Project

Emotion based “Music Player”

1. Abstract

In the form of the image integral, this primitive feature accelerates the performance of the Viola-Jones algorithm. However, the robust feature is necessary to optimize the results of emotion recognition. Previous research has shown that fisher face optimized projection matrix in the low dimensional features.
This feature reduction approach is expected to balance time-consuming and accuracy. Thus we proposed emotion recognition using fisher face-based Viola-Jones Algorithm along with which we are planning to use the data for “some” use. In this study, PCA and LDA are extracted to get the fisher face value.
Then fisher face is filtered using Cascading AdaBoost algorithm to obtain face area. In the facial area, the Cascading AdaBoost algorithm re-employed to recognize emotions. After a studying, we can conclude that the fisher face-based viola-jones algorithm recognizes facial emotion as more accurate than the viola-jones algorithm.

IN A NUT SHELL: <ABOUT THE PROJECT PERSPECTIVE>
This project is basically built up on the idea of using emotions of a person. Here we present only one among many applications of usage of emotions “The Emotion Based Music Player”. It plays music based on the emotions of a “single” person observing the screen.

2. Introduction

The Viola-Jones algorithm is often thought of as a rapid processing for face detection In this algorithms, AdaBoost algorithms classify the rectangular features in "cascade" stages.
The rectangle feature is computed rapidly using an integral theorem every shifting of sub-window. In the form of the image integral, this primitive feature accelerates the performance of the Viola-Jones algorithm Despite image integral can be calculated quickly, the representation of integral is less responsive to changes in face in some specific angles.
In emotion recognition research, image integrals cannot identify a problem optimally. Their results show that proposes the Viola-Jones algorithm only reaches the accuracy in 70%. The emotion can be performed using, gestures, speech, control, and facial expression.
The emotion is divided into the positive emotion and the negative emotion. The emotion is also divided into neutral, happiness, sadness, anger, fear, surprise and disgust.
Fisher faces or named as fisher linear discriminant is the combination of Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA).
PCA is an unsupervised algorithm, whereas LDA is an unsupervised algorithm.
PCA keeps the distribution information but cannot project the optimal matrix. LDA project the optimal matrix under Fisher criterion, but the dimension of the input space is greater than the number of training images, thus it cannot be applied directly.

Pseudocode of Fisher Face-based *Viola-Jones Algorithms* for Facial Emotion Recognition:

```
Input: Face image
Output: Emotion{Interest,Bored}
for i ← 1 to num of sub window's shift do
 for j ← 1 to num of cascaded stages do
   for k ← to num of filter do
    Calculate We fisher face Using Equation (6)
    update wface using Equation(8)
    update wemotion = Equation (8)
    if we < wface then
     break for k loop
    elseif we < wemotion then
     output = bored
    else
     output = interest
    end_if
   end_for
  end_for
 end for
```

3. Literature Review

264 million people of all ages suffer from depression. People want some one to help understand their emotion without being told. The latest study shows 90 percent of the population listens to music on average, they do so 32.1 hours a week. So we used Machine Learning approach to solve this problem to some extent. (Again, there are many other ways to approaches and extended versions how this could be more better.)

4. Proposed System and Result

Problem Definition: Some of the big tech giants use history to predict and influence our Minds to promote Things beneficial to them, and make us feel like they are very important to use and we must consume resources by them.

So basically the objective is to build a system more or like the same.
But with a Slight TWIST:

"NO MORE INFLUENCE of THEM on Our MINDS, in taking decision about WHAT WE SHOULD CONSUME AND WHAT WE SHOULD NOT..."

Some Explanation of the Problem: Basically the idea is to use the current Emotions of the consumer and promote things they like as per there mood and emotion and not as per any propaganda.
By the above said arguments its not hard to see that the revenue model this system would fetch would be too low infront of "them", but it's a myth, COMPLETELY!
Rather its observed as a part of research or even its not hard to feel that if some person Is shown what they need at the right time and at the right moment they appreciate it Much better, due to the fact that Humans Posses *"INSTANT GRATIFICATION".*

THE WHOLE PROGRAM FLOW:

Collecting data

Facial expression detection in Fisherface works with the help of trained models. Reason behind this is to allow user to take dataset according to their use.
Suppose if we take a huge amount of dataset of around 25-30k it will give nice accuracy no doubt but if the situation is like that the user of the devices are a few people. Now in such condition if we take some precise dataset with around 400-450 images as input releted to the user then it will also give good accuracy with the benefit of less amount of dataset and less storage on memory to operate.
As well as small memory of data give output fast which result in quick response time. Here we first tried with Cohn-Kanade dataset then we made some classification in the as our need make it to train our model.

Loading and saving trained model

For training, We have used Fisherface method of cv2 library. To save the model for later use we have implemented .save method. Now at the detection time first we have load model in memory using .read method.

Haarcascade model

Haarcascade model is precise face detection trained model which is provided by Open-cv. It return the co-ordinates in terms of (x, y) at (left, bottom) of face frame and it's width and height from those coordinates.
As here in the .detectMultiScale() method it is capable of detect multiple faces and it return an array of all the faces(co-ordinates) as an element.
The arguments has set according to the threshold what we need for our checking purpose. We have set it such like it doesn't affect our model accuracy.

Result Calculation

In our model we have not stick on one image for testing, While the code will run it will take around 10 images in a short time(1-2 sec) and for all those images it will compute result and according to the average value of that it will give result. Apart from that we have make two codes one work on single face at a time while another work with multiple faces in the image.

Machine Learning

Fisherface ML algorithm Fisherface algorithm is an algorithm which work on the basis of LDA and PCA concepts. Linear discriminant analysis (LDA) is a supervised Learning method of machine learning. Now supervised Learning is that where we use such data whose answer is also given to the model to learn it. It work on the concept of dimensionality reduction. Which reduce

the execution time among classification. Principal Component Analysis (PCA) is a one kind of conversion from correlated variables to uncorrelated in the form of mathematical values. It is mostly used for the observing data and from that by some probabilistic calculation generate models. The flow of Fisherface is like it takes classified images then it will reduce the dimension of the data and by calculating it's statistical value according the given categories it stores numeric values in .xml file. While prediction it also calculate the same for given image and compare the value with the computed dataset values and give according result with confidence value.

Resizing images

Whatever the image we have chosen for dataset it mostly related to the size which can give an precise output. The size is chosen such like the model can able to easily distinguish face from image by haarcascade model. And the size what we get from real time scan is not always same as data (very less difference) so, We resize it to the exact model data size. In our case we have chosen 350*350. Here In this method, we have implemented the cropping of image by given parameters of haarcascade by clahe_image[] and use of cv2's method .resize() to the given size. Finally, We have stored those images in dictionary and

after some count(=10) take it to check result.

Gray scaling images

It was the need for the method and because of it's contrast and shaded face, it result in benefit for algorithm to get output.

Face detection

As the given in the code grab_face() methods uses to get the images and do all operation and finally return cropped, grayed face value in dictionary.

Train and predict methods

This code is use to get prediction and confidence value for given amount of image. Then get the max function with obtained output and final result is shown to the user. Playing music

Detected emotions

We have implemented the linking of python with javascript through eel library. Which provide us the privilege to access python methods from js as well as vice versa. Here the striating flow will be in python code as the library is implemented in python then it transfer the control to html, JS. And according to the result we show emoticons. **Sad happy angry neutral**
According to which we can classify emotion directory for playing song we have chosen this 4 emotions. Methods for playing songs

In JavaScript file we have implemented too much methods for the switching of song. 1.Queue 2.Based on Emotion 3.Random

In the first one as queue works it has been implemented. In second one we call python code to get emotion from user's facial expression and according to that chosen next song which is also randomly and played it. In third one we directly used random function and all the methods are dynamic it can handle as change in number of songs accordingly.

HTML, CSS and JS concepts for online music player.ss

As we know the css give a great look to communicate and through JS we can interact with user and not look like complicated program run at console and it also give user privilege to choose any song to play.

5. Conclusion:

Its seen more and more depressed people are involving into social media platforms, for getting rid of their anxieties and stress, BUT the FACT is that they are actually getting under a TRAP of the fancy “ONILNE BUSSINESS MODEL”. SO this SYSTEM focusses on the very point that PEOPLE SHOULD BE THE ULTIMATE DECISION MAKER and NOT Some FANCY “They” 😊

Scope:

The System could be a game-changer if its capitalized int the right way for some suitable definition of Capitalisation.

To elaborate the definition, it doesn’t have to mean that would need a huge starting cost but its basically promoting the idea of Being CROSS-PLATFORM seamlessly.

A WEBAPP, A MOBILE APP, // This is just a primitive scope of this idea which any one can simply think of , and is very boring. ….AND MORE CAPITALISATION BRANCHES MAY INCLUDE, MUSIC BREAK BOOTHS (just like Food-Joints seen on highways) This Could be a place where people can sit alone just by generating a token and having a nice cup of tea in their hand along with their preffered choice of music played just by observing the emotions and their exhaustion level, again their lies great potential for a business investor to promote things which help multiply their business For example, Selling refreshments, promoting advertisements, offering subscription plans to loyal consumers. Loyal, because its observed on statistical basis that people tend to be more loyal to the things which give them “INSTANT GRATIFICATION”. Code EDITOR JUST LIKE EVERY BEGINNER PROGRAMMER WOULD LOVE to USE.. A GREAT Partnership Potential is possesd in this Approach FOR PROGRAMMERS. Usually its observed that new programmers have a nice fancy of listening to music while coding OR even its observed that Some People do feel nice to get a bit of relaxation using power of music so as to get better and nicer Programming Solutions to Complex Problems → WHICH IS CALLED AS HEALTHY PROCRASTINATION. SO while such people Procrastinate

about a better solution to a complex problem in their heads, a SMART BUSINESS IDEA would be to provide an extensions to their CODE EDITORS, which would make them not let them wasting time in searching some playlist here and there on 1000's of websites, Rather providing directly on their coding platforms. Surely this would fetch a nice breed of people induldged in such activities. AGAIN THE SOLE IDEA OF MAKING THIS PROJECT WAS TO USE THE POWER OF EMOTIONS in some way. SO MUSIC WAS CHOSEN. BUT THE IDEA COULD BE VERY WELL EXTENDED TO USE ON SOME SHOPPING SITES TO PROMOTE BRANDS PEOPLE ARE LOOKING FOR… Like, Rather than only using the previous knowledge of the consumer why not complement it along with the use of their Current mood and recommend things they want and as per mood reject some promotion ideas and say yes to some other promoting ideas. THERE ARE COUNTLESS EXAMPLES MORE, that's why SUITABLE CAPITALISATION definition was told at beginning.