesystem that shows the relationship between the user and the different use cases in whichtheuserisinvolved.

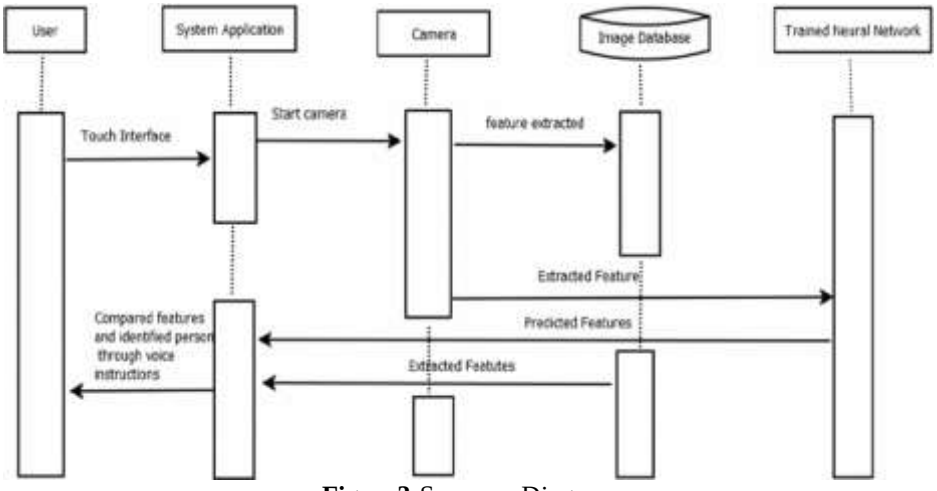


**Figure3:**SequenceDiagram

The above figure (fig. 3) shows the sequence diagram in Unified Modelling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams. It depicts the objects and classes involved in the scenario and sequence of messages exchanged between graphical manner. The objects needed to carry out the functionality of the scenario.

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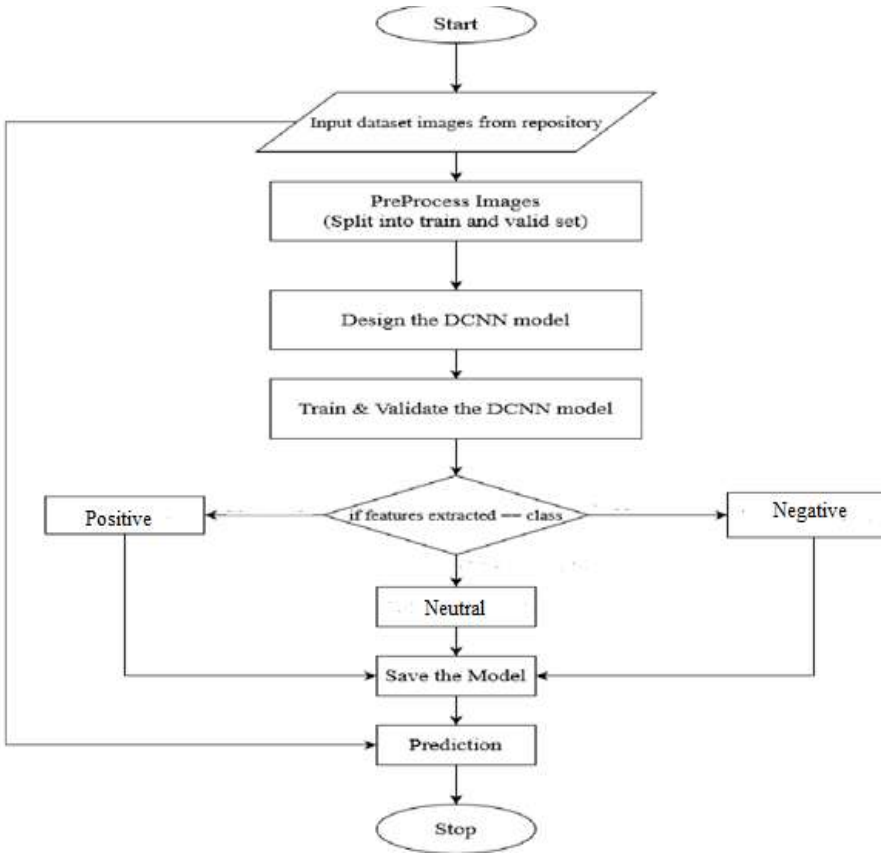


**Figure4:** ActivityDiagram

The above figure (fig. 4) shows the activity diagram for predicting human emotions. An activity diagram isanother important diagram in UML to elucidate vital aspects of the system. Activity diagram is additionally aflow chart to represent the result from one activity to a special activity. The activity is typically described as anoperation of the system. Therefore, the control flow is drawn from one operation of the system. Therefore,thecontrolflowisdrawnfromoneoperationtoaselectedone.It'sintendedtomodelcomputationaland organizational aspects.

## IV. RESULTS AND DISCSSION

The results of this prototype are shown within the type of tables and screenshots. The following are the results. TensorFlow is a computer vision technique used for object detection. It helps in detecting, locating and tracking an object from image or a video. It is a free open-source software library used in machine learning.

Todetectfacialemotions,wearevisitinguseTensorFlowlibrary.This processconsistsofsixsteps:

1. Process the image.
2. Create placeholders(test/train).
3. Initialize parameters
4. Define forward propagation.
5. Compute accuracy and loss.
6. Combine all the functions and create a model.

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```
train_dir = 'data/train'
val_dir = 'data/test'

num_train = 9307
num_val = 1155
batch_size = 64
num_epoch = 35
```

**Figure5:**Declare batch size and number of epochs.

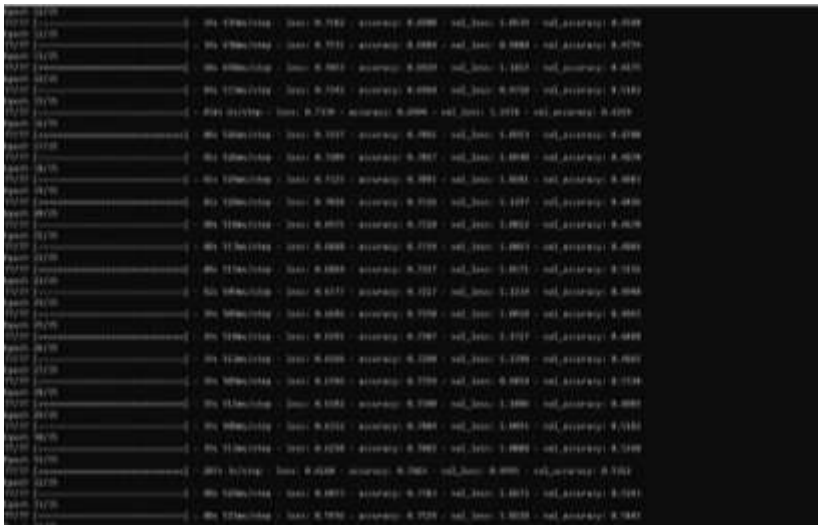

**Figure6:**Epoch analysis is processed.

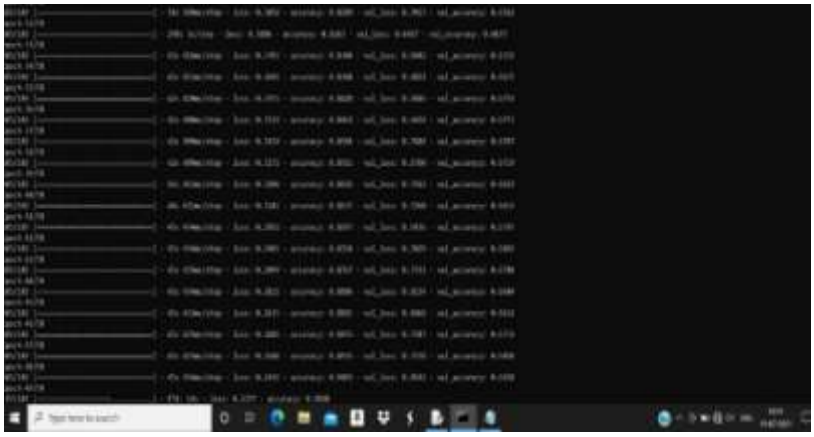

**Figure7:**Accuracy and loss percentages are obtained.

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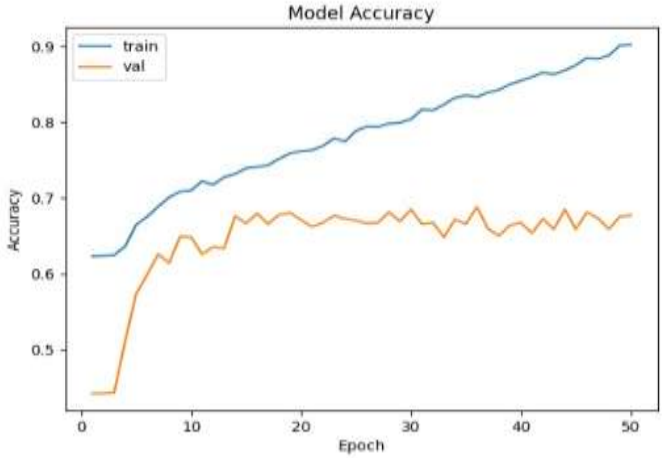


**Figure8:** Accuracy vs Epoch graph is obtained.

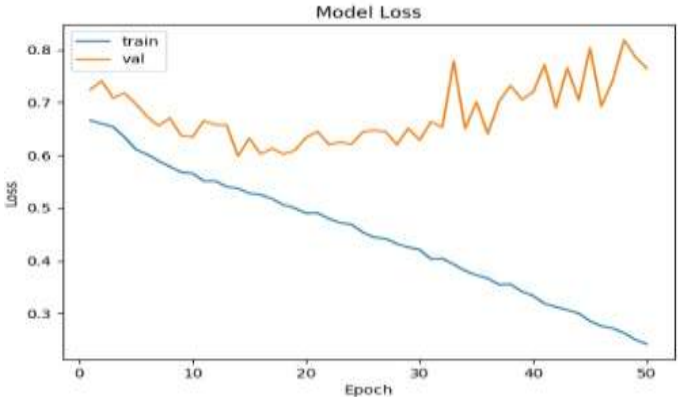


**Figure9:** Loss vs Epoch graph is obtained.

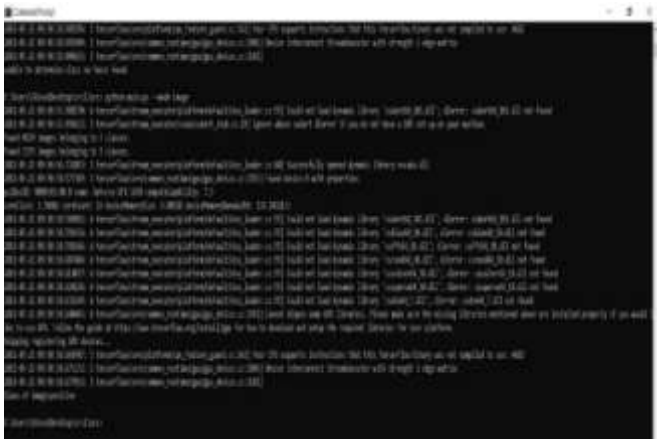

**Figure10:** The emotion in the image is displayed. (i.e., positive or Neutral)

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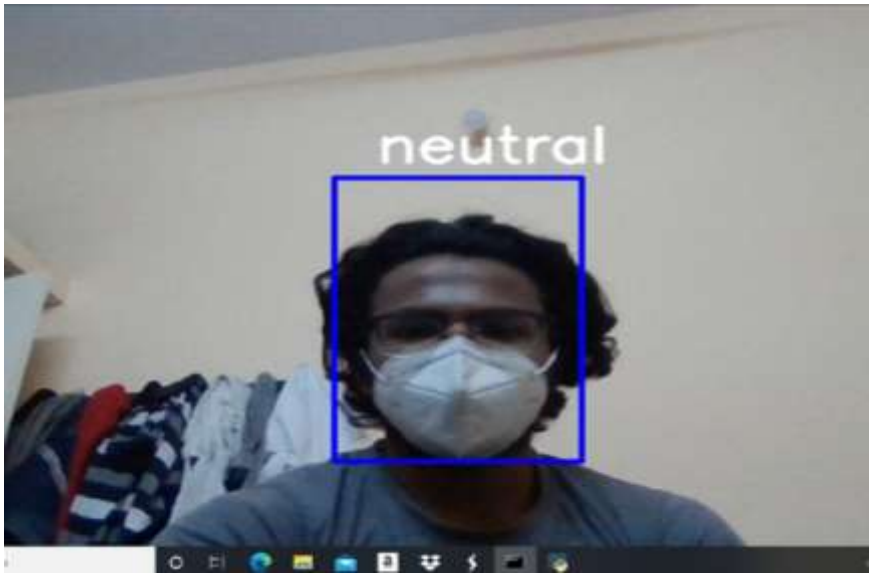


**Figure11:**Identifying and displaying of emotion in live meeting or video.

**Table1:**Testcases

| Steps | TestAction | Results |
|---|---|---|
| Step1 | Openthewebsite | Websitei.e.,homepageisloaded. |
| Step2 | Uploadtheimage | The image isuploadedintothetextbox. |
| Step3 | Clickonsubmit | Loadsthepageaskingusertoenterthenamefor displaying. |
| Step4 | Enterthenameandsubmit | Pop-upcloses andopens a new page. |
| Step5 | Can continue or change to live mode | It starts processing the image/video using CNN model. |
| Step6 | Clickontheclosebutton | Loadstheresultspageand shows the class of the image/video. |

## V. CONCLUSION

We have proposed a system, which will be very useful in predicting the human emotions with pictures of people wearing masks and give accurate result. Here we give RGB images as the input to our system which helps in identifying the emotions better. Specifically designed to find whether the emotion belongs to the class Positive, neutral or negative. Negative and Neutral classes are very difficult to predict. Hence, we are training our algorithm to predict it better than the existing system. We developed few Deep Convolution Neural Networks and trained the DCNN models.

The GUI developed has an option to load Adam model to use for prediction. The loss is very less for Alexnet (adam) compared to other models and moreover, adam optimizer is the extension of classical stochastic gradient and also has the RMSProp features, so we prefer Alexnet(adam) to use for predicting if a single model has to be used. And the GUI that loads the model automatically loads the Alexnet(adam) model.

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