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NC087 AUTOMATED ATTENDANCE USING FACIAL RECOGNITION

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ABSTRACT

Attendance should be given due credence in performance evaluation, discipline and responsibility in institutions. Traditional systems like manual input are bulky and ineffective and fingerprint systems raise the concern of hygiene issues following the post pandemic. To address this, a non-contact solution is proposed that will use python and OpenCV. It employs webcam and captures the faces, trains LBPH model and keeps a record of attendances as structured CSV files having timestamps. Registration, training and attendance are through a simple dashboard based on Tkinter. This automation is time-saving, it does not require proxy attendance and demonstrates how computer vision and machine learning can be applied to develop a scalable, hygienic and efficient system of attendance management.

Key words: Face recognition, attendance without contact, real time detection, python, machine learning.

INTRODUCTION

Identity verification of the user is a critical component of secure and effective digital systems. Increasingly standard procedures, like ID cards, manual spot-checks or fingerprints, are being replaced with facial recognition powered by AI. Facial Recognition Attendance is an identity-based encryption (IBE) systems proposed by Shamir [1] and extended to attribute-based encryption (ABE) systems to provide a better security [2][3]. CP-ABE can be used in cloud-based institutes to make sure that only the roles that should are able to view or modify records [4][5]. However, due to the potential threat to those classical protocols (RSA, DSA etc.) by quantum computing with Shor algorithm [6], post-

quantum encryption algorithms (e.g., lattice-based and code-based ABE) are being developed to be more efficient and resistant [7][8].

LITERATURE REVIEW

This paper examines the current state of facial recognition technology as it relates to enabling automated attendance management and how biometrics, computer vision, and machine learning technologies can be used to improve accuracy, reliability and convenience. Face recognition reduces human workload, eliminates proxy attendance, provides secure and touchless verification with a promise of privacy and data integrity.

Title: Automating Attendance with a Real-Time Face Recognition System

Authors: Priya Ranjan, Rahul Mehta, and Ayushi Sharma

Abstract: This paper examines the current state of facial recognition technology as it relates to enabling automated attendance management and how biometrics, computer vision, and machine learning technologies can be used to improve accuracy, reliability and convenience. Face recognition reduces human workload, eliminates proxy attendance, provides secure and touchless verification with a promise of privacy and data integrity.

Title: Intelligent Attendance Systems Using Deep Learning-Based Face Recognition

Authors: Abhinav Jain, Neha Sharma, and Vivek Gupta

Abstract: This paper examines the current state of facial recognition technology as it relates to enabling automated attendance management and how biometrics, computer vision, and machine learning technologies can be used to improve accuracy, reliability and convenience. Face recognition reduces human workload, eliminates proxy attendance, provides secure and touchless verification with a promise of privacy and data integrity.

EXISTING SYSTEM

The existing attendance solutions such as the use of manual registers, ID cards, fingerprints, RFID, and QR codes are inefficient, inaccurate and present security or hygiene concerns. Fingerprints do not work with damaged or wet fingers and RFID/QR systems require hardware that can be lost or is misused. Current facial recognition technology is limited to rudimentary algorithms that perform poorly in regard to lighting, angles and expressions and do not have real-time validation, anti-spoofing, and data security.

Therefore, these methods are not scalable and not robust though they are functional. A real time facial recognition system powered by deep learning provides an identity management solution that is more secure, safer and contactless.

Disadvantages

- Majority of the current technology is susceptible in practice since it can be spoofed using printed or motion pictures.
- Such systems are less reliable in challenging environment, where users are in motion, faces are covered with masks or glasses, or where the lighting is low, resulting in lower accuracy of recognition.

PROPOSED SYSTEM

The proposed Automated Attendance System using Facial Recognition provides a secure, fast, and accurate way to record attendance through live video capture and OpenCV-based face recognition. It automatically matches faces with the stored database, eliminating manual effort and preventing proxy attendance. The system is easy to manage, as records can be added, updated, or removed, and lightweight models ensure efficient performance even in crowded environments. With encryption for data security and cloud integration for scalability, it serves as a reliable and contactless alternative to traditional attendance methods.

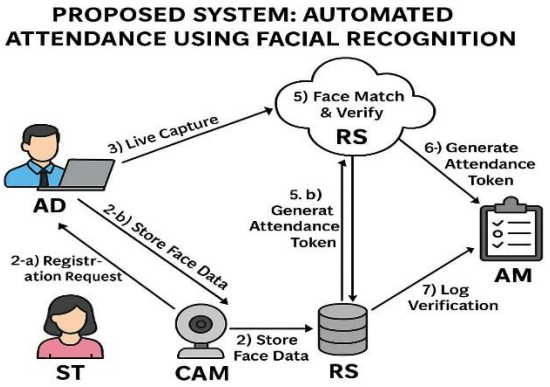

Fig 1. System model architecture

Advantages

- **Contactless & Hygienic Process:** Facial recognition can be used to automatically take attendance, repelling the need of any physical contact, which makes it an especially good solution in post-pandemic settings.
- **Automated Data Logging:** This means that when a face is identified, there is automatic update of attendance with timestamps thus eliminating manually entering attendance and the chances of tempering with the data and also keeping the records secure and frequently updated.
- **User security and privacy:** Data is locally stored and compared on encrypted channels and hence there is no privacy or

productivity loss and there is no misuse or security breach of sensitive biometric data.

IMPLEMENTATION

Automated attendance system through facial recognition is employed through application of computer vision, machine learning and real time databases. The Haar Cascade model and OpenCV are implemented to detect and recognize faces captured by live video that are paired with the stored student records to take automatic attendance. A registration step is then used to securely store important information about each student including facial images, IDs, names, sections and year in school, which will be used to train the recognition model to produce distinct feature vectors of each student. The system is flexible, simple to operate, can be integrated with cloud systems and provides efficient, safe and reliable time and attendance tracking than manual procedures.

Fig 2. Register Your Face

In live lectures they are automatically able to scan faces using the camera, and that scan will be compared with the stored database and the attendance is recorded automatically. Verified personnel may also access the attendance records to view, authenticate and revise them as frequently as necessary. The system is modular and can be easily upgraded where scripts are swapped to perform tasks like registration, training, recognition and reporting. It has the ability to be used in any institution big or small and greatly minimizes the manual load, avoids proxy attendance and has a high degree of data integrity.

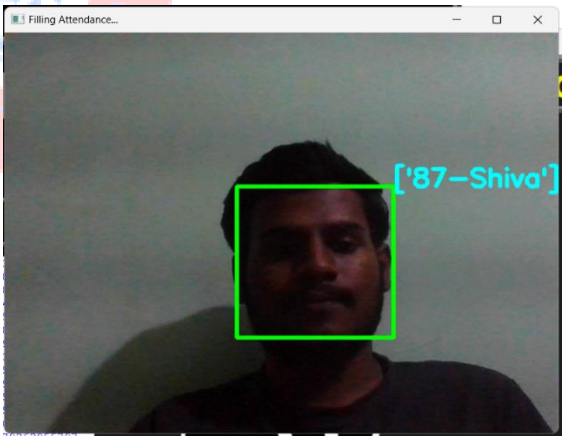

Fig 3. Filling Attendance

RESULTS

The Automated Attendance System using the Facial Recognition System is reliable and efficient compared to the conventional attendance systems. It eliminates the

possibility of human error and proxy attendance, and uses real-time recognition. The system has the ability to recognize a person accurately in different lighting or different angles providing attendance in seconds. Still, it is rather quick and efficient even when it has to deal with big groups.

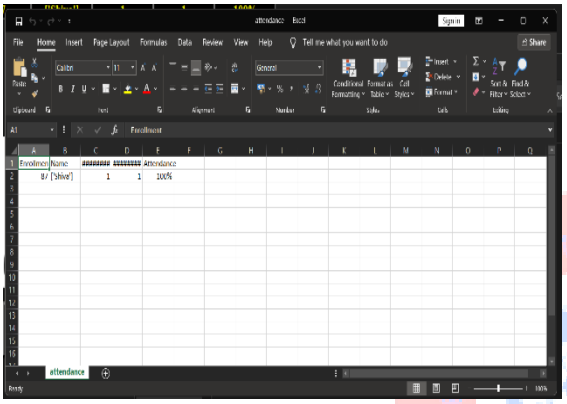

Fig 4. Excel Attendance Sheet

The system is interactive and easy to use whereby an administrator can create a record, generate reports of the attendance and manage data without difficulties. It also facilitates manual override in the instances of face recognition fail due to mask or technical problems, and it can be ready scaled to support big databases which make it be applicable in schools, colleges and universities. AI has become a tool of productivity and ease in academic processes as its most successful feature, facial recognition, is exceptionally accurate, reliable and efficient adding value to attendance monitoring.

CONCLUSION

The suggested facility is the automated attendance with face recognition as a secure and efficient one within the modern educational domain. It streamlines the attendance procedure, reduces errors and frauds, gives precise identification, safe data storage and near real-time capture and the anonymity of users. Its minimal latency enables it to be smoothly recognized on different lighting and orientations, and cross-referencing of data enables it be impossible to spoof and access it unauthorized. The administrators find it by easy to control student records and access or export student attendance logs. It is programmable and can therefore be applied in small educational rooms right up to large colleges. Deployment indicates that the system is more efficient, transparent and secure in attendance, and its further functionality can be encompassed by promoting better deterrence of spoofing, cloud dashboard and the use of multi-modal biometrics as part of educational digitalization.

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