



CLOUD APPLICATION DEVELOPMENT

Title:

Cloud Based Attendance System Using Facial Recognition in
Python

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1. Introduction

- An innovative solution that automates attendance tracking for businesses is a cloud-based attendance system that uses Python facial recognition technology. It authenticates users using facial recognition technology to identify them and ensure that attendance records are correct in real-time. Because the system is housed on a cloud platform, it is scalable, dependable, and secure. The system provides capabilities including real-time

tracking, attendance control, and system integration. It is a complete attendance management solution that reduces the need for manual tracking and offers more accuracy and efficiency.

2. Problem Statement

The Problem is to Organisations that track employees' attendance manually are more likely to make mistakes, find anomalies, and manipulate attendance data. Additionally time-consuming, this approach results in inefficiencies and lower productivity. By automating the attendance monitoring process and maintaining accurate records in real-time, a cloud-based attendance system employing Python and facial recognition can address these problems.

3. Project Proposal:

- **Objective:** The Objectives of a cloud-based attendance system using Python facial recognition are to automate and simplify attendance tracking, improve accuracy and eliminate errors, offer customization and anomaly detection, provide real-time tracking and reporting, increase productivity, and enhance workplace security.
- **Target Users:** Organisations and businesses of all sizes and in all sectors that need a reliable and effective means to track attendance are the target users for a cloud-based attendance system employing facial recognition in Python. This can include institutions like colleges, hospitals, government offices,

manufacturing sites, and more. Managers, supervisors, and HR staff can maintain attendance records and provide reports using the system. Employees may also utilise the system to check in and leave, making it a practical and simple way to keep track of attendance.

Project Scope and Objectives:

- Create facial recognition software that can be used to track attendance.
- Integrate the system with a cloud-based reporting and tracking platform for real-time monitoring.
- For safe access to attendance records, utilise user authentication.
- Offer customization options and make sure mobile devices can access the website.
- Automate and streamline the tracking of attendance.
- Boost precision and get rid of mistakes in attendance records.
- tracking and reporting of attendance in real-time.

- By streamlining the processes for tracking attendance, workplace efficiency will increase.
- By monitoring employee attendance, you may improve workplace security.
- Offer a variety of customization choices for various enterprises and industries.
- Provide anomaly detection to alert users to suspect activities or atypical attendance patterns.

2. Understanding the relationship between different kinds of Threads

There are two ways to execute code concurrently in a programme: threads and processes. A thread can operate concurrently with other threads within a process, whereas a process is a unit of execution that is governed by the operating system.

By employing threads, a work can be broken down into smaller subtasks that can be carried out concurrently on many threads.

Utilising the platform's APIs and tools to build and manage threads within the application is a need for developing apps that use the cloud application platform's threads.

Multi-threading In Attendance System Using Facial Recognition

An application's performance can be increased by using the multi-threading technique, which enables it to carry out numerous activities at once. Python can leverage multi-threading to speed up the capture and processing of photos as well as the detection of faces in a cloud-based attendance system. By doing this, the amount of time needed to record everyone's attendance can be considerably decreased.

You can identify the sections of the code that can be run concurrently, such as the image processing and facial recognition operations, to implement multi-threading. The threading module in Python can then be used to generate several threads, each handling a distinct task. These threads can operate independently and concurrently, enhancing the application's overall performance.

In conclusion, you may speed up the process of recording attendance for a sizable number of individuals and enhance the overall performance of the programme by employing multi-threading in a cloud-based attendance system that uses Python and facial recognition.

Technical Architecture:

- **User Interface:** A camera or webcam is part of the user interface, and it also has a display so that employees can view their attendance history. Employees should receive feedback on their attendance status through the interface, such as a Blue checkmark signifying successful attendance.
- **Facial Recognition Engine:** The system's photos are processed by the facial recognition engine, which uses machine learning techniques to recognise faces in them. This part consists of face

landmark identification, feature extraction, face encoding, and face matching.

- **Database(As a CSV File):** To store employee data, attendance records, and other system data, the attendance system needs a database. The database needs to be scalable, able to manage massive amounts of data, and simple to access from the cloud.
- **Cloud Services:** The infrastructure necessary to host the system and enable remote access is provided by the cloud services component. This covers cloud computing resources for machine

learning processing as well as cloud storage for data backup and retrieval. Additionally, serverless operations for real-time data processing might be included.

- **Security:** To guarantee the security of employee data, the system must be designed. Secure authentication and data encryption are part of this. Secure system access may be provided via multi-factor authentication.

- **Analytics:** The system can be equipped with analytics tools that can generate reports and offer insights on attendance patterns, output, and anomalies. In addition to automated email or messaging systems to alert managers or HR staff about attendance difficulties.

Task Flow:

- Employees must register their personal data, which includes their name, picture, and other pertinent information. The database of the system then stores this data.
- The system trains the facial recognition model to recognise the faces of the registered employees using machine learning algorithms.
- The technology employs the camera or webcam to take a picture of the employee as soon as they arrive at work. The image is processed

by the facial recognition engine, which then compares it to the face of the registered employee and stores the attendance information in the system's database.

- Based on the information stored in the database, the system creates attendance reports. Authorised individuals, such as managers or HR teams, can view these data to monitor attendance patterns, spot problems, and take relevant action.

- To guarantee optimal functioning, the system needs routine maintenance. This include improving the database, updating the system's hardware, and updating the facial recognition engine.
- The system can be equipped with analytics tools that can generate reports and offer insights on attendance patterns, output, and anomalies. This part may contain dashboarding tools for visualising attendance data as well as automated email or messaging programmes for alerting managers or HR teams about attendance problems.

Overall, the job flow should be created to minimise manual data entry and administrative chores while optimising attendance tracking and management. To guarantee the security of employee data and to continue to be scalable, flexible, and simple to operate, it should prioritise security and privacy.



Thank You