Automatic Attendance System Using Facial Recognition

Imagine walking into a classroom, a camera instantly marks your attendance, no signs/ID & fingerprint scanning! Our project brings that futuristic vision to life with facial recognition. This system captures images with **Camera module** and processes them on a **Python-based local server** (**OpenCV & dlib)**, stores data in structured (**SQL database) - No manual input, No delays, No more proxies!**

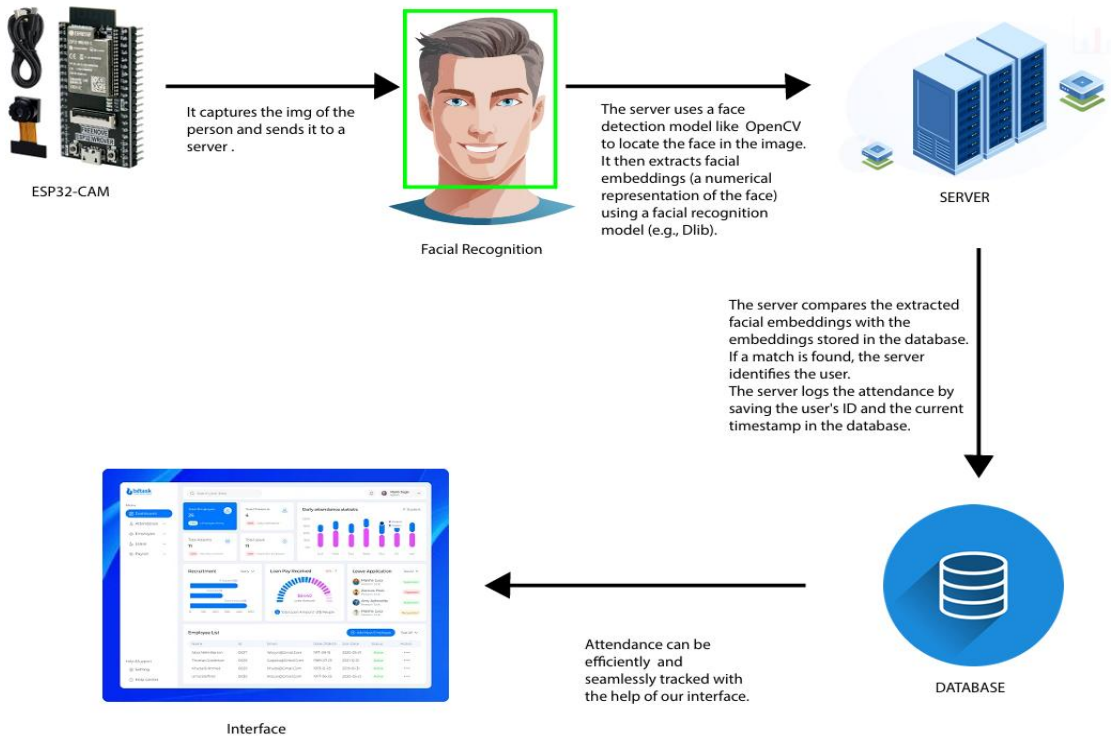
Technologies:

Hardware: ESP32-CAM & FTDI-Programmer - Captures real-time images.

Software & Libraries:

1. **Python** - Primary language (Simple & Extensive library support).
2. **Flask** - Communication between ESP32-CAM & local server.
3. **OpenCV & dlib** - For **Facial detection & recognition** using **Machine-Learning**, **Deep-Learning**, **Computer -Vision.**
4. **Pillow** - Image processing & handling.
5. **NumPy** & **Pandas** - Numerical computations of images.
6. **SQLite** - Database for attendance records.
7. **Tkinter** - For GUI Development.

Architecture:



Advantages of Our System:

Unlike expensive commercial systems, our project is **Affordable, Open-source, fully customizable & Ensures privacy.**

Feature	Our System	Commercial Models
Cost	Affordable (₹500-₹800)	Expensive (₹10,000 - ₹1,00,000+)
Hardware	**ESP32-CAM** (₹500-₹800)	Cameras & biometric scanners
Software	**Open-source python libraries**	Paid Proprietary software
Data Storage Privacy & Security	**Local storage (SQLite), Data stays on local servers**	Data stored on paid third-party servers **(privacy risks)**
Scalability	Easily expandable with **multiple ESP32-CAMs**	**Expensive** (Hardware)