Face Recognition Based Attendance Monitoring System

S.Manikandan[1], Dr.Vaidehi.V[2]
[1]Dept of Computer Applications
[2]Professor, Dept of Computer Applications
[1, 2] DR.MGR.Educational& Research Institute,Chennai-95

Abstract- *The Face Recognition Base Attendance Monitoring System(FRAMS) is a novel approach to automating the attendance tracking process in various settings such as educational institutions, corporate offices, and other organizations. Traditional methods of attendance taking, such as manual roll calls or card-swiping systems, are often cumbersome, prone to errors, and susceptible to proxy attendance. In contrast, FRAMS leverages state-of-the-art facial recognition technology to accurately and efficiently identify individuals and record their attendance.This system works by capturing images or video footage of individuals as they enter a designated area, such as a classroom or workplace. These images are then processed using advanced facial recognition algorithms to detect and identify unique facial features. Upon successful identification, the system logs the individual's attendance automatically, eliminating the need for manual intervention.*

Keywords- Face recognition, Image Processing, Registration, Model Training, Attendance Records, Face Detection.

I. INTRODUCTION

In several domains and disciplines, FACE recognition is a significant research issue this is due to the fact that biometric identification is a fundamental human behaviour that is necessary for successful human communication and interaction, in addition to a variety of useful applications including mugshot tracing, access control, credit card recognition, and security monitoring[1].

Face recognition systems are part of facial image processing applications and their significance as a research area are increasing recently. They use biometric information of humans and are applicable easily instead of fingerprint, iris, signature etc.,[2].

Face recognition may be used to identify people in an organisation for attendance purposes. The maintenance and evaluation of attendance records is critical in every organization's performance review. The aim of creating an attendance monitoring system is to automate the conventional method of taking attendance[3].

Attendance plays a pivotal role in determining academic performance of children and youth in schools and colleges. The regularity of attendance shows that the students are less likely to engage in delinquent or destructive behavior[4].

In today's networked world, the need to maintain the security of information or physical property is becoming both increasingly important and increasingly difficult. From time to time we hear about the crimes of credit card fraud, computer breaking's by hackers, or security breaches in a company or government building[5].

II. LITERATURE SURVEY

According to**Yusuf Perwej**.et al., 2022attendance at the beginning and end of each session is an important part of daily classroom assessment. If you use traditional methods like voting or taking student signatures, managing attendance can be a time-consuming task. The teacher usually checks this, although it is possible that the teacher misses the answers of one or a few students several times. The facialrecognition-based attendance system is a solution to the problem of facial recognition to collect attendance using facial recognition technology based on high-definition video monitoring and other information technology[6].

According to**Jayasree Rapa**.et al., 2019 Tobuild an attendance tracking system based on facial recognition in an educational institution to improve and update the current attendance system to be more efficient and \inefficient than before. There is a lot of ambiguity in the current old system, resulting in inaccurate and \inefficient participants. Many problems arise when the institution is unable to implement the current order in the old system. The technology behind it is a facial recognition system[7].

According to**Tanmay Desai**.et al., 2020 marking attendance in the classroom during a lecture is not only a

tedious but also a time-consuming task. As the lecture is attended by an unusually large number of students, there will always be an authorized participant(s). Attendance marking using conventional methods was a challenge. The growing need for efficient and automatic presence tagging techniques is a growing challenge in the field of face recognition[8].

Godwin Ansa.et al., 2023 says that many studies on face recognition-based attendance systems have used either a single-camera or multi-camera on architecture to capture and generate images that cover the entire class of attendees. Single fixed camera architectures are proven to be blind spots. This paper proposes a cost-effective single camera rail system that can be adapted and implemente[9].

According to**Min-Chuan Huang**.et al., 2021implemented identification principles using identification technology, redesigned efficient software using standardized methods and expanded the use of networks. The identification principle and identification technology can be applied to research and analysis of business processes, such as facial recognition, body temperature testing and online technology automated attendance registration[10].

III.PROPOSED SYSTEM

The proposed system is to automate the existing manual system. once the system gets computerized it will not only save the time but also ensure reliability accuracy etc. The system uses Microsoft access to store the data and a very user friendly graphical interface.

- Efficient retrieval time.
- Efficient linkage of information.
- Validation check to ensure query.

Rewards of proposed system

- The proposed system is being designed so that the working will become easier, faster, and more reliable than before.
- Attendance of students can be easily generated.
- Redundancy is minimized User friendly.

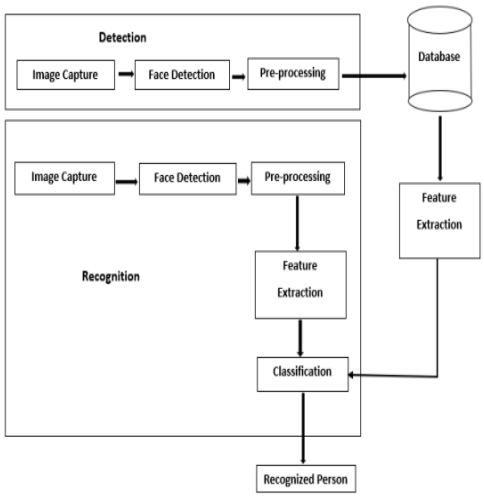

Fig 1. Block Diagram

IV. METHODOLOGY FOR IMPLEMENTATON

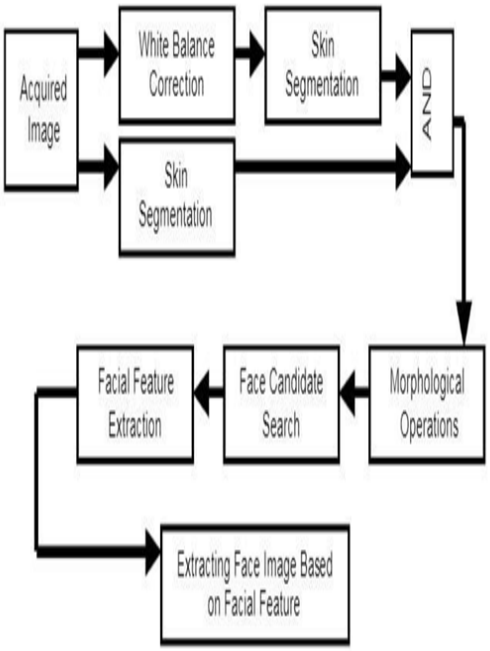

Fig 2. Flow-chart of the methodology used for Training Process

1. Introduction:

Introduce the methodology section by providing an overview of the approach taken to design, implement, and evaluate the Face Recognition Based Attendance Monitoring System (FRAMS).

2. Data Collection:

Describe the process of collecting facial data for building the FRAMS database. This may include:

- Selection of data sources (e.g., cameras, image datasets).
- Procedures for capturing facial images (e.g., camera setup, lighting conditions).
- Considerations for data quality and diversity.

3. Data Preprocessing:

Detail the preprocessing steps applied to the collected facial images to prepare them for facial recognition. This may involve:

- Image cropping and resizing.
- Normalization techniques to address variations in lighting, pose, and facial expressions.
- Quality control measures to filter out poor-quality images.

4. Facial Recognition Algorithm:

Explain the facial recognition algorithm(s) used in FRAMS. This may include:

- Overview of the underlying principles (e.g., deep learning, feature extraction).
- Selection criteria for the chosen algorithm(s).
- Implementation details (e.g., software libraries, programming languages).

5. System Implementation:

Outline the implementation process of FRAMS, including:

- Hardware requirements (e.g., cameras, computing resources).
- Software architecture (e.g., client-server model, cloud-based deployment).
- Integration with existing systems (if applicable).

6. Evaluation Metrics:

Define the metrics used to evaluate the performance of FRAMS. This may include:

- Accuracy measures (e.g., True Positive Rate, False Positive Rate).
- Computational efficiency (e.g., processing time per image).
- User satisfaction surveys (if applicable).

7. Experimental Design:

Describe the experimental setup used to assess FRAMS performance. This may involve:

- Selection of test datasets (e.g., real-world images, synthetic data).
- Cross-validation procedures to assess generalization performance.
- Baseline comparison with existing attendance monitoring methods.

8. Results and Analysis:

Present the results of the experiments conducted to evaluate FRAMS. This may include:

- Quantitative performance metrics (e.g., accuracy, precision, recall).
- Qualitative analysis of system behavior (e.g., case studies, error analysis).
- Visualization of results (e.g., charts, graphs, confusion matrices).

V. RESULT AND DISCUSSION

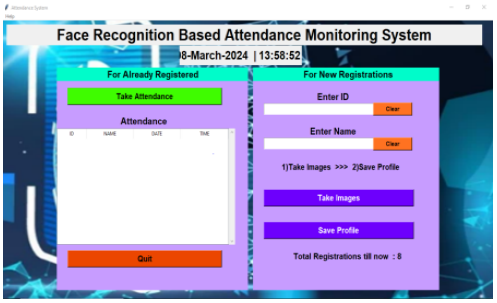

Fig.3 Main screen for Face Recognition Based Attendance System

Fig 4. The interface for the Face Recognition Based Attendance System in which the Id and Name of the respective students are stored.

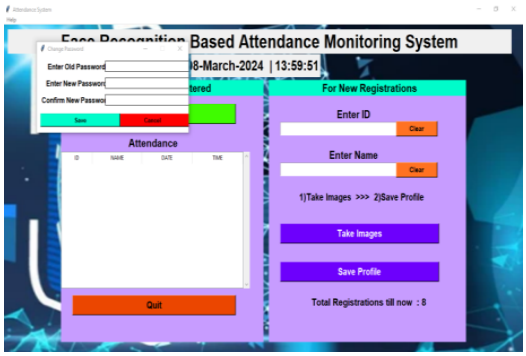

Fig.4 Changing password option

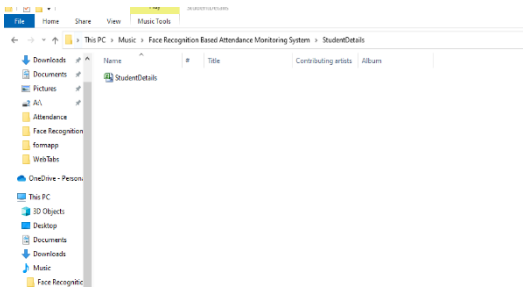

Fig.5 The excel sheet for the student details is created

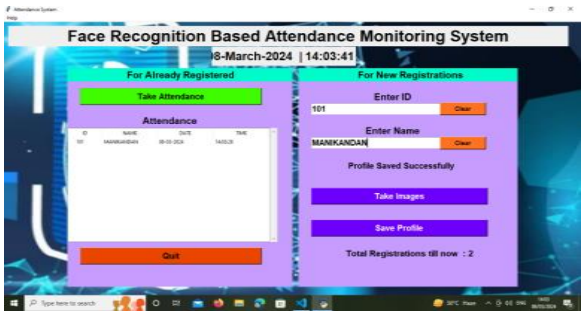

Fig.6 After tracking the images are attendance of the students is marked.

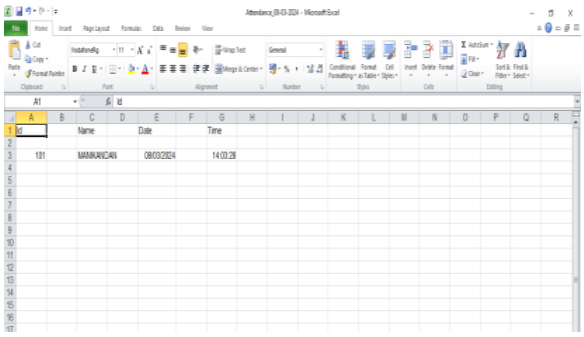

Fig.7 The names of the students have been stored in the Student Details excel sheet.

Fig.8 The excel sheet for attendance of the students is created

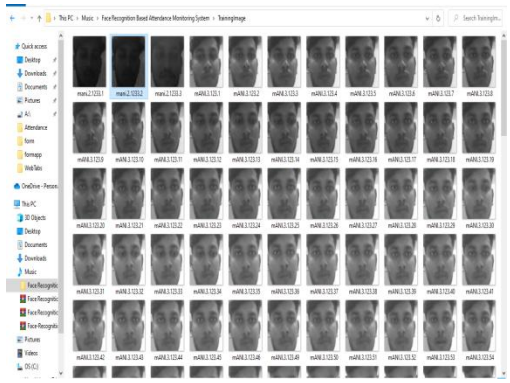

Fig.9 The images are stored in a folder named "Training Images".

VI.CONCLUSION

This paper features the most productive Open CV face recognition method accessible for Attendance Management. The system has been implemented using the LBPH algorithm. LBPH excels other algorithms by confidence factor of 2-5 and has least noise interference. The implementation of the Smart Attendance System portrays the existence of an agreement between the appropriate recognition rate and the threshold value. Therefore LBPH is the most authentic and competent face recognition algorithm found in Open CV for the identification of the students in an educational institute and marking their attendance adequately by averting proxies.

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