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Research Article

FACE RECOGNITION BASED ATTENDANCE SYSTEM

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Abstract

Attendance management is a critical task in academic institutions and organizations, as it directly affects performance monitoring and record maintenance. Traditional attendance methods such as manual roll calls, sign-in sheets, and card-based systems are time-consuming, error-prone, and vulnerable to proxy attendance. This paper presents a Face Recognition Based Attendance System that automates the attendance process using computer vision and machine learning techniques. The system captures real-time facial images, preprocesses them, and compares them with a trained database using face detection and deep learning-based recognition models. Algorithms such as Haar Cascade and Convolutional Neural Networks are employed to achieve accurate and contactless attendance marking. The proposed system minimizes human intervention, prevents fraudulent practices, and provides real-time monitoring with automated report generation, thereby improving efficiency and reliability in attendance management.

Keywords: Face Recogination, Attendance System, Computer Vision, Deep Learning,Automation

Introduction

Attendance tracking plays a vital role in educational institutions and organizations, as it reflects participation, discipline, and productivity. Conventional attendance systems rely on manual registers, biometric scanners, or card-based technologies, which often suffer from inefficiency, human errors, and security issues such as proxy attendance. With the advancement of artificial intelligence and computer vision, automated attendance systems have gained significant attention

Face recognition technology offers a contactless, user-friendly, and secure solution for attendance management. By identifying individuals based on unique facial features, the system eliminates the need for physical interaction and reduces administrative workload. This paper focuses on

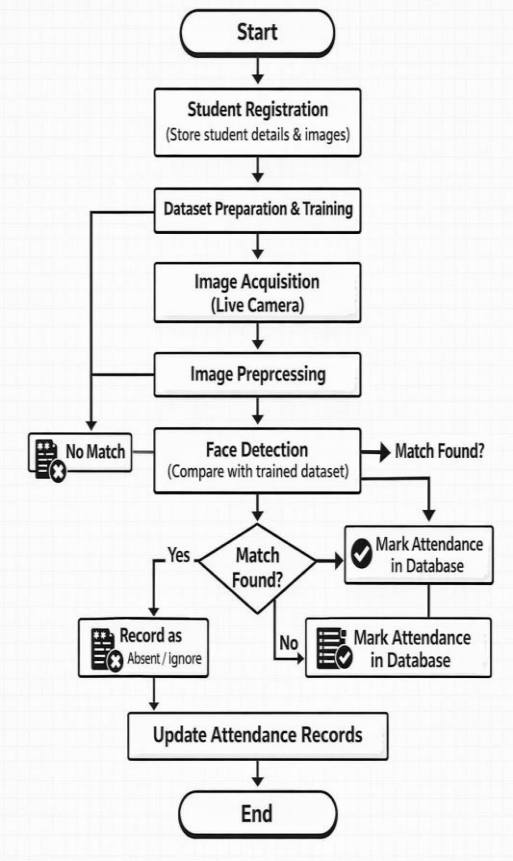
the design and implementation of a Face Recognition Based Attendance System that ensures accuracy, efficiency, and scalability.

Literature Review

Traditional attendance tracking methods such as manual roll calls and sign-in sheets are simple but inefficient and unreliable for large-scale environments. These methods consume valuable time and are prone to manipulation. Biometric systems like fingerprint and iris recognition improved security but introduced issues related to hygiene, user discomfort, and high implementation costs.

Recent studies highlight the use of machine learning and deep learning techniques in face recognition systems. Algorithms such as Principal Component Analysis (PCA), Local Binary Patterns (LBP), and Support Vector Machines (SVM) have been widely used for feature extraction and classification.More recently, Convolutional Neural Networks (CNNs) and transfer learning models such as FaceNet and VGG-Facehave demonstrated superior performance in real-time face recognition applications. These advancements form the foundation for modern attendance automation systems.

The system starts with student registration, where facial images are collected and used to train the recognition model. During attendance, images are captured through a live camera and preprocessed for better quality. Face detection and recognition are performed by comparing the captured image with the trained dataset. If a match is found, attendance is marked in the database; otherwise, the student is recorded as absent.



Flow Diagram 1

Experimental Results And Analysis

The system was tested in a controlled classroom environment to evaluate recognition accuracy, execution speed, and reliability. Performance metrics such as recognition accuracy and false acceptance rate were analyzed. The results demonstrate that the proposed system achieves high accuracy under varying lighting conditions and facial expressions.

Compared to traditional attendance methods, the face recognition system significantly reduces time consumption and eliminates proxy attendance. The experimental results confirm that the system is suitable for real-time deployment in academic institutions.

Conclusion And Future Work

This paper presented a Face Recognition Based Attendance System that automates attendance marking using computer vision and deep learning techniques. The system is contactless, secure, and efficient, addressing the limitations of traditional attendance methods. By integrating real-time recognition with automated data storage, the system enhances accuracy and reduces administrative workload.

Future enhancements may include cloud-based data storage, integration with other biometric systems for multi-factor authentication, real-time alerts, and advanced analytics dashboards. Improving recognition performance under low-light and crowded conditions is also a potential area for future research.

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