International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 10 Issue: 08 | Aug 2023 www.irjet.net p-ISSN: 2395-0072

Student Attendance Management Automation Using Face Recognition Algorithm

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Abstract - *Attendance management using Real-Time Face Recognition is a real-world solution to day to day activities of handling student attendance system. The system aims to improve attendance management by eliminating the manual process of entering attendance and reducing time and errors. The proposed student attendance management automation system uses the Haar cascading and Local Binary Pattern Histogram algorithm. The system uses a camera to capture the facial features of the students and applies the Haar cascading algorithm to detect faces. The LBPH algorithm is then applied to recognize the faces and mark attendance. The system provides real-time attendance reports, and the attendance details can be accessed by authorized personnel.*

***Key Words*: *Face Recognition, Attendance, LBPH algorithm, Haar cascading algorithm, Camera, students*.**

1. INTRODUCTION

The paper considers the importance of automation in attendance systems, highlighting the advancements that have taken place to improve efficiency. The focus of the paper is on automated attendance systems, which have replaced the traditional method of attendance marking. These systems are based on bio-metric, smart-card, and web-based and are used in different organizations. The traditional method of attendance marking is time-consuming and can be complicated when dealing with a large number of people. Automation of attendance systems saves time, increases accuracy, and can also be used for security purposes, preventing fake attendance.

The proposed attendance management system, which is based on biometrics (in this case, face recognition), consists of several stages, including image acquisition, database development, face detection, feature extraction, Face Recognition, and Attendance Marking. The paper provides a literature survey, a detailed description of the various stages involved in the proposed model, the results obtained, and conclusions drawn from the study.

2. LITERATURE SURVEY

[1] B. K. Mohamed and C. Raghu worked on Fingerprint attendance system for classroom needs.

The system uses a portable fingerprint device that can be passed among students to place their finger on the sensor during lecture time without the instructor's intervention. The system ensures a fool-proof method for marking attendance.

[2] T. Lim, S. Sim, and M. Mansor worked on Rfid based attendance system," in Industrial Electronics & Applications.

The authors propose an RFID-based attendance system where students carry an ID card with an embedded RFID tag. Students have to place the card on the card reader to record their attendance, and the system is connected to a computer via RS232 to save the attendance in the database.

[3] S. Kadry and K. Smaili worked on A design and implementation of a wireless iris recognition attendance management system.

The authors propose an iris recognition system based on Daugman's algorithm. The system captures iris images, performs feature extraction, stores thedata, and matches the iris data to verify the identity ofindividuals.

[4] Roshan Tharanga, S. M. S. C. Samarakoon worked on Smart attendance using real time face recognition.

The authors propose a real-time face recognition system that is reliable, secure, and fast. The system uses face recognition algorithms to detect and recognize faces, and it can be used for attendance management in various settings.

3. PROPOSED SYSTEM

The proposed system of automated student attendance system is shown in figure 1. The system captures the face of students and stores it in the database for their attendance. The face of the studentsshould be captured in such a manner that all the feature of the student's face needs to be recorded and analyzed with the existing record. Further, the recognized image of the student is provided with attendance, else ignored.

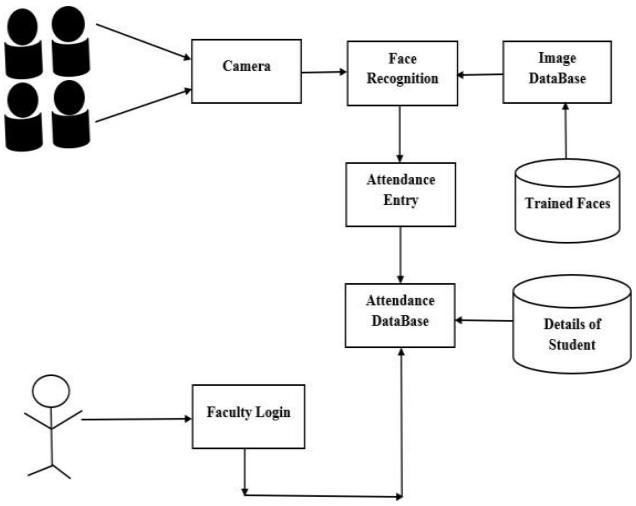

Fig -1: Proposed System

3.1 Image Acquisition It is the process of capturing an image using a camera or other imaging device. Captured image is then used for face recognition and attendance tracking purposes.

3.2 Face Detection In this process, Haar cascading is used, which is a popular algorithm used for face detection in computer vision applications. Algorithm works by scanning the image with a sliding window of varying sizes and aspect ratios. At each step, the Haar classifier evaluates whether the window contains a face or not , based on the features that it has learned. If the window is classified as containing a face, it is flagged as a potential face detection and further processed to eliminate false positives.

3.3 Feature Extraction Local Binary Pattern Histogram (LBPH) is a widely used feature extraction technique for face recognition. The LBPH algorithm works by dividing the image into small regions and extracting a binary pattern from each region. This binary pattern is then represented as a decimal number, which is used as a feature for that region.

3.4 Facial Recognition The LBPH feature vector is then compared to the feature vectors in the database using a distance metric, such as Euclidean distance, to find the closest match. If the distance is below a certain threshold, the system recognizes the face and marks the attendance of the corresponding student.

3.5 Create DataSet The dataset typically consists of a collection of images of the students, each labeled with their corresponding student ID. The student information is recorded along with their corresponding facial images, which are detected using Haar cascading algorithm.

4. METHODOLOGY

It is the process of defining the system architecture, components, modules, interfaces and data for a system to satisfy specified requirements. In this process, requirements are translated into a representation of software.

4.1Flow Chart Diagram

The flow chart describe the working of the system. Flow chart starts with the process of capturing the students face and store it in the data set. Next process is that camera will capture the students faces for recognition and then it will be matched with the database already saved. If this image is not matching then it will be ignored and if it matches then that student will be indicated as present ,then the process will end.

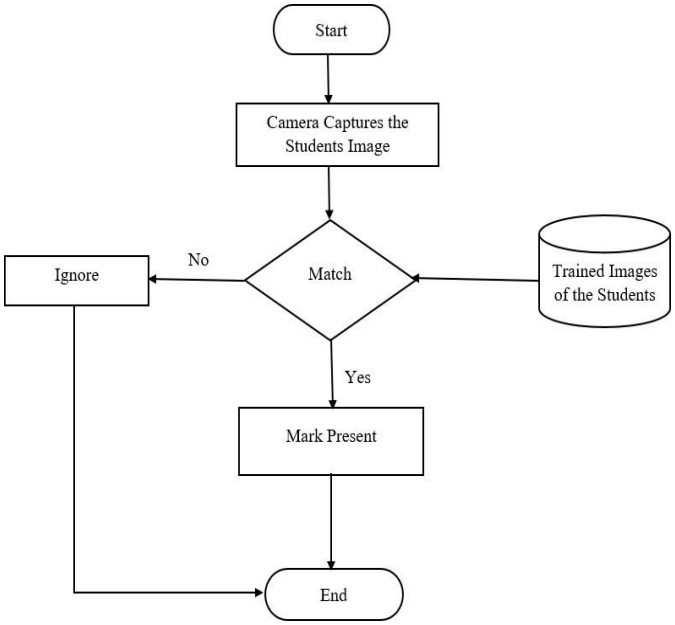

Fig -2: Flow Chart Diagram

4.2 Use case Diagram

A use case is a set of scenarios that describes an interaction between a source and a destination. Use case diagram of the system is as shown in figure 3

Admin has the highest privileges among all as admin is responsible to take images of the students and add them to the database. Admin can both view and update the details of students. They can also view the attendance report. Teachers can log in to the system. They can open the application and view the attendance report.

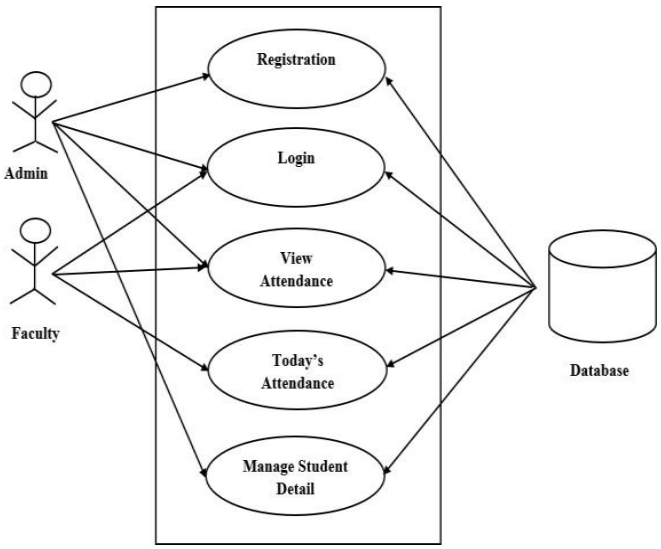

Fig-3: Use case Diagram

4.3Sequence Diagram

A sequence diagram for User in figure 4 shows object interactions arranged in time sequence. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Admin has the highest privileges among all, he is responsible to register to the system student during admission time, which is saved in the student database. If it is success admin get the pop up message that registration done successfully. The faculty can login to the system using faculty name and Id. Then the system will verify faculty name and Id and send pop-up message to the faculty if login is successful. The faculty can request the system to show the attendance report, the system will check the student attendance saved in the student database. Then database generates the attendance report and system will show the attendance report in the xml sheet to the faculty.

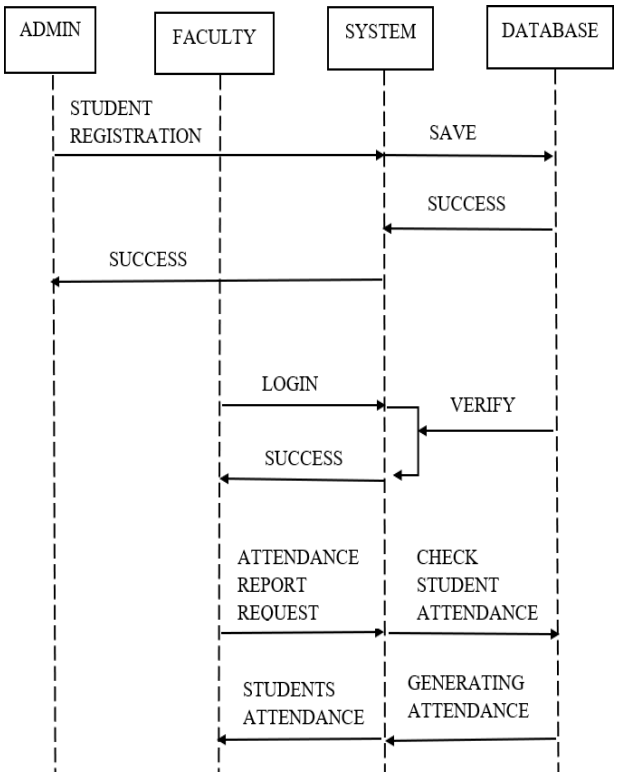

Fig-4 :Sequence Diagram

5.RESULT

The home page of a student attendance system typically includes information and options related to managing attendance records for students and new student entry as shown in the below figure 5.

Fig-5: Home Page

The new student entry section contains a form that allows only administrators, to add new students to the system. The form requires information such as the student's name, ID number, to create a new dataset.

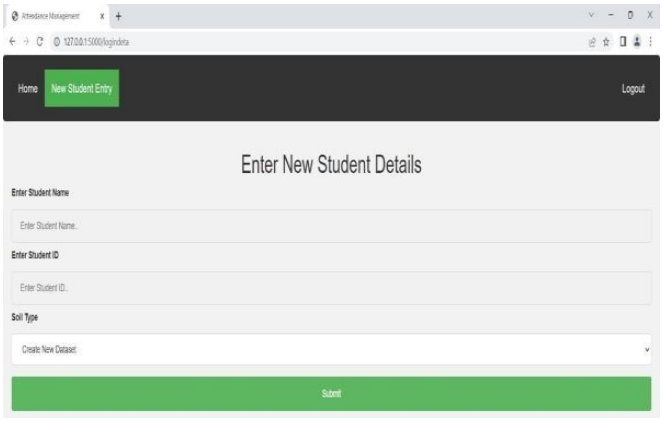

Fig- 6: Enter New Student Details

The system would then display a live video feed of the classroom or group, which would be captured by a camera or multiple cameras placed strategically around the room. As students enter the room and take their seats, the system would use facial recognition technology to identify each individual and match them with their name and attendance record in the system.

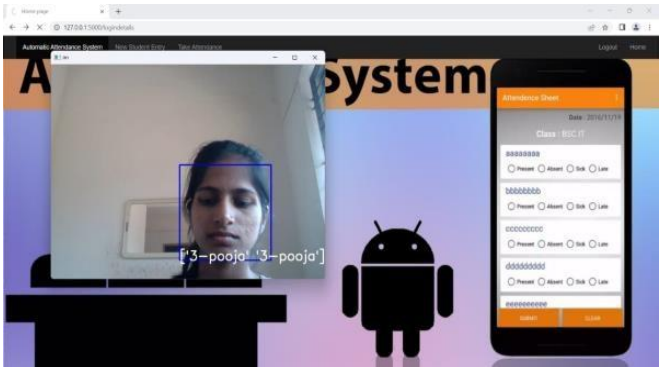

Fig- 7: Face Recognition

The result page for a student attendance system may display the name of the student who is present along with their ID, the date, and time of the class or session. Each row in the list format of the result page would represent the attendance record for a single student, displaying the attendance status for that particular date and time. This information can be used by teachers, administrators.

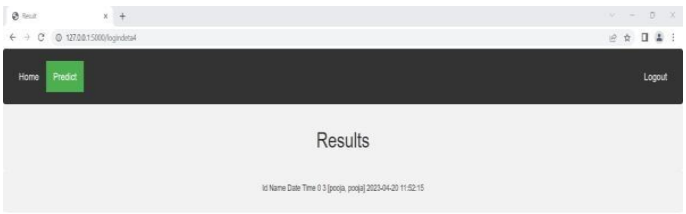

Fig- 8: Result

6. CONCLUSION

Automated student attendance system using face recognition technology can offer several benefits for schools and educational institutions. By automating the attendance tracking process, such a system can save time and reduce errors, while also improving the accuracy and reliability of attendance records. Additionally, facial recognition technology can provide a fast, efficient, and non-intrusive way to identify individuals and mark attendance, without requiring physical contact or the use of traditional attendance-taking methods.

REFERENCES

[1] B. K. Mohamed and C. Raghu, "Fingerprint attendance system for classroom needs," in India Conference (INDICON), 2012 Annual IEEE. IEEE, 2012,pp. 433–438.

[2] T. Lim, S. Sim, and M. Mansor, "Rfid based attendance system," in Industrial Electronics & Applications, 2009. ISIEA 2009. IEEE Symposium on, vol.2. IEEE, 2009, pp. 778–782.

[3] S. Kadry and K. Smaili, "A design and implementation of a wireless iris recognition attendance management system," Information Technology and control, vol. 36, no. 3, pp. 323–329, 2007.

[4] T. A. P. K. K. L. P. M. L. M. P. A. W. G. D. P. J. G.. RoshanTharanga, S. M. S. C. Samarakoon, "Smart attendance using real time face recognition," 2013.

[5] P. Viola and M. J. Jones, "Robust real-time face detection," International journal of computer vision, vol. 57, no. 2, pp. 137– 154, 2004.

[6] W. Zhao, R. Chellappa, P. J. Phillips, and A.Rosenfeld, "Face recognition: A literature survey," Acm Computing Surveys (CSUR), vol. 35, no. 4, pp. 399–458, 2003.

[7] T. Ahonen, A. Hadid, and M. Pietik¨ainen, "Face recognition with local binary patterns," in Computer Vision-ECCV 2004. Springer, 2004, pp. 469–481.

[8] M. O. Faruqe and M. Al Mehedi Hasan, "Face recognition using pca and svm," in Anti- counterfeiting, Security, and Identification in Communication, 2009. ASID 2009. 3rd International Conference on. IEEE, 2009, pp. 97–10.