FACIAL EXPRESSION RECOGNITION

Shubham Sinha[1], Rahul Kumar[2], Shital Nalawade[3], Deepak Ray[4]

[1, 2, 3]*Department of Electronics and Telecommunication, Bharati Vidyapeeth*
Deemed University College of Engineering, Pune
[4]*Assistant Professor, Department of Electronics and Telecommunication, Bharati Vidyapeeth*
Deemed University College of Engineering, Pune

---***---

Abstract – *The objective of this paper is used to detect the facial expression of faces. The facial recognition is based on the emotion of the human which is shown in the face at the particular time. As we know that face expresses human feeling and mental situations. With the help of the opencv package and machine learning we are going to capture the expression in the particular image to find out either they are happy or sad. And if we want to use it for many other kind of expression we can be able to find it out. Through this paper our main purpose we are going to show we can be able to capture the facial expression and with the help machine learning we can be able to detect the expression of any human being.*

1.INTRODUCTION

The human can express their feeling either by saying something or by their face expression. In this topic we care about the face expression. Yaah it`s true that every time the face expression shown by the person does not tell about their right feeling from inside. But in this project we don't want the inside feeling but what is shown in the face we are taking it to the true feeling. Also only the human being in the planet has many kinds of expression not other living things like animals, bird.

Human can be able to understand the other human various expression with their intelligence. But if the machine can be able to recognize the same then it will be the part of making the other super human. This method can also be used for many engineering fields such as artificial intelligence, computer vision robotics etc.

In this project we are simply going to capture the only two facial expression smiling and not smiling. And for making of this project we are going to use   Ada Boost Method (haarcascade).powerful machine learning tool is been used in this project known as scikit learn(sklearn).and also we used the computer vison tool known as opencv.

This software is built with very high accuracy. And this software is completely built and written in python programming language.

Fig-:different emotion of the human faces

STEPS OF MAKING THIS PROJECT

The system constituted many domains and thus the plan for the project development was divided into four major categories:

1- First Section-taking the 500 images of the faces of human and classified into two categories and consider (smiling as 1,and non-smiling faces as 0)

2- Second section-From the first section we take the result into account(i. e dataset classification into two different categories of 1 and 0) and train a linear support vector machine classifier and takes any other image from testing set of the dataset to verify the integrity of the classifier.

3- After training the classifier in second section ,we take the classifier and applies to the video frame from the camera, after the detecting the face in the frame using frontal face haar-cascade classifier.

4- And at the end all the function are been coupled together and we developed the python based Graphical user interface.

2.1 Classifying Dataset & Storing Results .xml File

Taking 500 images of the human face and and make their two groups in one of it it will be smiling and other one will be non-smiling and result of it should be saved in .xml file and the bar graph is plotted so as to know how many of the 500 faces are categorized as smiling and how many are non-smiling.

- Datasets should contain 500 images of these subjects in various facial expressions with smiling and non-smiling.
- And the classifier depend on these data set show at the time of training we should be very careful in separating them into two categories.

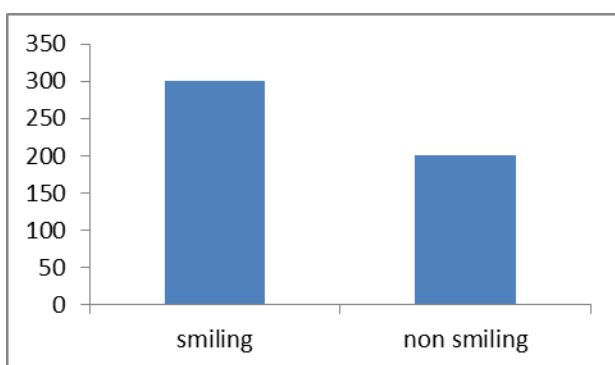
Fig-: datasets of different faces

Fig-:shows the bar graph as plotted

2.2 Training the Linear Support Vector classifier

In the previous section we have taken the images of faces into datasets folders and clustered the datasets into two different groups and saved the .xml file as a result. we have also plotted the graph of total numbers of images in each categories and we have also plotted each category separately. Now this section we will compute the k-mean cross validation method on the results and train a support vector classifier (SVM) based on this.

Linear support vector machine (Linear SVM) classifiers are a set of supported learning methods used for classification and/or regression. This section will train the classifier and will test the classifier with sample test data.
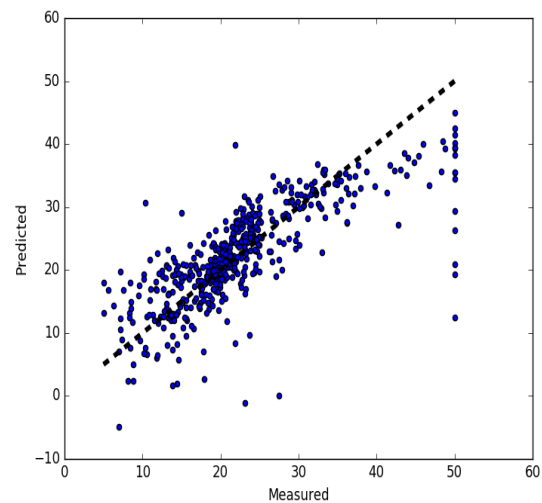

Fig-: shows the linear regression

- In this graph dotted in the blue color represents the data .
- And the line drawn between them at the center from the majority numbers of data
- The data point not lying in the line is making of the prediction
  $$Y=mx+c$$
- The equation is of the linear regression .
- Where y and x denotes the x term and y term
- C denotes the constant
  The slope of the line is known as the gradient and is represented by m

2.3 Face Recognition and Emotion Prediction Using trained svm classifier

Since the classifier has now been trained .it was the time to test the classifier on the live video where user can actually see if the machine has learnt it's objective or not.
To determine this, or specifically to apply our svm classifier to the frame ,we have detect the face in the frame . This is

where we use the haar cascade classifier which detects the faces in the frames by applying the haar cascade transform.

once we detected the face successfully next step is to extract the face out of the frame & convert it to size same as the size of images in the database. this step is extremely crucial in order to be able to apply our classifier to the frame. If this step is not done correctly, then the emotion recognition won`t be successful

2.4 Output-:

I have uploaded the testing screenshot the testing screenshot of the face detection as well as the emotion detection in this step which was done with optimized co efficient.

2.5 Graphical User Interface for the application
The GUI of the application is build up in the python and the packaged used is Tkinter. In the graphical user interface we

are going to have the 500 images which is been used for the training. and at that we are trained the classifier. that image capture is smiling or not smiling
And also the Graphical User Interface consist of the trained data results which on pressing it is going to open the video frame and the detection of faces and its smiling or not smiling is going to be shown.

3. CONCLUSION

Through this paper we performed and built up an application for facial expression recognition. Through which we get to know about how to train the system and use the linear regression algorithm. And the best thing about this project is to we going to learn about the machine learning .here we use opencv computer vision for detecting the faces but for extracting the emotion we used machine learning methods and here also we used the statistical recognition. This part of the project is going to be used In future in various fields such as computer vision, artificial intelligence and robotics have mention about only two features but we can used it for as many facial recognition. This process can be used in the object recognition even. Yaah its true that error can be raised in this process .but even with some error this application accuracy is very high.

4. REFRENCES

1. https://pythonprogramming.net/image-recognition-python/
2. https://pythonprogramming.net/machine-learning-python-sklearn-intro/
3. https://pythonprogramming.net/tkinter-depth-tutorial-making-actual-program/
4. https://pythonprogramming.net/loading-images-python-opencv-tutorial/