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REAL-TIME FACE RECOGNITION USING OPENCV

[1]Anil Kumar Dubey, [2]Harsh Kumar Srivastav, [3]Harsh Sachan,

[1]Assistant Professor,[2]Scholar,[3]Scholar

[1]Department of Electronics and Communication Engineering,

[1]Greater Noida Institute of Technology, Greater Noida, India

Abstract : In today's advanced world of Tech-era, face acknowledgement system performs an important task in every management and security field. Face recognition can be used for many purposes like for authentication of a particular person, security, identification and has many other advantages. Face recognition is one of the mostly used biometric system for the security purpose. It is one of the mostly used system, in comparison to other biometric systems like finger-print or iris recognition system because of contactless procedure. This system can be used to mark attendance of employee, students or staffs of any company, school or colleges. This system have four processing phases- data creation, data/face detection, face recognition, automatically marked attendance. Data is created by the images of employee, staffs or students. Face detection is done by Haar cascade xml classifier and face recognition is done by a followed algorithm know as histogram-algorithm of binary(0,1) Pattern. The faces aresensed and recognised from the live sessions. The data /attendance is marked in a CSV(comma, separated value) file and gets stored in the local system drive.

***IndexTerms*– Opencv, data-creation, face-recognition, haar cascade, image processing.**

I. INTRODUCTION

The local method to mark the attendance is a monotonous task for faculties in school, colleges and companies and the chances of getting lost of marked attendance are very high. This process is also very time taking and there are major chances for proxies and data loss. In 2017 Okokpujie, Kennedy O designed an attendance system using iris biometric method. Iris biometric attendance system has a slow process rate so later on this problem was overcome by the introduction of face attendance system in the market [4]. In 2018 Akbar, Md Sajid modelled a Face Recognition and RFID Verified System which was very effective but the estimated cost was very high and was not good for the regular [3]. In 2018 Hapani, Smit created an semi-automated Attendance model using Image Processing techniques. Which was a success above other attendance system, but the accuracy of system was low because of old image processing methods and libraries[2]. In 2018, Salim, Omar Abdul Rhman, Rashidah Funke Olanrewaju, and Wasiu Adebayo Balogun designed a attendance management model using facial identification and recognition, which was very effective for large data but also has a very slow processing rate [8].

In this model, a haar-cascade xml file is used , that contains a opencv library modules. At the beginning of project a user has to provide their input(face-image) and later on the attendance will be marked in csv file whenever the user present his/her face to the system for the second time. Because of haar-cascade xml modules the recognition is very fast and effective.

II. WORKING METHODOLOGY AND ALGORITHMS

STEP 1. DATASET CREATION

A web-cam is required to capture images of students or employees. Large number of images of user will be captured in different plane, positions and angles. Pre-processing of these images was done in the next step. All captured images are cropped, so that the region of interest for the image can be obtain. Then, these images are converted to gray scale from RGB form. Later, these images are saved by the provided IDs of respective user in an user defined folder.

STEP 2. FACE DETECTION

Face detection process for this system is done by Haar-cascade XML classifier with scripted opencv libraries. A training process is required in order to make face recognition process smooth. This whole process is known as features extraction. This system used haar cascade training model used is an xml filehaarcascade_frontalface_default.

It is very important to crop the facial features from the face. For cropping purpose a rectangular segment is required. This rectangular segment hasthree parameters to consider- scaleFactor, minNeighbors, minSize. scaleFactor shows image reduction(how much an image can be reduced). minNeighbors and minSizeshws how many cordinated each candidate segmented rectangle should have.

STEP 3. FACE IDENTIFICATION

Face Identification process can be co-relatively divided in three steps-preparing the training model using the data from database, trained face identifier, prediction to identify the gestures of saved face image. Here images of employee or student act as training data , which is present in the database. The images will be assigned with annumerical(integer) label of the user it belongs to. These these images were then used for face identification/recognition. Face recognition feature used for this model is LBP(Local Binary Pattern)Histogram. Initially, the list of local binary patterns (LBP) of entire face is obtained. These LBPs are converted into decimal number and then histograms of all those decimal values are made. At the end, one histogram will be formed for each images in the training data. Later at time of recognition process histogram of the face to be recognized is calculated and then compared with the already computed histograms and returns the best matched label associated with the student.

STEP 4. ATTENDANCE

After face identification, the recognized/identified faces will be marked as name/IDs with the respective day date and time in the csv format which can be open as excel sheet. Faculties can collect the attendance from the drive/disk where the path to the csv file is allocated.

III. DESIGN FLOWCHART

Design flowchart of proposed image is shown inf Figure 1-

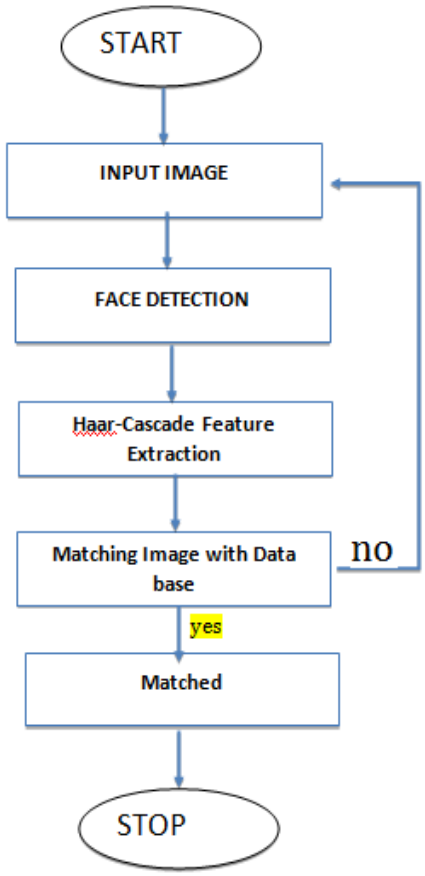

Fig 1: Flowchart of proposed design

IV. RESULTS

In this project the user can interact with the system with the help of command line interface. They just have to mention their name or ID. When the information is taken by the camera/webcam, it will start to capture the face present in the frame and then the system will create a binary file which contain the facial detail in binary encoded pattern and the extension of this binary file is .npy. During the moment of attendance, the client need to show his/her face in the frame and then their attendance will get marked.
Figure 2 shows the captured image(data storing)

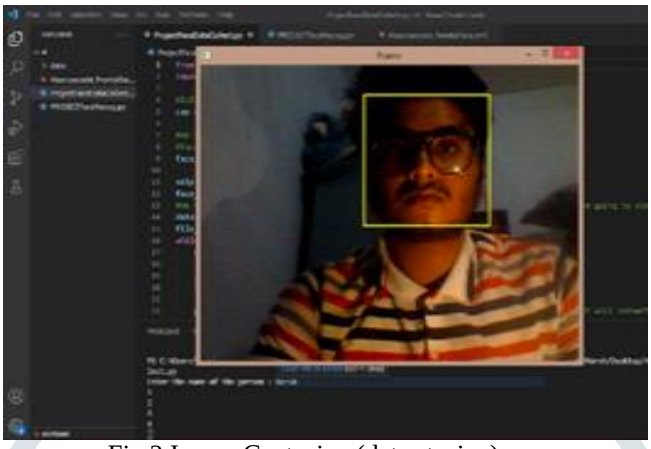

Fig.2 Image Capturing (data storing)

Faculty need to re-run the code to mark the attendance in every session and the attendance can be extracted from the database. The supported format of the attendance will be in CSV (comma separated values) and it can be easily opened in MS EXCEL.

Stored data in .npy format is shown in figure 3-

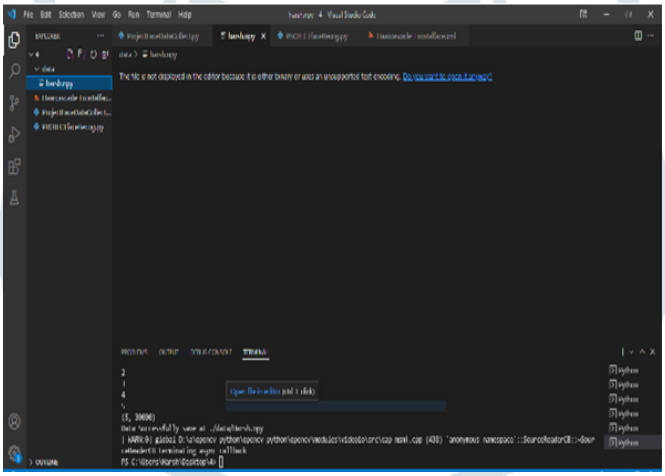

Fig 3. Stored data in .npy format

Image recognition is shown in figure 4-

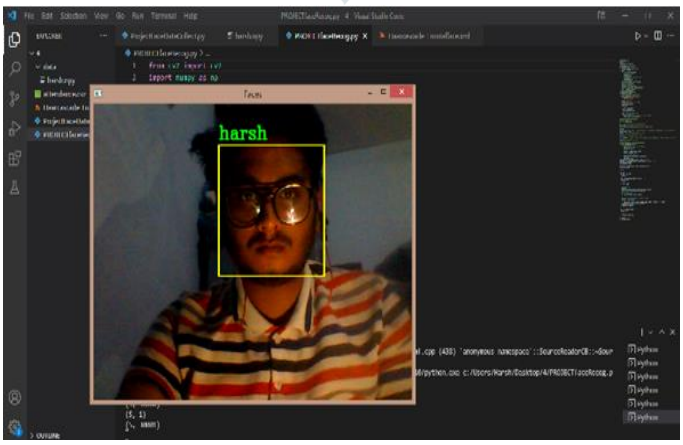

Fig 4. Image Recognition

Recognized image attendance in CSV format is shown in figure 5-

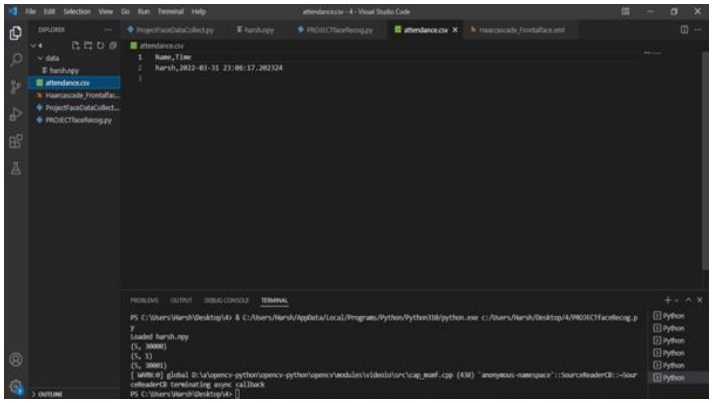

Fig 5. Attendance in CSV format

IV. CONCLUSION

This system is very helping to build an effective face recognition system and also able to create an attendance of identified faces. First it will detect a single face of user with help of webcam and then it will use the stored images in the database to recognize the faces and lastly it will mark the attendance of all the recognized user. This attendance is stored in csv format which can be opened as an excel document.

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