Chapter 18
Smart Face Recognition Attendance System Using Deep Learning

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ABSTRACT

The Face Recognition-Based Attendance System is an AI-driven solution designed to enhance attendance management using deep learning. In educational institutions and corporate environments, accurate tracking is crucial for monitoring performance and ensuring accountability. This system utilizes Convolutional Neural Networks (CNNs) for real-time facial recognition, ensuring seamless, contactless authentication and eliminating proxy attendance. Facial images are captured via a webcam or IP camera and matched against a pre-registered database. For added security, a secondary authentication layer using voice recognition is implemented,

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along with GPS-based location validation to prevent fraudulent remote check-ins. By automating attendance tracking, the system significantly reduces administrative workload, enhances security, and improves accuracy. It eliminates physical interactions, making it a hygienic and efficient solution, particularly in the post-pandemic era. Its real-time processing and scalability make it a reliable solution for modern attendance management in various sectors.

INTRODUCTION

The appearance of advanced technologies such as artificial intelligence and computer vision has significantly transformed management systems, making them more accurate, safe and efficient. Regular methods from manual roll calls to RFID tags and fingerprint scanners often face complications such as human error, security risks and proxy visit and GPS cheating.

To overcome these limits, this program introduces a real -time, facial recognition -based attendance system that includes deep learning models and geographical verification. To create facial embeds to verify individual identities, this system uses Yolo (only once you see) for high -speed and accurate facial diagnosis. This solution is presented by a flask backward, which is provided by a stream-free front, which ensures a gentle user experience. All attendance records to support scaling and efficient data manipulation are safely maintained in the MongodB database. In addition, the coordination of the API stack of the geographical service enables the user's physics location - ensuring that the arrival can only be logged into the recognized geographical boundaries. By calculating the distance between the company and the user's location, the system can effectively prevent fraud or distant attendance efforts.

This chapter introduces a non-communication, anti-fraud and real-time face recognition-based attendance system, which significantly reduces the administrative effort and improves security. By automating attendance surveillance, it eliminates the need for manual intervention and supports the uninterrupted operation in education and corporate environments. Cloud coordination further enables remote access and measurement, which is a suitable solution for all agencies. The organization combines high speed facial recognition, geographical -based recognition and strong structure to provide modern, efficient and reliable approach to visit management.

The consolidation of the parent's approval methods and the coordination of child engaging protocols is equal to the digital safety regulations. It is very important to implement the protection that requires the approval of the parents who have been verified before collecting or processing any data related to the child, especially in the organizations that include facial recognition and data collection, especially in minors. At the same time, raising the participation of the child through age -old