Face Recognition using KNN

G CHIRAG Computer Science Pes University Banglore, India

HITHESH PATEL Computer Science Pes University Banglore, India

SEETHARAM U N Computer Science Pes University Banglore, Indi

Abstract

Face Recognition is a computer application that is capable of detecting, tracking, identifying or verifying human faces from an image or video captured using a digital camera face recognition system is a technology capable of matching human face. It captures, analyzes and compares patterns based on the person's facial details. The face capture process transforms analog information into a set of digital information (data or vectors) based on the persons facial features. The face match verifies if two faces belong to same person.

I. INTRODUCTION

Along with the rapid development of technology, it needs to be balanced with appropriate security enhancements so that users are comfortable with the personal information on the technology. Face is one of the most popular types of biometrics at the moment. The face dominates as biometrics which is most increase in the next few years, which is followed by
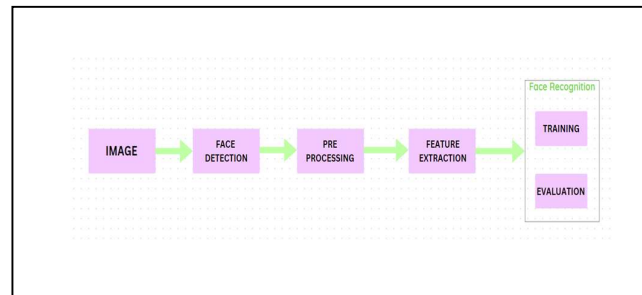
multimodal, iris, and fingerprint. Biometrics is a personal identification system that is very different from one person to another. This difference makes face as a biometric that is widely applied besides is easily acquired. This paper of shooting faces in unrestricted environments usually contains significant variations in poses, which dramatically reduce the performance of algorithms designed to recognize the front face. This study developed a face verification algorithm for the variations in significant facial poses. The study entitled Real-Time Face Detection and Recognition in Complex Back-ground has researched facial biometrics. The PCA algorithm is used to recognize faces efficiently. This rhythm reaches 99.2% for correct facial recognition and a true positive level of 98.8% for face detection. There are three stages carried out in this study to identify face, that is face detection, feature extraction and

classification. Face detection is a face recognition to find the position of the face from an image that will be extracted later. Face detection displays the location of all faces in the input image given, usually in the form of a box divider. Feature extraction is a step to determine the natural characteristics of a face which will then be classified or recognized. Whereas, classification is the process of matching input with data in a database. The face is one of the biometrics that is very easily acquired, namely using a camera. This paper develops face identification using the K-Nearest Neighbor classification method and using feature extraction Principal Component Analysis (PCA). The classification method used is K-nearest Neighbor (KNN). This paper will produce a program using the python programming language, which is used for the purpose of identifying faces.

Objective

To build a face recognition system which will be able to match your face with the celebrity and show the result by indicating the name of the celebrity along with the percentage of match.

II. PROPOSED APPROACH

We have used a supervised learning method, where we provide the training data set with the name as the labels. Then by using KNN algorithm we can test our model with the help of test data set.

The dataset which is nothing but the faces has to be stored manually. Face identification using the K-Nearest Neighbor Method consists of two phases namely the training phase and the testing phase
- o Data source used comes from manual shoots.
- o Image enhancement
- o Feature extraction
- o KNN classification

There are two files one of which will be used to store the data of the face in the form of .pkl file.
The other file contains the code which will detect the face provided that the face has already been registered.

A. Application and Uses

a) Face recognition technology is being used by security firms to protect their facilities.

b) Face recognition helps IoT by enabling improved security measures and automatic access management at home.

c) Schools can use this technology to monitor kids' attendance.

d) The applications mentioned above will be effective when the model is attempting to identify a face that is already in the database.

e) This feature might be applied in specific filters of social media apps that reveal which celebrity the user's face most closely resembles

III. DATASET

The dataset used in our project is the celebrity face which is stored in .pkl file by using module called pickle. We have created new_face.py file whose may purpose to gather the new faces and store them along with their label(here label is the name of the person whose face is stored).
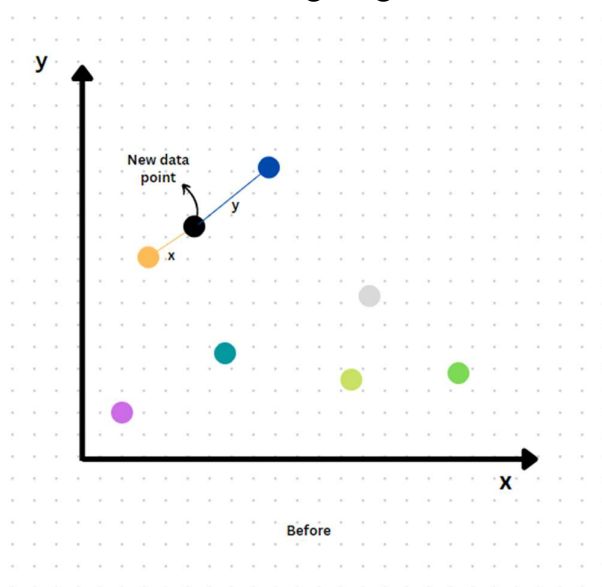
For eg:

Images of Virat and RDJ

IV. MODEL

The model used in our project is KNN(K-Nearest Neighbors). Initial dataset is used which have images along with the name as their label.

Suppose we have n number of images along with their label(name) and we have a new face to categorize it to one of the images we use KNN.

Consider the following diagram

In the above diagram consider different color dots a different images. The black dot is the new data point as we can see for k =

2 we are considering the two nearest neighbor, as we can see x distance is less when compared to y black dot will be classified as yellow dot. After the classification
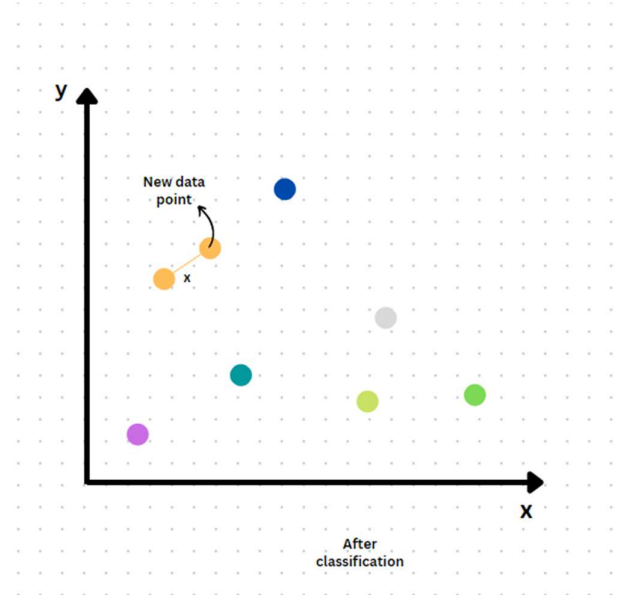
We have used haarcascade to recognize the object in the image here object is the face. It gives the co ordinates of the face in the image and whenever the new face come we have used Euclidean distance to find the nearest neighbor

$$\sqrt{(x1 - x2)^2 + (y1 - y2)^2}$$

By calculating the nearest neighbor we can classify the new incoming face.

V. CONCLUSION

In this paper we have presented an experiment for face identification using the KNN method. KNN is one of the simplest algorithms that can be used for classification. The sources of data come from manual shooting which divided into 30 classes. The face identification using the KNN method consists of two stages, such as the training phase and the testing phase. Based on the results by changing the

parameter k value obtained results are different for each parameter. The value of k greatly affects the level of accuracy of the system. The parameter k value and accuracy are inversely proportional, the greater k value gives the smaller accuracy of the identification system. From this research can be concluded that the higher k value is the smaller accuracy that we get for face identification using KNN.

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