DEMONSTRATE THE PERFORANCE OF SEVERAL DEEPLEARNING MODELS FOR REAL TIME FACIAL EXPRESSION AND EMOTION RECOGNITION

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ABSTRACT

In general emotion is considered as one of the important aspects in various fields such as biomedical engineering, psychology, and mental health. Hence this is mainly used for diagnosis of human brain and psychological disorders. Till now lot of research work is conducted in order to identify the emotions from real time facial expressions but no work is completely achieved in finding all the 7 emotions from human face. Hence this motivated me to develop this current application in which we try to use several deep learning models on emotion detection from either still images or from video sequence and then check the ability of each and every individual model. The proposed system can effectively and efficiently recognizes emotions from the facial expressions of the individual user. Here we try to use several pretrained models and customized model for finding the accuracy and compare the performance of each and every model individually based on this validation loss and accuracy. By conducting various experiments on our proposed models by taking a sample facial images dataset collected from KAGGLE website and try to train the system to detect the emotions accurately.

Key Words:

Pre-Trained Model, Emotion Recognition, KAGGLE, psychological Disorders, and Facial Expressions.

I. INTRODUCTION

Actually there are several factors which influence the features like physical characteristics, sex, genes, and age for emotion detection. In some cases may be all these features may affect the emotion recognition or some features may affect the emotion recognition by predicting wrong emotions[1].

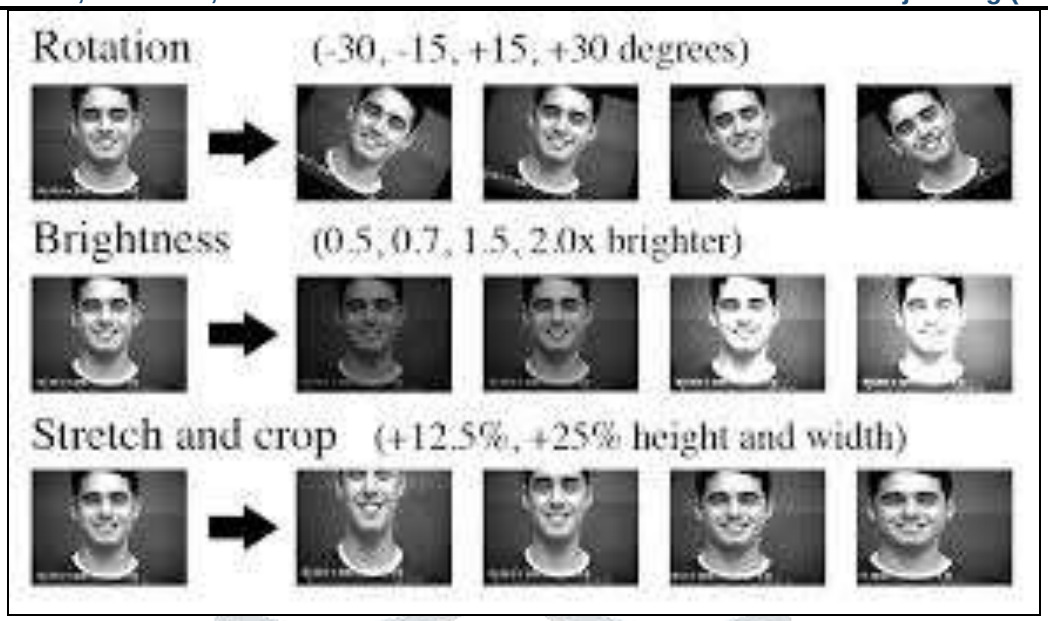


Fig 1. Represent Several Factors which effect on Effective Emotion Recognition

From the above fig 1, we can clearly find out there are multiple factors which are effecting the emotion detection in real time environment. All these problems are due to because of low resolution camera pose or due to environment changes or sometimes photos which are captured on moon light[2]. Hence we need to do some pre-processing steps on those images and convert the initial input image into pre-processed images which can work on any environments like dark light, bright light, moon light, sunlight, face with spectacles, etc. Hence this is becoming a tedious job for the end user to operate the model on facial images[3].

In general the emotion detection system has 4 stages of processflows:

1) Face Detection
2) Preprocessing
3) Feature Extraction, and
4) Emotion Recognition

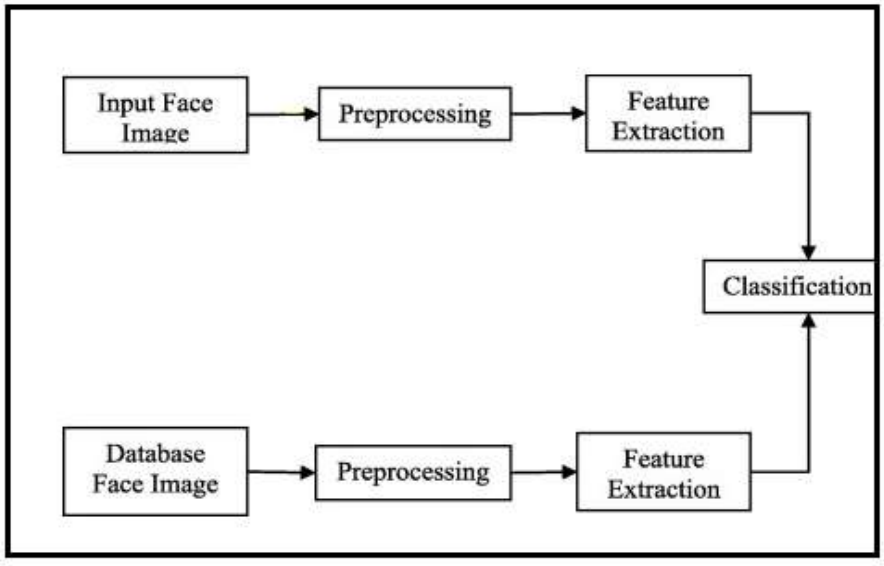


Fig 2. Represents the Basic Flow of Emotion Detection from Facial Expressions

From the above figure 2, the facial expression recognition and emotion detection is categorized in the following way: Initially the user try to load input as one facial image and the image is pre-processed for getting unique size and features. Once the image is pre-processed we try to acquire the features which are present for that image and now all the features are kept in the test folder to match this with already pre-loaded images which are present in train folder. Now both the images are applied for matching and now we try to classify the emotion from facial expression.In this current article we try to use the ability of deep learning algorithms or models to detect the emotion of human and try to find out the inner feeling of the human based on the emotions [4]. In this proposed article we try to use some pre-trained CNN models like Inception V3 model, VGG19 Model, RESNET 50 and Hybrid CNN model for finding the accuracy[5]-[9].At the end we try to find out the different accuracy for every individual CNN model and our proposed Hybrid CNN model gives more accuracy compared with several pre-trained models which are present in the deep learning literature.

2. EXISTING SYSTEM & ITS LIMITATIONS

In the existing system, there was no concept like classification of all the various classes if expressions and emotions from human faces. In the existing system almost all the research is going on either emotion detection for 2 or 3 expressions and but no model is designed to check all the 7 emotions from the human facial expression recognition. Also in the existing system there is a great limitation in classifying the human faces accurately and there is no proper label assignment for the detection emotions.

LIMITATIONS OF THE EXISTING SYSTEM:

In the existing system the following are the main limitations that are available

1. The existing model can classify only few emotion classes.
2. The existing systems are failed to classify the facial images and then try to find out the emotions based on different types of poses.
3. There is no accurate model to classify the real time facial detection based on all seven emotions.
4. All the existing models are having less accuracy to train the images and identify the emotions.

3.PROPOSED SYSTEM & ITS ADVANTAGES

In this proposed work we proposed an application which can be used for prediction of expressions of both still images and real time video. However, in both the cases we have to provide image to the model. In case of real time video the image should be taken at any point in time and feed it to the model for prediction of expression. Once the image is captured from the video sequences the system will automatically detects face using HAAR cascade then its crops it and resize the image to the specified dimension and give to the model for prediction. The model will generate seven probability values corresponding to seven expressions. The highest probability value to the corresponding expression will be the predicted expression for the image.

ADVANTAGES OF PROPOSED SYSTEM

1. The proposed scheme is very accurate in classification of images
2. The proposed system gives accurate recommendation of Youtube videos based on type of emotion.
3. The proposed system is capable of classification of facial expressions accurately and try to recommend in efficient manner.
4. The proposed model can able to distinguish all the 7 classes of human emotions accurately and then classify the emotions accurate manner.

4. MODELS IMPLEMENTATION

Here in this section we try to discuss about the proposed CNN models which are used for emotion detection from facial expression and try to find out which model gives more accuracy compared with several pretrained CNN models. In this current article we used nearly 3 pre-trained CNN model and 1 model we applied customized logic related to emotion detection. They are as follows:

1. Inception V3 model,
2. VGG19 Model ,
3. RESNET 50 and
4. HYBRID CNN model

1) INCEPTION V3 MODEL

This is the primary model which is used for image recognition and identifies the expressions from the human face. Almost this can give accuracy of nearly 30 percent of image net database which is present in the google. In this proposed application we try to test this model on facial expression recognition dataset which is collected from KAGGLE and then test the accuracy of the model. By conducting various experiments on our V3 model, we got accuracy of 38 % for detecting 7 emotions from human facial expressions.

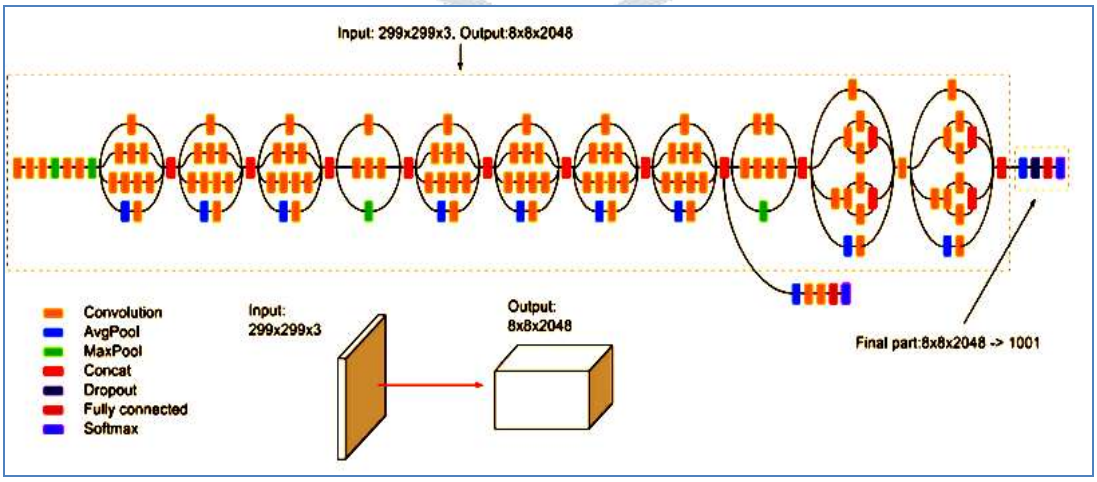
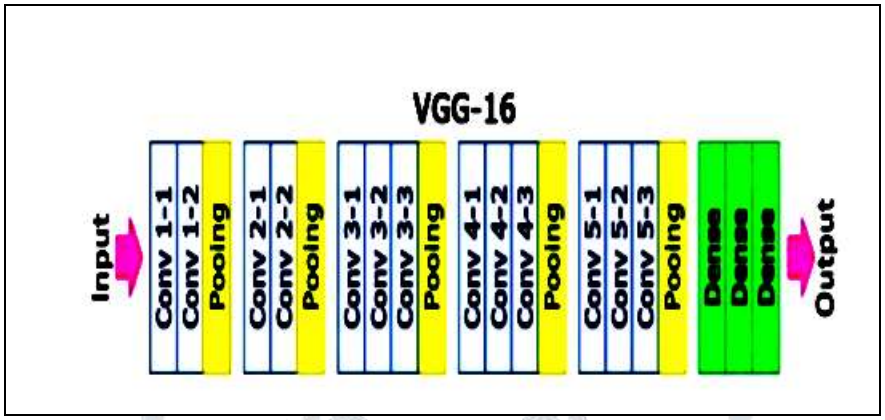


Fig 3. Inception V3 Model

From the above Fig 3, we can clearly identify the architecture of Inception V3 pre-trained model for calculating the emotions from facial expression.

2) VGG 19 MODEL

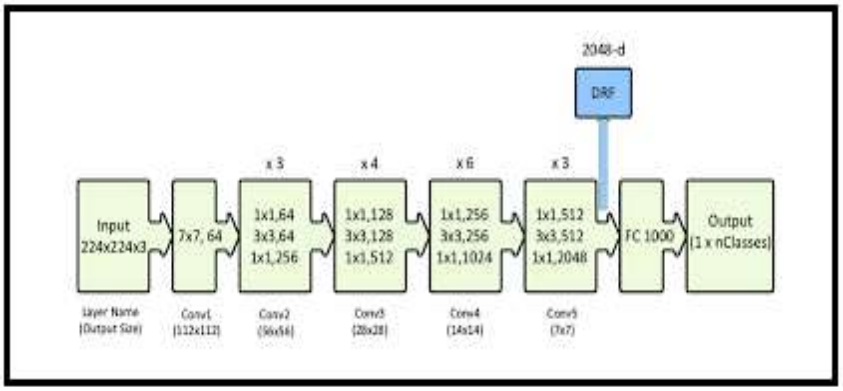
This is also one of the best pre-trained models which can identify the emotions from human face. In this model we are having 19 layers and the image is divided into several internal layers and this is pre-processed internally for model verification. The proposed model gives accuracy of nearly 20 % when tested with the facial expression recognition dataset collected from KAGGLE.



In this proposed application we applied VGG 19 on given dataset, so that we got accuracy of 20 percent.

3) RESNET 50 MODEL

ResNet-50 is one of the CNN models which are processed up to 50 deep layers compared with all other models. In order to get very accurate result this model is trained on several millions of images and can identify the emotion accurately.



In this proposed application we used RESNET 50 CNN model and then found that accuracy of 24 % with 5 epochs

4) HYBRID CNN MODEL

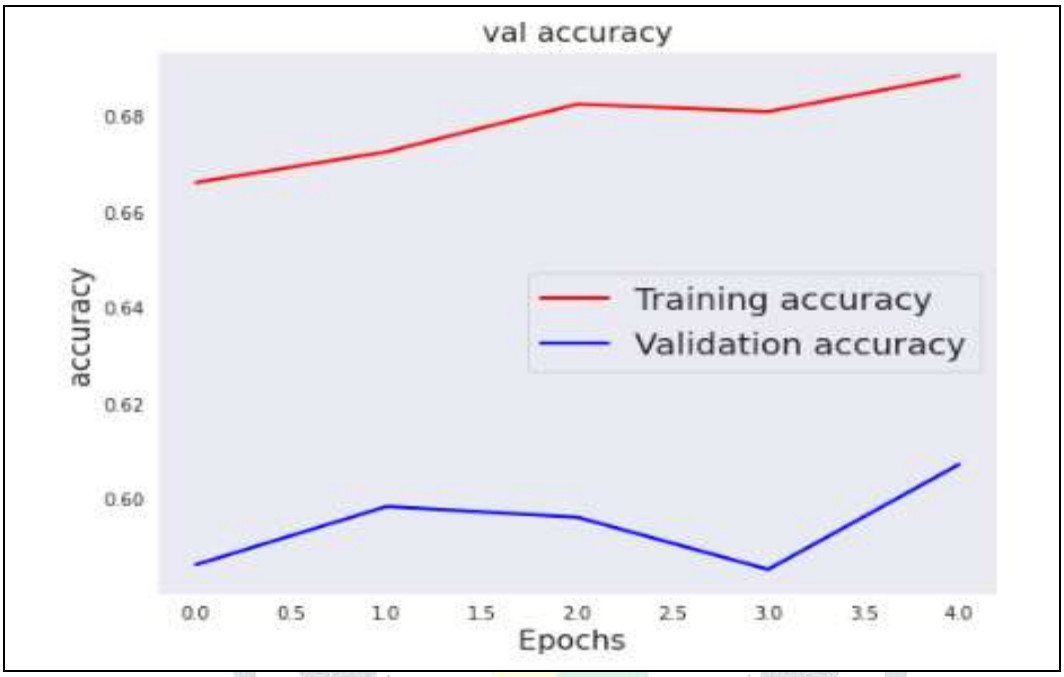
Here we try to apply some customized model by taking sample CNN architecture and adding some user defined functionality to test the accuracy of emotion detection on some facial images. In this proposed hybrid model we try to enhance the number of deep layers and try to check the efficiency and accuracy when we try to

increase the number of epochs.Finally we try to apply the facial expression recognition dataset on this hybrid model and find out that accuracy is up to 60 percent.

5. RESULT ANALYSIS

In this section we try to place the accuracy graph by comparing the training and validation accuracies on several models and then check the performance of proposed hybrid model corresponding to the facial expression dataset.

PERFORMANCE ACCURACY GRAPH



From the above graph we can clearly see that training and validation accuracy plotted on line graph.And here we can see the validation accuracy is almost achieved upto 60 percent for the current Hybrid Model.

6. CONCLUSION

In this we for the first time implemented multiple CNN models to detect emotions from human facial expressions and try to find out which one is best suited for emotion detection. Here in this proposed application we can able to detect the seven types of emotions very accurately from sample data set images or from video file. The hybrid model generalized the results from the training set to the testing set better than pre trained models present in deep learning. The results of the emotion detection algorithm gave average accuracy up to 60% for the proposed input dataset with number of epochs. As a future work we can able to extend the same work on some new models and then increase the accuracy as well as try to add some more new emotions.

7. REFERENCES

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