ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION

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ABSTRACT:

Automatic Face Recognition (AFR) has created a revolution in this changing world. It has ensured us with more safety of our data. Smart attendance using Face Recognition comes handy in day to day activities. It helps reducing the amount of paper and efforts for taking manual attendance. It is a process which uses students face to recognize them. It is done by using face biometrics and some other features of face. It is captured and been stored in the memory and it's been processed on to recognize the student by using various algorithms and techniques. In our attendance system, computer will be able to recognize the student whose data has been stored and it marks attendance of that student. Various algorithms and techniques has been used for improving the performance of face recognition. The concept we are using here is Open CV. We are also using Raspberry Pi and camera module to take image and storing them in database. This way the attendance will be automated.

INTRODUCTION:

A facial recognition system is computer app which takes multiple photos of the person and it stores the data of face of that person and when the person again comes in front camera, it is able to verify that person. We give the basic information of student like, roll no., name. The method we are using is Open CV. It takes around 100 images of that person and stores the data. Now a days attendance is a very important part for student as well as teacher of an organization.

In general, the attendance system of students can be maintained in two ways

- Manual Attendance System (MAS)

- Automated Attendance System (AAS)

Manual Attendance System is a process in which teacher calls out for each & every student and individual; marks their attendance. It can be considered a time consuming process still there can be error of judgment from teacher also. Sometimes student may answer for their friend or teacher miss someone., there are a lot of problems in this traditional way taking the attendance. To solve this problem we go with Automated Attendance System (AAS).

LITERATURE SURVEY:

2.1 A Counterpart Approach to Attendance and Feedback System using Machine Learning Techniques:

In this paper,[1] the idea of two technologies namely Student Attendance and Feedback system has been implemented with a machine learning approach. This system automatically detects the student performance and maintains the student's records like attendance and their feedback on the subjects like Science, English, etc. Therefore the attendance of the student can be made available by recognizing the face. On recognizing, the attendance details and details about the marks of the student is obtained as feedback.

2.2 Automated Attendance System Using Face Recognition:

Automated Attendance System using Face Recognition proposes that the system is based on face detection and recognition algorithms,[2] which is used to automatically detects the student face when he/she enters the class and the system is capable to marks the attendance by recognizing him. Viola-Jones Algorithm has been used for face detection which detect human face using cascade classifier and PCA algorithm for feature selection and SVM for classification. When it is compared to traditional attendance marking this system saves the time and also helps to monitor the students.

2.3 Student Attendance System Using Iris Detection:

In this proposed system[3] the student is requested to standing front of the camera to detect and recognize the iris, for the system to mark attendance for the student. Some algorithms like Gray Scale Conversion, Six Segment Rectangular Filter, Skin Pixel Detection is being used to detect the iris. It helps in preventing the proxy issues and it maintains the attendance of the student in an effective manner, but in one of the time-consuming process for a student or a staff to wait until the completion of the previous member.

Face Recognition-based lecture attendance system the faculty member of the institute. This also reduces the chances of proxies in the class, and helps in maintaining the student records safe. It is a wireless

biometrics technique that solves the problem of spurious attendance and the trouble of laying the corresponding network.

This paper proposes that the system takes the attendance automatically recognition obtained by continuous observation. Continuous observation helps in estimating and improving the performance of the attendance. To obtain the attendance, positions and face images of the students present in the class room are captured. Through continuous observation and recording the system estimates seating position and location of each student for attendance marking. The work is focused on the method to obtain the different weights of each focused seat according to its location. The effectiveness of the picture is also being discussed to enable the faster recognition of the image.

Xiang-Yu Li [5] the author proposed that recognition face Using hog features and pca algorithms. By applying 0recognition algorithm to cropped faces images from that we get similarity b/w taken image and database image. In this paper PAC algorithm used for face detection and recognition.

Arun Katara [6] the author shows that face recognition of facial of different person or student .from recognition attendances is upload to database using face detection and recognition of student or workers. From this manual work is decrease by human and automatically attendance system based on faces process done.

EXISTING RECOGNITION SYSTEMS:

3.1 Fingerprint Based recognition system:

In the Fingerprint based existing attendance system, a portable fingerprint device need to be configured with the students fingerprint earlier. Later either during the lecture hours or before, the student needs to record the fingerprint on the configured device to ensure their attendance for the day. The problem with this approach is that during the lecture time it may distract the attention of the students.

3.2 RFID (Radio Frequency Identification) Based recognition system:

In the RFID based existing system, the student needs to carry a Radio Frequency Identity Card with them and place the ID on the card reader to record their presence for the day. The system is capable of to connect to RS232 and record the attendance to the saved database. There are possibilities for the fraudulent access may occur. Some are students may make use of other students ID to ensure their presence when the particular student is absent or they even try to misuse it sometimes.

3.3 Iris Based Recognition System:

In the Iris based student attendance system, the student needs to stand in front of a camera, so that the camera

will scan the Iris of the student. Retinal scanning is a different, ocular-based biometric technology that uses the unique patterns on a person's retina blood vessels and is often confused with iris recognition. Iris recognition uses video camera technology with subtle near infrared illumination to acquire images of the detail-rich, intricate structures of the iris which are visible externally. Digital templates encoded from these patterns by mathematical and statistical algorithms allow the identification of an individual or someone pretending to be that individual.[1] Databases of enrolled templates are searched by matcher engines at speeds measured in the millions of templates per second per (single-core) CPU, and with remarkably low false match rates.

3.4 Face Based Recognition System:

The facial recognition technology can be used in recording the attendance through a high-resolution digital camera that detects and recognizes the faces of the students and the machine compares the recognized face with students' face images stored in the database. Once the face of the student is matched with the stored image, then the attendance is marked in attendance database for further calculation. If the captured image doesn't match with the students' face present in the database then this image is stored as a new image onto the database. In this system, there are possibilities for the camera to not to capture the image properly or it may miss some of the students from capturing.

4. PROPOSED SYSTEM:

4.1 Raspberry Pi 3 Set Up procedure

When we bought Raspberry Pi 3, it's casing, Pi-fan and Pi camera were not assembled. Thus, the first thing to do is to screw the Pi-fan in place on the casing provided and next secure the Pi board on the casing by again tightening it with screws. For the fan to work, it's end has to be connected to a 5 V pin and a ground pin which are pin 4 and pin 6 respectively with the red-wired connector to pin 4 and black-wired connector to pin 6. Then, assemble the Pi camera onto the Raspberry Pi by first lifting up the camera port's tab which is located between the Ethernet and HTMI code on the Raspberry Pi to loosen it up, next insert the Pi camera connector into the port with silver surface on the camera's connector facing the HDMI port. After that, push the port's tab downwards to secure the connection. Finally, assemble the casing and the final product is shown below in the figure.
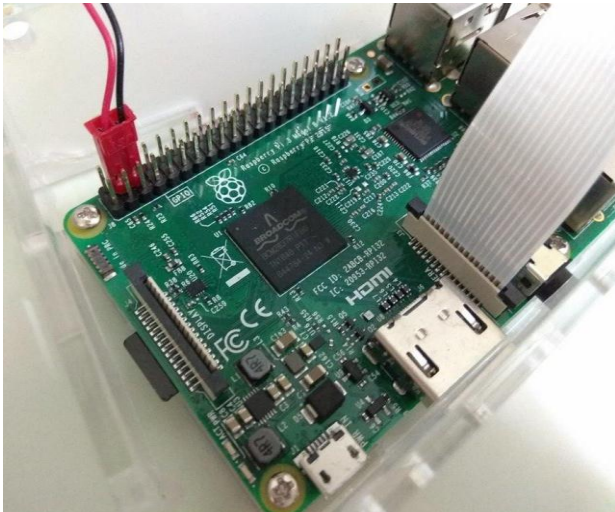
Fig. Final assembled product

4.2 Installing OpenCV into the Raspberry Pi

In this project, OpenCV is used to do facial recognition where the whole program will be coaded Python language. The installation of OpenCV is not enough, therefore OpenCV is installed with Python bindings bridge Python and C++ in OpenCV. The following is a walkthrough on the installation process that had done.
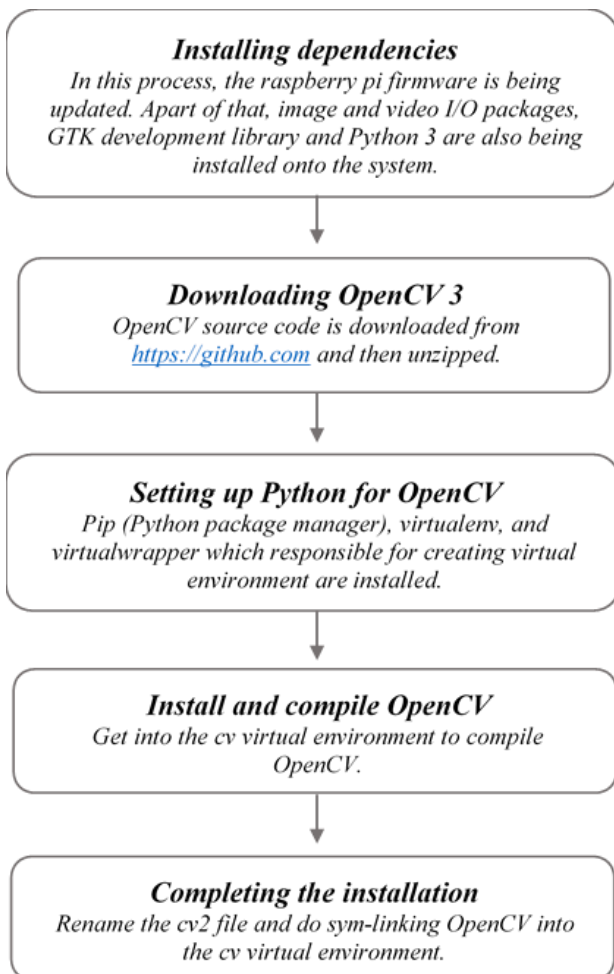
4.3 Software Development

There are two major system flows in the software development section as shown below:

- The creation of Face database

- The process of attendance taking

In the process of creating the face database, mul-tiple photos of the student standing in front of the camera are taken. It takes around 100 images of the student for creating the face database. All of this images are stored and in this way creation of face database is done.

The figure explaining the creation of face database is shown below.

Fig. Creation of face database

In the process of attendance taking, with just a click of button on the webpage, a Python script will be executed which will launch a series of initialization such as loading the trained data to the recognizer and etc. The attendance taking process will then proceed in a loop to acquire, identify and mark the attendance for each of the student that is obtained from the Pi camera. The flow chart of the attendance taking process is shown below.
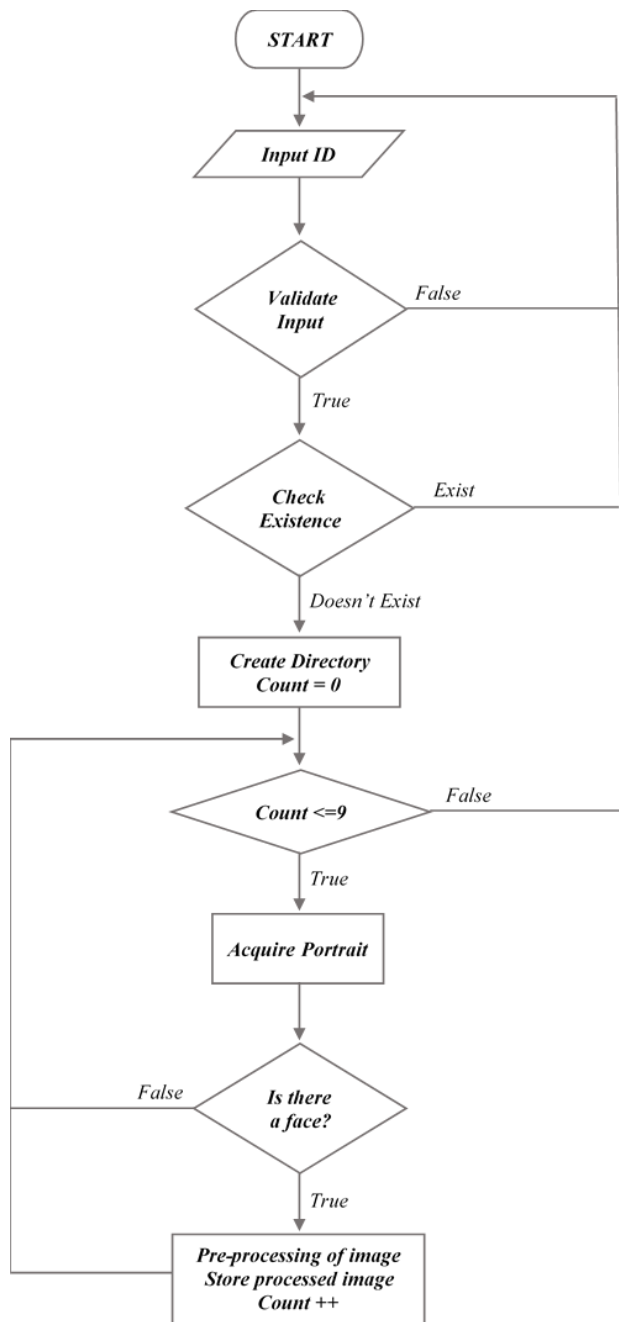
Face Detection Using Haar-Cascades:

A Haar wavelet is a mathematical fiction that produces square-shaped waves with a beginning and an end and used to create box shaped patterns to recognise signals with sudden transformations. An example is shown in figure 1. By combining several wavelets, a cascade can be created that can identify edges, lines and circles with different colour intensities. These sets are used in Viola Jones face detection technique as an input(picture) is searched to find any face[9], after finding the face the image processing cleans up the facial image for easier recognition of the face. CNN algorithm can be implemented to detect thefaces. To analyse an image using Haar cascades, a scale is selected smaller than the target image. It is then placed on the image, and the average of the values of pixels in each section is taken. If the difference between two values pass a

given threshold, it is considered a match. Face detection on a human face is performed by matching a combination of different Haar-like-features. For example, forehead, eyebrows and eyes contrast as well as the nose with eyes as shown below in figure A single classifier is not accurate enough. Several classifiers are combined as to provide an accurate face detection system. Similarly, in viola Jones method [8], several classifies were combined to create stronger classifiers. ADA boost is a machine learning algorithm that tests out several week classifiers on a selected location and choose the most suitable [8]. It can also reverse the direction of the classifier and get better results if necessary [8].Viola Jones [8] used a summed area table (an integral image) to compute the matches fast. First developed in 1984 [10],it became popular after 2001 when Viola Jones implemented Haar-cascades for face detection.

RESULTS & DISCUSSIONS

The main working principle of the project is that, the video captured data is converted into image to detect and recognize it. Further the recognized image of the student is provided with attendance, else the system marks the database as absent.
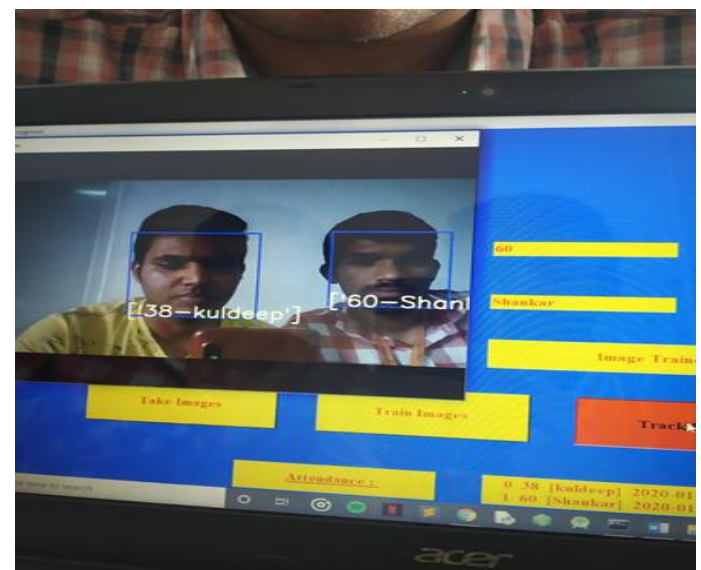
CONCLUSION:

This paper describes visual perception and autonomy module. Next, it explains the technologies used in the project and methodologies used. Finally it shows the result and how they were resolved followed by a discussion .Using Haar-Cascades for face detection worked extremely well even when subjects wore spectacles or they have beard or any other facial features Real time video speed was satisfactory as well devoid of noticeable frame lag. Considering all factors, LBPH combined with Haar-Cascades can be implemented as cost effective face recognition platform. An example is a system to identify known troublemakers in a mall or a supermarket to provide the owner a warning to keep him alert or for automatic attendance taking in class.

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