SMART ATTENDANCE SYSTEM USING REAL TIME FACE RECOGNITION USING MACHINE LEARNING

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Abstract: Face Detection and Recognition is an important area in the field of substantiation. Maintenance of records of students along with monitoring of class attendance is an area of administration that requires significant amount of time and efforts for management. So, we come up with an idea to use face recognition technology in this field. we use face data of a person and mark attendance and store it in database and send the information to respected department or coordinators.

Index Terms - **HAAR CASCADE and LOCAL BINARY PATTERN HISTOGRAM (LBPH), face recognition, face detection algorithm, tkinter, YAGMAIL.**

I. INTRODUCTION

Generally, in the classroom the attendance was taken by the teachers manually at the beginning and ending of the class. The problem with this approach is that it requires some time to take and the manual process will have chances to make mistakes in most of the cases. To overcome that problem, RFID (Radio Frequency Identification) was introduced in the past years. But those are also having the fail proof of attendance system. So, we are introducing the concept of Face Recognition Based Attendance system, the main objective the proposed system is to allot attendance to the students using face recognition-based algorithms to achieve fail proof attendance system.

The prevalent techniques and methodologies for detecting and recognizing face we use HAAR and LBPH algorithms. Faces are recognized using advanced PCA using the database that contains images of students and is used to recognize student using the captured image. When face recognized we just stored the entire information of student at what date, time, with their name and recognized. Once the images are capture we can enter the email of respective coordinator or class representative. once the email is send we will be getting a notification with their mail ID.

II. LITERATURE REVIEW

Traditionally attendance was taken manually which is very time consuming and often leads to human error. Additionally, there are many uncertainties towards the sources of the attendance records which in fact, most of the attendance records are not retrieved from the actual situation. The old method that uses paper sheets for taking student's attendance can no longer be used. Based on the research, there are many solutions that are available to solve this issue.

First paper we have studied is named as "Biometric Based Attendance". In this paper Biometric scaled up for real time deployment, it provides solution of late coming.

The second paper named as "Finger Based Attendance Management with SMS Alert to Parents". This paper introduced system includ terminal fingerprint module and attendance module and SMS system for alerting parents for updating about their child.

The Third paper named as "Key Authentication Based Door Lock Monitoring System". This project is concentrated more on automation of institute security provides lesser security than actual physical security.

The fourth paper named as "Employee Attendance Monitoring System Using radio frequency Identity Card". Facilitates automatic wireless identification using ID tags and reader method.

III. RESEARCH METHODOLOGY

PROPOSED WORK
The proposed system SMART ATTENDANCE SYSTEM USING REAL TIME FACE RECOGNITION USING ML can be divided into five main modules. The modules and their functions are defined as follows.

Image Capture
The camera is fixed to the system to capture the frontal image of the students. And remaining process goes for face detection.

Face Detection

A proper and efficient face detection algorithm always increases the performance of face recognition systems. Multiple faces can be detected at a time. Various algorithms are proposed for face detection such as machine learning based methods. Before we continue, we must differentiate between face recognition and face detection Face Detection determines the locations and sizes of human faces in arbitrary images. In Face Recognition, the use of Face Detection comes first to determine and isolate a face before it can be recognized. They are not the same, but one depends on the other. In this case face recognition needs face detection for making an identification to "recognize" a face. I will only cover face detection. Face detection uses classifiers, classifiers have been trained to detect faces using thousands to millions of images in order to get more accuracy. Here we used two types of classifiers, LBP (Local Binary Pattern) and HAAR Cascades.

HAAR Cascades

A HAAR Cascade is predicated on "Haar Wavelets" which defines as:

A sequence of rescaled "square-shaped" functions which together form a wavelet family or basis. It is supported the Haar Wavelet technique to research pixels within the image into squares by function. This uses machine learning techniques to urge a high degree of accuracy from what's called "training data". This uses "integral image" concepts to compute the "features" detected. Haar Cascades use the Adaboost learning algorithm which selects a little number of important features from an outsized set to offer an efficient results of classifiers.
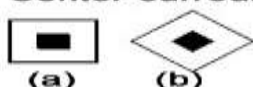

Feature Extraction

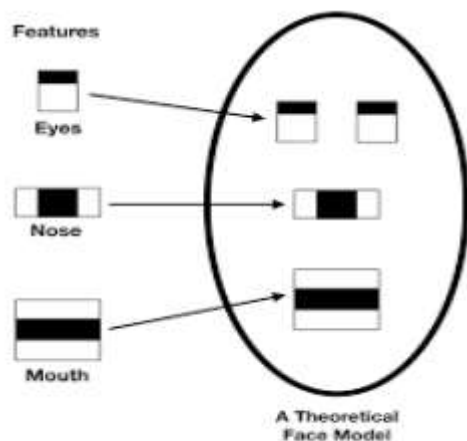Haar Cascades use machine learning techniques during which a function is trained from lots of positive and negative images. This process within the algorithm is feature extraction.

Pre-Processing

The detected face is extracted, subjected to pre-processing. This pre-processing stage involves With the histogram equalization of the extracted face image and is resized to 100x100.Histogram Equalization is that the commonest technique in Histogram Normalization. This improves the contrast of the image because it stretches the ranges of the intensities in a picture by making it more perfect.

Database Storage

In this Face recognition based system collection of each individual is required. This database storage phase consists of image capture of every individual student and extracting the Face recognition feature for every individual, in our proposed system it is face and after it's enhanced using pre-processing techniques and to be stored within the database.

Post-Processing

In the proposed system, after recognizing the all faces of the scholars, the names of people are updated into an excel sheet is made by exporting mechanism present within the database. The database also has the ability to store data in date and time with their name and roll number of student's attendance. These generated records can be viewed by the faculty and students this ensures that student whose Faces are not recognized correctly by the system have the chance to send a request to admin. And Thus, giving the

ability to the correct the system and make it more stable and accurate. We can even send this data to any faculty or to the students mails also.

IV. RESULTS AND DISCUSSION

Face Recognition using Python for GUI model:
Faces are made from thousands of fine lines and features that has got to be matched. The face recognition using Python is employed to interrupt the task of identifying the face into thousands of smaller, bite-sized tasks, each of which is straightforward to face Recognition Python is that the latest technology in Machine Learning techniques. OpenCV utilizes Machine Learning algorithms to look for faces within an image . we used tkinter because out of all the GUI methods, tkinter is the most commonly used method. It is a typical python interface to the Tk GUI toolkit shipped with python. Python with tkinter is that the fastest and easiest method to make the GUI applications. we introduced GUI based model for face recognition because it is easier and simple way for the users to use.

YAGMAIL:
YAGMAIL may be a simple GMAIL/SMTP client that's created to get rid of the effort out of sending emails. With the Python library, we wrote a few lines of code to include email sending capabilities to our application and sidestep using the traditional approaches.
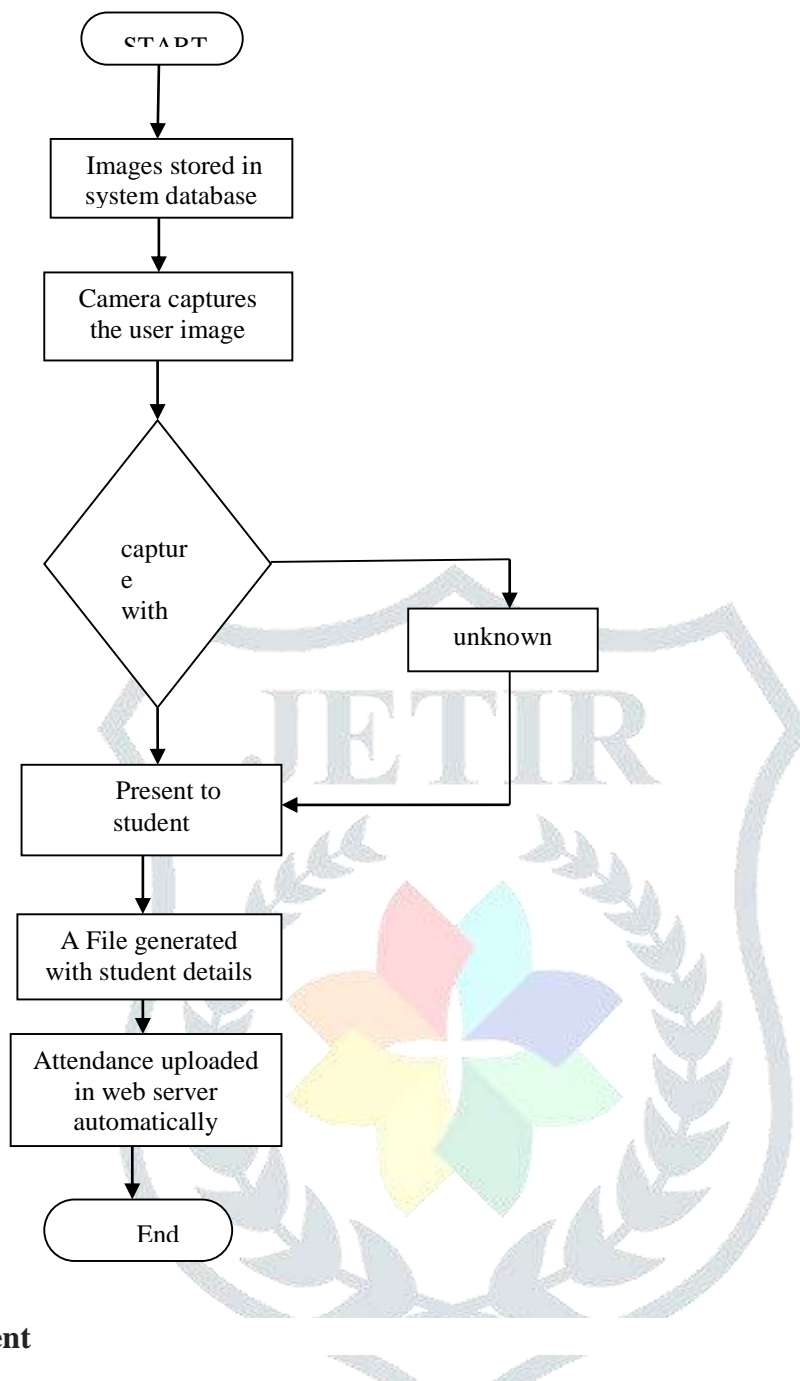
Result:

Proposed Algorithm:

1 Capture the student's image through camera.
2 Detect each and each individual face by apply face detection algorithm.
3 if image captured then
      Attendance will taken
  Else
Consider it as Unknown
4 post processing

FLOW CHART

V. Acknowledgment

Conclusion

By this real time face recognition attendance for multiple students can be taken at a time. Time will be reduced because of multiple face recognized at a time. We can get the information of students login time exactly. We can even send the attendance data to multiple email IDs. Data can be stored in, and no need to worry about lost data.

Future scope

By the smart attendance we can try to integrate with biometric of faculty with the integration of biometrics that particular faculties can get of their class data. And also we can even make absentee list by comparing of data.

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