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Attendance System Using Face Recognition

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ABSTRACT— The conventional attendance system consists of registers marked by teachers, leading to human error and a lot of maintenance. Time consumption is an important point of concern in this system. We have thought of revolutionizing it using digital tools available in the modern era, such as FACE RECOGNITION. In our project, there will be minimal manual work and more precision
Our project revolutionizes the conventional system to address its limitations. It uses face recognition (Machine Learning technology) to register attendance through a Histogram of Oriented Gradient for face detection and an SVM Classifier for name recognition. All students' data is stored in a folder; if their faces match one of those stored images, their attendance is marked. The model boasts an impressive accuracy rate of 99.38% on the Labelled Faces in the Wild benchmark.
Keywords used :Face Detection, Face Recognition, OpenCV, and Tkinter, among others.

INTRODUCTION

At present, facial recognition and image processing are two fascinating topics that have yet to be fully explored. As a biometric method, facial recognition is rapidly overtaking traditional ones like fingerprints and RFID, due to its uniquely distinct features linked to one person. This proposed project can be used to create an advanced attendance system that eliminates the drawbacks of pen-and-paper activities such as time consumption, proxy methods, and manipulation issues. We aim to develop this project to make the attendance system more efficient, stop all methods of proxies, and save time during lectures.

The idea for this project was inspired by what we observed in the classroom- the lengthy time it took to mark attendance, followed by the relaxed attitudes of those who had checked in. We thought this would be a great avenue to explore through our Project since image processing and recognition has limitless potential; this experience will help us hone our skills and prepare us for any future endeavors

This project seeks to replace the traditional attendance system with an automated one. It facilitates data maintenance such as in-time, out-time, and break-time digitally. Moreover, this digital technique yields enhanced visualization of information using graphs that display the number of employees present today, the total work hours each employee puts in, and their break time. Substantial benefits would result from upgrading to this more

efficient system

LITERATURE REVIEW

A method called histogram of oriented gradients is used to implement face detection. An image of a student is stored in a database folder as well as the student's name. When someone is given the camera, the captured photo is compared with images stored in the database. If there happens to be a match between the two, then attendance will be marked and recorded in a CSV file.
Utilizing facial recognition to mark attendance offers an automated system that is based on facial detection and identification algorithms. This is used to detect the student's faces when they are in front of the camera, comparing their image with those stored on the database. If a match is found, attendance is marked. This system has numerous benefits over traditional methods, such as time-saving and eliminating any chance of proxy.
Attendance System proposes a feature of Email notification so users can receive details about their attendance via email on their respective Google accounts.

A research journal titled Automatic Face Recognition Attendance System using Python and OpenCV (Radhika Mandhanya, Shraddha Birla, Ujjwal Mandlo 2021) reveals that face detection has been achieved by utilizing a histogram of oriented gradients. The system stores students' images in a database folder with the corresponding names. Upon appearing before the camera, it captures the image of a person for comparison with images stored in the database folder - if a match is detected, then this student's attendance will be marked and stored in a CSV file.

- Student image dataset was used
- Parents can track their child's attendance online
- Multiple images are not recognized as disadvantage.

The second research journal "Face Recognition Based Attendance Marking System" (SenthamilSelvi, Chitrakala, Antony Jenitha, 2014) focuses on identifying face recognition as a solution to the issues of the previous attendance system. Open CV detects faces and saves them into the folder. At the time of attendance, it compares the current faces to the faces saved in the folder. If a match is found, attendance is recorded.

- Student image dataset was used
- It uses 3D Face Recognition, which is highly accurate
- In low light, it is difficult to recognize

The Third research journal "Face Recognition Based Attendance Marking System" (Divya Pandey, Priyanka Pitale, Kusum Sharma) has identified facial recognition to pursue an answer to the problems of the predecessor attendance system. This section particularly focuses on techniques, methodologies, and concepts related to facial recognition and image processing that apply solely to a procedure utilizing facial recognition algorithms and image processing techniques. The proposed project consists of four phases; namely capturing, recognizing, Mismatching images, and marking attendance.

- Image of a student was used as the data set
- Time-saving and efficient
- This image does not provide a training dataset. It gives an error message.

SYSTEM ARCHITECTUR

The main task of our proposed system is to detect and recognize the image of the student and mark the attendance accordingly in the excel file. In addition to creating, reading, deleting, editing, and searching, the proposed system can also capture new entries if needed. We have divided the proposed system into three main modules, which are:

In the Admin module, one is required to provide login credentials which include an id and password that will be matched with the one in the database.

It is possible to edit, add, update, delete, and search student details such as enrollment, name, etc.

This module marks attendance if the student's face matches the database, otherwise, it won't.

Its primary goal is to provide an easy-to-use computer vision infrastructure so that people can build sophisticated vision applications quickly. OpenCV is the primary technology behind Face Recognition. The user stands in front of the camera at a minimum distance of 50cm and his image is taken as input. The frontal faces are then extracted and saved to the file.

The first is data science

Computer technology known as face recognition is used to identify human faces in digital images in a variety of applications. The most advanced face recognition method, which is also employed to authenticate users through ID verification services, pinpoints and measures facial features from a given image.

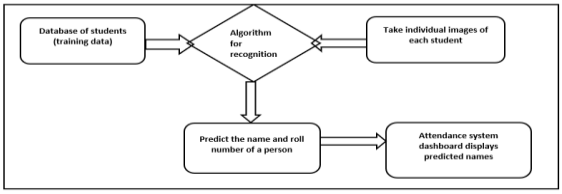

Figure 1: Block diagram for face recognition

OpenCV and take an image from the webcam.

The face recognition model detects the face and saves it to the folder.

The system compares the current faces with those saved in the folder at the time of attendance.

If attendance already marked message show (already mark your attendance in a database)

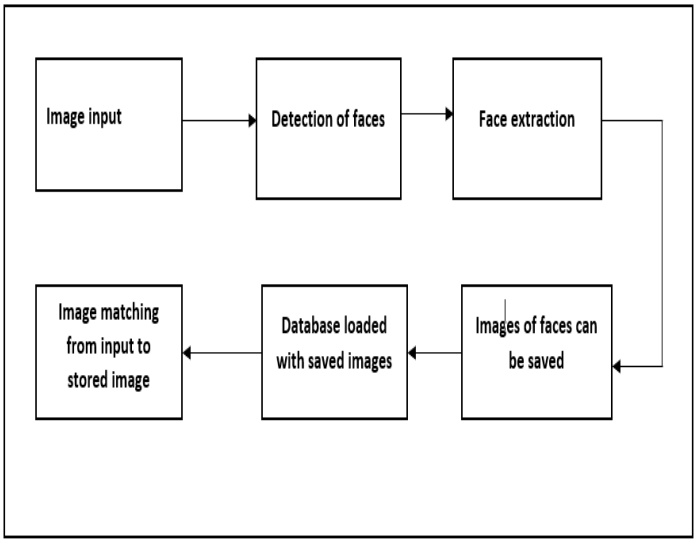

Fig. 2: Flow chart for face recognition

The proposed system's workings:

It is necessary to meet the following requirements (hardware, software, and services) to successfully deploy the system:

The hardware:

A 32-bit, x86-based processor

An Internet connection is required

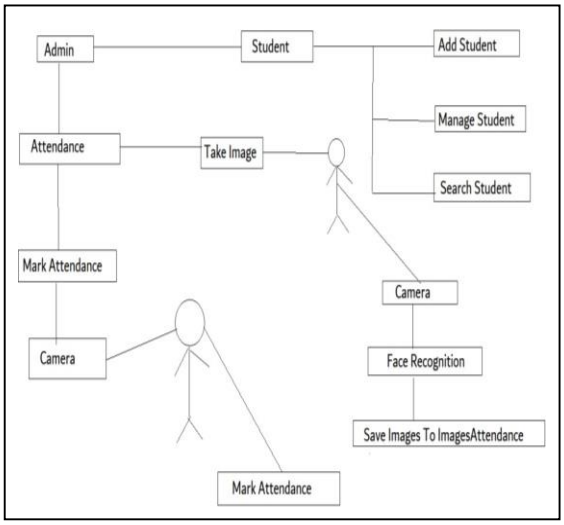

Fig. 3: Detailed working of attendance system

Computer software:

Operating system Windows 10 or later or digital device to display the page

A Mysql Workbench server is required.

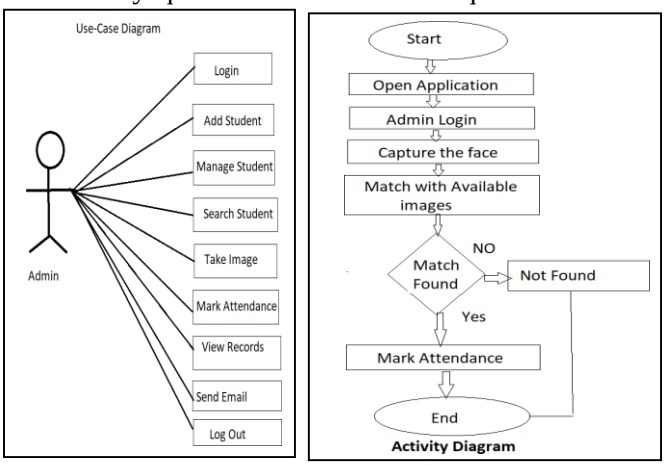

Fig. 4: Activity diagram for attendance system for face recognition

Dataset Description: The method uses a digital camera to capture a face image, a computer to process and analyze it, and an output device to display the results. Face recognition is a high-speed and reliable technology that can easily identify any person from a variety of facial images.

Hardware Details: On the proposed laptop, Windows 10 is installed, the processor is Intel® CoreTM i7-9750H with a base frequency of 2.60GHz and a maximum turbo frequency of 4.50GHz, and the GPU is NVIDIA GeForce RTX 2060 of 6GB.and we have to require High-definition Camera.

Objective:

1. Using face recognition technology to reduce manual process errors.
2. To ensure attendance recording is faster than the previous system, which took approximately 3 seconds per student.
3. A user-friendly interface for admins to access the attendance database and for non-admins (parents) to check their child's attendance by mail.
4. Using Python openCV to build the Face Recognition Attendance System

Advantage:

1. In foolproof attendance marking, students can no longer create false proxy accounts for their friends as the system only needs the faces of the students.It is helpful to promote the development of agricultural economy in multiple directions and transform the traditional agricultural economicmanagement mode.
2. Students disrupting the normal attendance marking method can cause time to be lost due to time-saving.
3. As an alternative to manually updating attendance on the college servers, the system will calculate student attendance beforehand.

Experimental Results*:* Experimental data indicates that the video face recognition system is accurate up to 82%. By replacing the traditional check-in method, attendance through this system can be reduced by roughly 60%. This has made skipping classes a rare occurrence and eliminated the issue of early leaving. With real-time video processing, the face recognition time and attendance system can swiftly complete

students' check-in tasks without the need for complicated naming procedures. This has substantially increased the efficiency of class time management and will continue to contribute significantly to shaping the future of attendance systems.

Fig. 5: Different Panel available in a Software

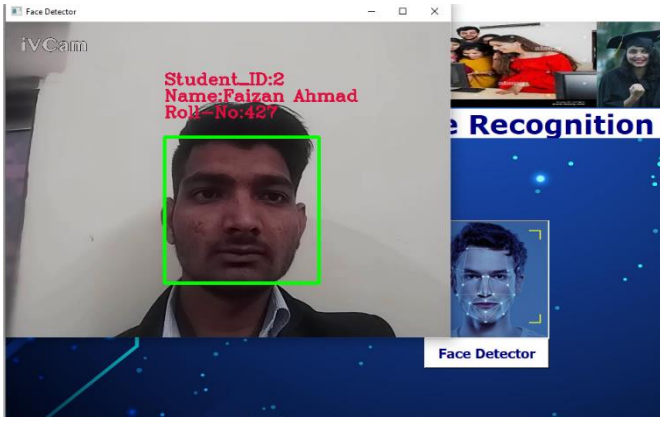

Fig. 6: Face detection and automatically attendance marked

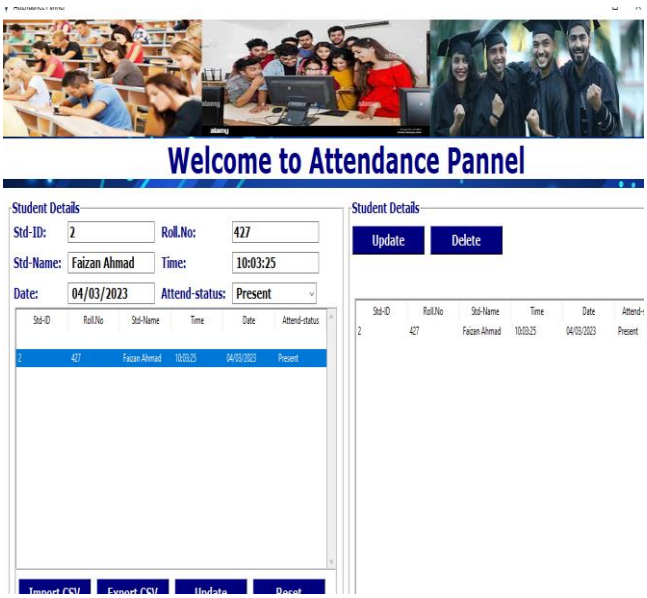

Fig. 7: Attendance Mark in database and show the attendance report

Future Scope:

I. For maximum accuracy, the face recognition model will need to be more precise.
II. The marked attendance will be stored in one excel spreadsheet, rather than multiple spreadsheets for different dates.
III. Adding each student manually can be tedious, however, retrieving data from spreadsheets would be efficient.

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