Facial Recognition Attendance System

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Abstract- Face recognition is an important application in student attendance system because it saves time in marking attendance. The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institution to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that caused inaccurate and inefficient of attendance taking. Many problems arise when the authority is unable to enforce the regulation that exist in the old system. The technology working behind will be the face recognition system. The human face is one of the natural traits that can uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a face to deviate or being duplicated is low. In this project, face databases will be created to pump data into the recognizer algorithm. Then, during the attendance taking session, faces will be compared against the database to seek for identity. When an individual is identified, its attendance will be taken down automatically saving necessary information into a database. The main motive of developing this type of application is to reduce time consumption of taking attendance of students on paper by a teacher during their lecture. **Keywords**-Smart Attendance System, NFC, RFID, OpenCV, NumPy.

I. INTRODUCTION

The humans have always had an innate ability to recognize and distinguish between faces. Now computers are able to do the same, opening a plethora of opportunity for the advancement of human civilization. A face recognition system is a biometric technology used for mapping facial features and patterns for the purpose of identity storage and verification. It is being widely used to improve access and security, allows payments to be processed without physical cards. It also enables criminal identification, strengthening the pillars of law and enforcement. It also has started breaking natural barriers by helping blind or low vision users recognize faces and their surroundings.

Purpose and Description of Project: This project aims to automate the traditional attendance system where the attendance is marked manually. It also enables an organization to maintain its records like in-time, out time, break time and attendance digitally. Digitalization of the system would also help in better visualization of the data using graphs to display the no. of employees present today, total work hours of each employee and their break time. Its added features serve as an efficient upgrade and replacement over the traditional attendance system

II. APPLICATIONS

A. School This application can use in schools because in schools' traditional way of attendance marking in use where they call every student by roll number to check that they are present or not. This method is time consuming. During class taking attendance can take long time. This application can improve the standard of the school. By this system, students can't mark proxy attendance. Efforts of teacher is decrease, increase productivity and reduce human error. So, from this above importance of this system, it can be easily used in school.

B. Institutions This application can use in institutions because like schools, institutions also use traditional way of attendance marking where they call every student name or roll number to check that they are present or not. This method is time consuming. This application can improve the standard of the institute. By this system, students can't mark proxy attendance. Efforts of teacher is decrease, increase productivity and reduce human error. So, from this above importance of this system, it can be easily used in school.

C. College In college traditional way is used like school and institute. By using this application, process of taking attendance can improved and save time consumption of marking attendance. This application can improve the standard of the college. By this system, students can't mark proxy attendance. Efforts of teacher is decrease, increase productivity and reduce human error. So, from

III. Literature Survey

The Basic ideal to Facial Recognition Attendance System came in our mind after reading the following three IEEE papers:

1. Rapid Object Detection using a Boosted Cascade of Simple Features

2. Attendance Management System using a Mobile Device and a Web Application

IV. Proposed System

All students must register with required details and their image is stored in database. During each session faces are detected using

live streaming video of classroom. If face is matched with database attendance of that student is marked are Present or else it is marked as Absent. Attendance can be viewed and modified by admin.
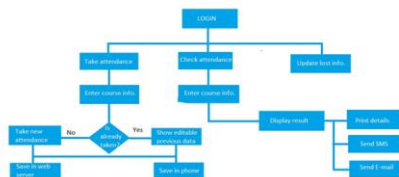

Figure 1. Flowchart

This Process can be divided into 4 steps:

1. **Database Creation:**
   Images of student is taken by using web cam. Multiple images of single student are taken and processed to crop unwanted part. Further image is converted to Grayscale from RGB. These images are stored in folder with student name.

2. **Face Detection:**
   Face detection is done by using Open CV. Haar-Cascade Classifier is used for this. Haar Cascade algorithm needs to be trained to detect human faces before it can be used for face detection. This is called feature extraction. The haar cascade training data used is an xml file- haarcascade_frontalface_default. The haar features shown in Fig.2. will be used for feature extraction.
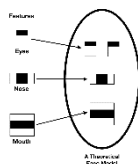

Figure 2

   A Haar-like feature considers adjacent rectangular regions at a specific location in a detection window, sums up the pixel intensities in each region and calculates the difference between these sums. This difference is then used to categorize subsections of an image.

3. **Face Recognition**:
   Face Recognition 3 Steps: Data Train, Recognition & Prediction.
   Here images in dataset will be trained. Integer label of student will be assigned to images. Local Binary Pattern Histogram (LBPH) is used for face recognition. The LBPH algorithm typically makes use of 4 parameters:

Radius: The distance of the circular local binary pattern from the center pixel to its circumference and usually takes a value of 1.
Neighbors: The number of data points within a circular local binary pattern. Usually, the value of 8.
Grid X: The number of cells in the horizontal plane, is usually a value of 8.
Grid Y: The number of cells in the vertical plane, is usually a value of 8.
Given the above-mentioned parameters, LBPH works as follows;

A data set is created by taking images with a camera or taking images that are saved, and then provisioning a unique identifier or name of the person in the image and then adding the images to a database. It is recommended to take many samples from a single individual. A portion of the data set is used for the training of the algorithm, while the rest is used for testing.

Using a circular neighborhood concept (which takes non-integer pixel points around a selected area), the number of appearances of LBP codes in the image is put together to form a histogram. The classification is then carried out through the calculation of the basic similarities of the histograms under comparison.

This histogram contains a description of an individual at three different levels: at a pixel-level, labels are combined in a small area to create a regional level, the regional histograms in combination build a general description of the person.

4. **Attendance Marking:**
   For each face detected and matched with enrolled face, the attendance is marked for the corresponding Roll no in the database. The name of student along with day and time of attendance is also be stored in the database.

V.   Conclusion

Facial recognition attendance system project is an effort to build, understand and automate attendance system (clock in and clock out time) and maintaining records of student and employees in study and work environment. Implementation is been done using Django as framework for web development. OpenCV and Viola jones Algorithm and haar cascade dataset as main detection and recognition process. Resources used bootstrap, Dlib and open-source face recognition library.

VI.   References

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