

Face Recognition Technology for Automatic Attendance System

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ABSTRACT- The attendance system is essential in schools and colleges. There are several drawbacks to manual attendance systems, including the fact that they are less dependable and difficult to maintain. This enhances accuracy while requiring less time than previous ways using an attendance system using facial recognition technology. There are several current attendance systems, such as IoT facial detection, PIR, and so on. For facial recognition, hardware devices are also helpful. The problem is to ensure that all sensors function well without damage. The aim is to use the hair cascade algorithm to create a system with the best accuracy of all of the methods and methods. Images may be taken between 50 and 70 cm away. A graphical user interface is meant to let users with one click to collect images, build datasets and train datasets. After recognition of the face, it shows the student's name and roll number. In the attendance sheet, the information is automatically provided together with the date and time.

KEYWORDS- face detection, face recognition, Haar features, histogram of oriented gradient, PIR sensor.

I. INTRODUCTION

As many schools and colleges have observed, faculty members struggle with the problem of proxy attendance, enabling them regularly to preserve every manuscript record of student attendance for each batch. You have a tough job ahead of you. Many ways to minimize their burden have been devised. RFID: Students have to carry an RFID card every day for attendance under this method. The chip consists of a card. The system reads all the students' details and records their attendance by snipping this card through a card reader. Biometric system: it may control the particular characteristics of the body, such as fingerprints. It must first store fingerprints in a database for each applicant. The present and preserved fingerprints are inspected during the course of the presentation [1][2][3][4][5][6].

The approaches for facial recognition are Eigen faces, LBPH, fishing faces and SIFT. For front sensing: AdaBoost, SVM-based, and face detector Viola-Jones. The hair cascade method and the AdaBoost classification are used for face detection and identification in our implementation. There are four steps: The purpose of Haar is that it collects face characteristics and

movements. It extracts all the functionalities by processing all the photos it takes. Internal Image: After the collection, the internal image is generated utilizing line, edge and four rectangle characteristics[7][8][9]. These are the results of certain measurements of the pixel. Classification of Ada boost: All the traits and the distinctiveness of the faces are merged at this stage. Cascading classification: This step distinguishes the faces and the non-faces successfully. This is for research purposes. In consequence, this approach promotes the enrolment of colleges, universities, organizations, institutions and enterprises across all sectors. Different facial detection and identification algorithms are utilized to acquire live camera pictures while removing conventional or manual labor [10][11][2].

An interface is developed to build the dataset in our solution. The Haar Cascade and AdaBoost classifications were used to train the pictures. It can distinguish and distinguish properly between faces and non-faces following study. Once saved and compared photos match, the attendance sheet is immediately updated to the time and date. It is better for faculty to keep track of student hours so it saves and student's entry time[12][13][14].

A. Applications

Common techniques to follow up involve yelling out the name of each student to see whether they exist. This type of call is time-consuming and uncomfortable. The attendance technique may be considerably increased by utilizing facial recognition to save time and providing an easy approach to check attendance automatically. The increase in the number of school pupils increases the university's production and standard by use of an automated system. Most employees of companies register their entry and departure timings using their biometric or ID cards. Usually, the numbers of individuals who arrive and leave work at peak hours are high. In this way, the office creates a bottleneck where workers wait and queue[15][16][17].

The usage of facial recognition technology simplifies the procedure of attendance. Employees should not be forced to consider monitoring their time when it is automatically managed. The gadget records the time to arrive and leave when an individual goes in or out of the office. A head count is done every day in prison to confirm that all inmates are present. The use of facial recognition to streamline the process of head count enhances

performance and reliability. Therefore, the defense is reinforced as each prisoner can be monitored at all times.

II. LITERATURE REVIEW

Research across the world shows that pupils at academic institutions are worried about the requirement for RFID and the biometric presence and security system based on Arduino: In this article they offered the participation and protection system of employees utilizing facial and biometrics, Smart RFID cards and Arduino. The project involved the deployment of an attendance system based on RFID, which combined facial recognition with a unique number of employees. The integration of fingerprint authentication (biometrics) into the technique enhanced protection. An audio welcome message was added to legitimate employee attendance registrations, and an audio warning was added to unwanted entry along with a sound alarm [18].

Face Recognition Assistance System: This study was focused on improving the school and university attendance system. Because manual attendance like cost, false attendance had many drawbacks, and may not always be correct. Biometric and face recognition technologies are therefore employed. The exactness of traditional approaches for facial recognition has not been enhanced. This document offered the notion, that it was extremely helpful for the attendance system to employ facial recognition technology to reduce time and enhance protection. Photographs have, for the purpose of attendance, been taken in a school or college using a camera or a CCTV camera. The face was then detected using features such as eyes, nose, mouth, hairs, and different poses of the face in the picture [19].

Ada-Boost, SQMT, LBP, and the SNOW classifier method were incorporated in face detection algorithms. Use the Driven Gradient Function Histogram (HOG) and Haar Cascade to detect a facial face. The images recorded are then connected to the database. Participation is marked if it is fit. If not, the image is saved in an unknown folder. This method can only be used in tiny datasets, though. The identification and recognition data was produced by MATLAB. In the block diagram below is depicted the technique and functioning of a visionary system based on face reconnaissance: Functionalities of Oriented Gradient (HOG) and Haar Cascade [20]. Automated assistant mgmt. Face recognition system Introduction: The principle of image processing is based on face recognition. The processing of images may be divided into two categories: analogue and digital. Hard copies such as pictures and prints require analogue processing. Digital processing: a device is used to manage digital image quality. Two types of participation exist: Automated assistant system and assistant system [21].

Manual attendance had several issues, such as following all documents and marking every day with a pen that took longer and longer. All these problems can be removed with the automated attendance system. The publication was primarily aimed at collecting pictures and videos of the faces, places and attendance of pupils. Some attendance systems were available, although they were restricted. Biometric system: it scans particular elements

of the body, such as fingerprints and the presence of tracks. However, it is time-consuming. This system is not modular as it only supports 8 connections at a time. Bluetooth System is not modular. RFID System: In such a system, each person must swipe an RFID card for attendance. When an RFID card is misplaced, though, it presents a dilemma. [22].

Face Identification in the Internet of Things for students: This method was based on the core notion of improving participation by using face recognition technology. This would decrease the number of proxies while improving precision [23]. Requirements for Hardware Microcontroller: The Arduino Uno microcontroller is used here to integrate the sensors. PIR Sensor: A passive infrared sensor is used for measuring the quantity of radiation and rotation of an item emitted [24].

If the image of the pupil is clicked, the database will be connected and the data base will be changed if the image matches. It is labelled as unfinished otherwise in the folder. Every day, a particular student's reports in the database are sent via mail or by SMS to their parents. The technique worked with the professors in the same way. Faculty has produced an additional directory. It can also follow up professorship via this way [25]. This means that enrolment increases in all regions, including universities, colleges, organizations, institutions and companies. Various facial detection and identification algorithms are utilized to capture live pictures from a camera while reducing manual or traditional effort. It builds a GUI to construct the dataset in our method. In the picture trainer were the Haar Cascade and AdaBoost categories. After rigorous testing, it can consistently differentiate between the faces and the non-faces. The attendance sheet is promptly updated with the date and hour when the stored and compared photographs match. It is preferable for faculty to keep track of student hours in order to minimize admission time for applicants.

III. METHODOLOGY

A. Design

Haar Features and AdaBoost Classifier apply our solution. It creates a GUI to store the name and role number of each student in a file. A dataset of student faces is produced and stored in a folder for gathering information from students. After that, the training images were kept in a directory required to recognize the face. These are some of the most important and important phases in our implementation. It puts the camera near the classroom entrance in a real-time setting and continually records live information. It plot pictures from the live stream of the camera. The captured photos are connected with images kept in a database at the moment of input.

If the image fits, the name and number of the student is shown on the identified or recognized face. These data are automatically provided in the attendance sheet along with the date and hour. The photos will be stored in an unknown directory if the images do not match. For faculty members, it is particularly useful because it monitors student attendance by days and times. Professors can therefore rapidly choose the students at which time to attend the lecture. The suggested strategy would all benefit from participation in laboratories,

attendance by government offices, participation by institutions/organizations and attendance by libraries.

B. Sample

In a register the data were saved. Then a dataset of student faces is generated and trained. Then it utilizes facial recognition methods like the haar function and the Ada classification boost. It records live video pictures and transfers them to a file then matches the photos in the file to determine whether they match a student's. If the response is yes, the image with the time and date will be labelled as current, else it will be saved to an undefined file.

C. Instrument

As a result, the global widespread participation is expanding in schools, colleges, organizations, institutions and firms. Different facial detection and identification technologies are utilized to collect live camera pictures, while manual or conventional labor is eliminated. It

generates a GUI for creating the dataset in our approach. The pictures were trained with the classifications Haar Cascade and AdaBoost. It can precisely distinguish and distinguish between faces and non-faces after thorough investigation. Once saved and compared photos match, the attendance sheet is immediately updated to the time and date. Faculty should keep track of student hours in order to reduce the time it takes for students to be accepted.

D. Data Collection

This is how our system looks: Fig. 1 shows our dashboard where the student ID and NAME are to be entered. When entering the ID and NAME of the student, he must choose the option Take Images. Then it takes a photo of the student, as seen in Fig. 2.

It learnt and classifies pictures with haar and AdaBoost characteristics. There is also a Train Picture symbol. So you must select Train Image to assign the ID/Name that is entered in Fig. 2 after you take a photo of a pupil.



Figure 1: Face Has Recognized

Still a file has to be traced, therefore you have to click on the Track Image icon. After a single picture is tracked, the student's name and identity will be shown in the face identified, as illustrated in Fig. 1, and the details will be recorded in a database. After these operations, click on the icon Quit to save the information of the student

present, as seen in Fig. 2, and to generate an excellent file with the information of the student present. That's how the system works.



Figure2: Student's Attendance Has Marked

E. Data Analysis

To clarify matters, let's look at a few scenarios to help us visualize the system:

- How will the gadget work if just one student enters the school simultaneously? When just one student enters the school in a single time, the student's pictures are captured by camera, and the picture is configured to recognize the students' faces on the basis of the images saved in the dataset. The specifics of this image will produce an excellent file and save the name, roll number, date and time of pupils based on the identification of face. The pupils are then recognized by the technique as present. The objective of the system is to monitor current students when the data have been entered into the system.
- Remember the second scenario, where a large number of pupils simultaneously go the classroom. In this scenario, it also works effectively.

When entering the classroom it may recognize or recollect numerous faces at once and shows the naming of the student as seen in the above graph. The attendance message displays in the attendance box when it hits the exit button after recognition. In the attendance sheet the

attendance is immediately notified, along with your id, name, date and time.

As a result, universities, organizations, institutes and enterprises worldwide have become more and more registered. Different methods of facial detection and recognition are utilized to capture live photos from a camera while eliminating manual or traditional work. It creates an interface for our system to build a data collection. In the picture trainer were the Haar Cascade and AdaBoost categories. After rigorous testing, it can consistently differentiate between the faces and the non-faces. The attendance sheet is promptly updated with the date and hour when the stored and compared photographs match. Professors can keep track of student hours to decrease the time it takes for candidates to be accepted.

IV. RESULTS AND DISCUSSION

All the student information visible in the image are in the attendance record. This machine is therefore able to manage a lot of faces simultaneously. The attendance sheet is modified, as seen on the photo.

	A	B	C	D	E	F	G
1	Id	Name	Date	Time			
2		100 [nana]	2020-05-14	14:31:57			
3		10 [priya]	2020-05-14	14:32:03			
4							
5							
6							
7							
8							
9							
10							
11							

Figure 3: Multiple Students Attendances Has Marked

The pupils have maintained their information in an excellent file following identification of the faces of Fig. 3. It retains all records of a student, whether they are a single face or several faces. The machine works correctly in other situations. If you recall your ID and name, together with the current date and time, you input the class (single and multiple) in the attendance slip.

As a result, the number of students learning on a worldwide scale is rising in schools, colleges, organizations and institutions. The camera's live picture is captured by several facial detection and identification methods while the manual or the traditional work is removed. It builds a GUI to create the dataset in our context. The pictures were trained with the classifications Haar Cascade and AdaBoost. It can precisely distinguish and distinguish between faces and non-faces after thorough investigation. Once saved and compared photos match, the attendance sheet is immediately updated to the time and date. Professors should keep track of student hours in order to reduce the time it takes for students to

be accepted.

CONCLUSION

This approach essentially promotes registration in all areas, including schools, colleges, associations, institutions and companies. Using several methods of face detection and reconnaissance, live camera photographer are collected and hand or traditional labor is minimized. The dataset is created by developing a GUI in our solution. It utilized the classificatory Haar Cascade and AdaBoost to train pictures. After testing, face and non-sides may be successfully identified and distinguished. The attendance sheet is promptly updated with the date and hour when the stored and compared photographs match. It is easier for faculty members to keep track of student hours because it stores the entering time of each student.

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