

FaceAuth 2.0

Student Attendance System

An AI-Powered, Contactless Attendance Automation Solution



Department: M.M. Institute of Computer Technology & Business Management (MCA)

University: Maharishi Markandeshwar (Deemed to be University), Mullana-Ambala

Project Type: Bachelor in Computer Application (Data Science) – Final Year Industrial Project

Session: 2025-26

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The Inefficiency of Legacy Attendance Systems

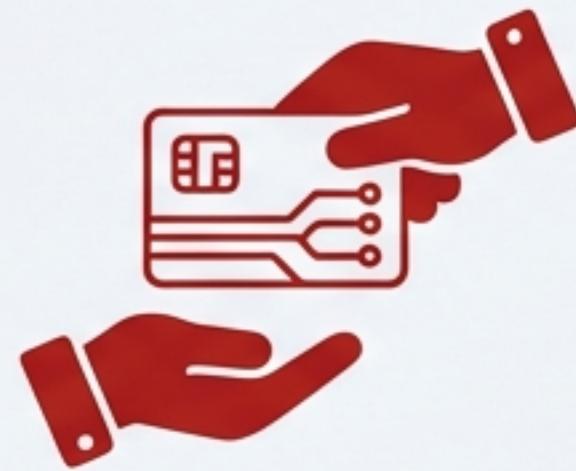


Manual Systems

High administrative overhead.

Prone to 'Proxy Attendance' where students answer for friends.

Vulnerable to human recording errors.



RFID / Smart Cards

Dependence on physical hardware.

Cards can be exchanged, lost, or damaged.

Fails to prove the actual physical presence of the student.



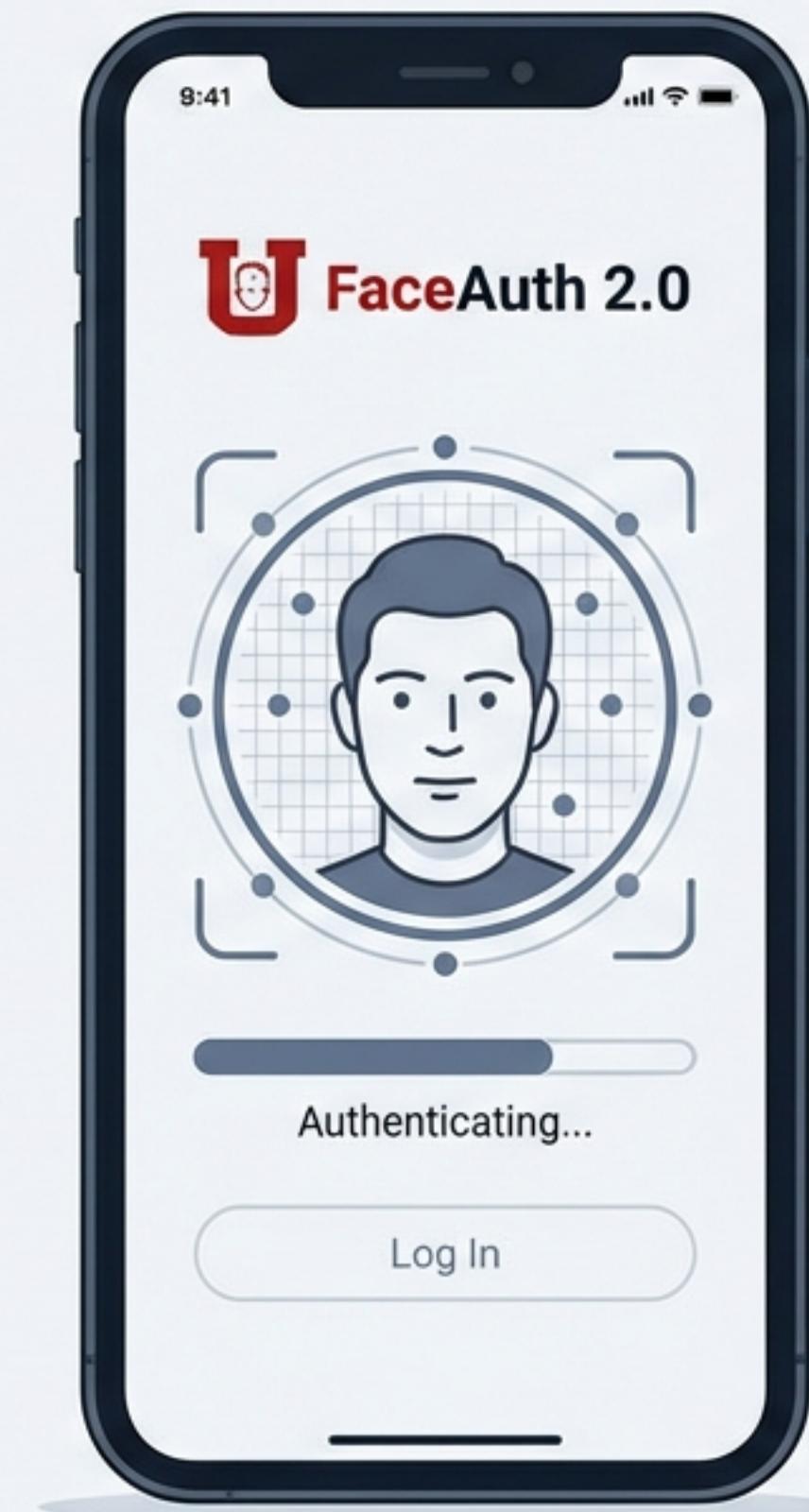
Contact Biometrics

Creates physical bottlenecks.

Hygiene concerns in high-traffic areas.

Sensors wear out and are vulnerable to 'Artificial fingerprint' spoofing.

Summary: There is a critical need for an automated, secure, contactless system that eliminates proxy attendance and integrates seamlessly with institutional ERPs.



Introducing FaceAuth 2.0

An advanced AI-driven application automating attendance via secure face recognition.

- ✓ **DeepFace Recognition:** High-accuracy identification using deep learning models.
- ✓ **Liveness Detection:** Anti-spoofing technology (blink/movement checks) to prevent photo attacks.
- ✓ **Auto-Model Training:** Automatic generation of face embeddings for new users.
- ✓ **Role-Based Access:** Distinct interfaces for Admin, Faculty, and Students.
- ✓ **ERP Synchronization:** Direct export of attendance logs to university management systems.

Project Objectives & Goals

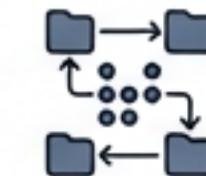
General Objectives (The Macro View)



Eliminate proxy attendance via AI.



Create a contactless, hygienic solution.



Streamline data flow across departments.

Specific Objectives (The Micro View)



Admin

Manage profiles, enroll faces with auto-ML training, and sync with ERP.



Faculty

Mark real-time attendance, export PDF/Excel reports, verify identities instantly.



Student

Access transparency via attendance percentage views and low-attendance alerts.

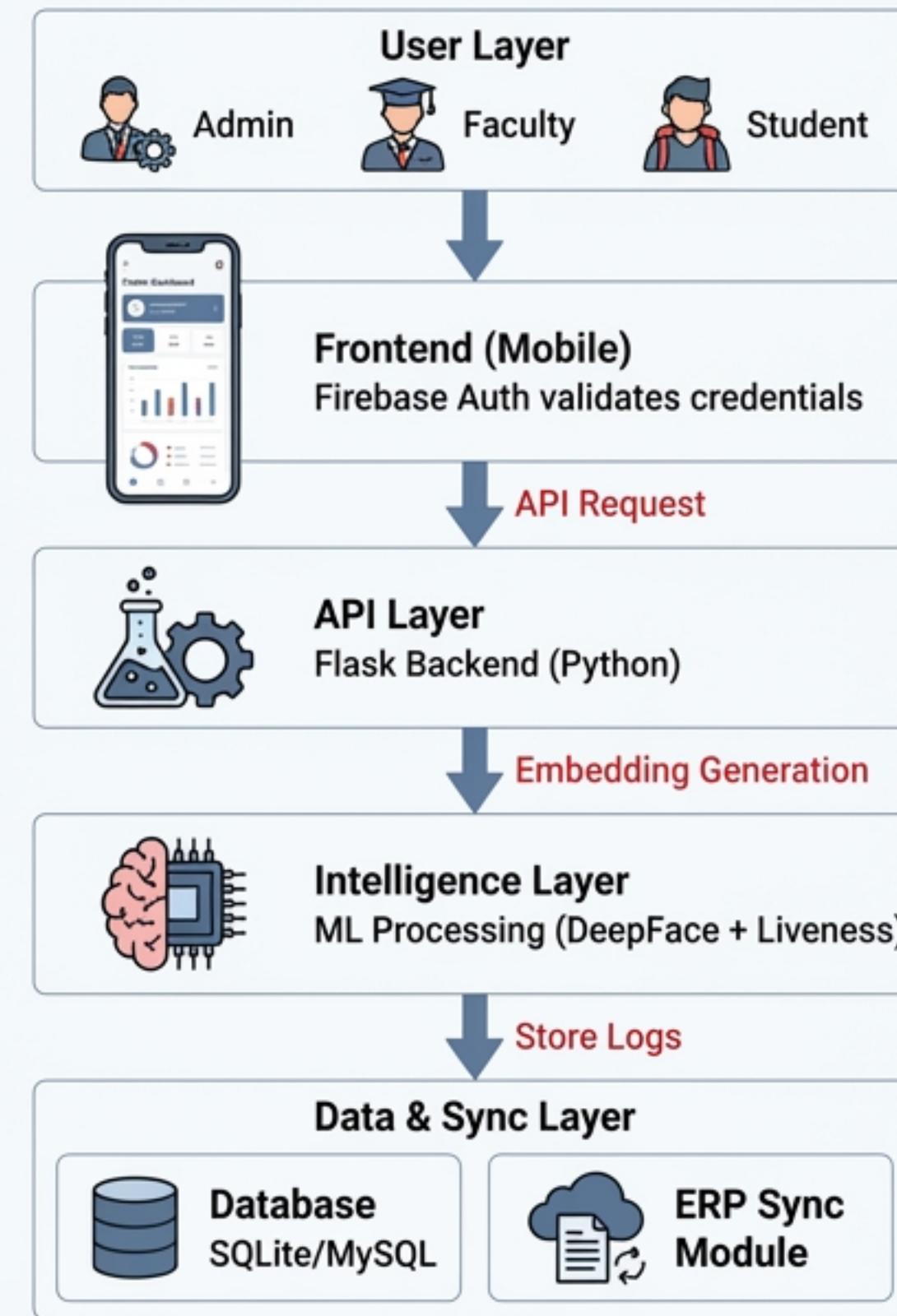


Technical

Ensure data integrity via Firebase Auth and secure API handling.

Academic Product

System Architecture



Technology Stack

Frontend (Mobile)

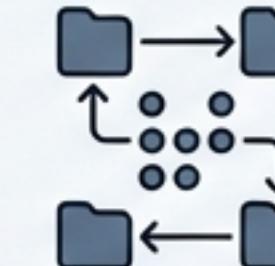


Framework: Flutter SDK 3.x+



Key Packages: camera (live stream),
flutter_liveness_detection,
firebase_auth

Backend (Server)

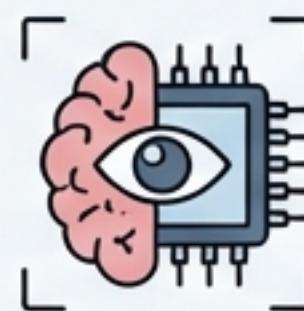


Language: Python 3.10+



Framework: Flask (API Services)

AI & Computer Vision



Libraries: OpenCV (Image Processing),
DeepFace (Embeddings), TensorFlow

Method: Anti-spoofing via
blink/movement detection

Data & Cloud

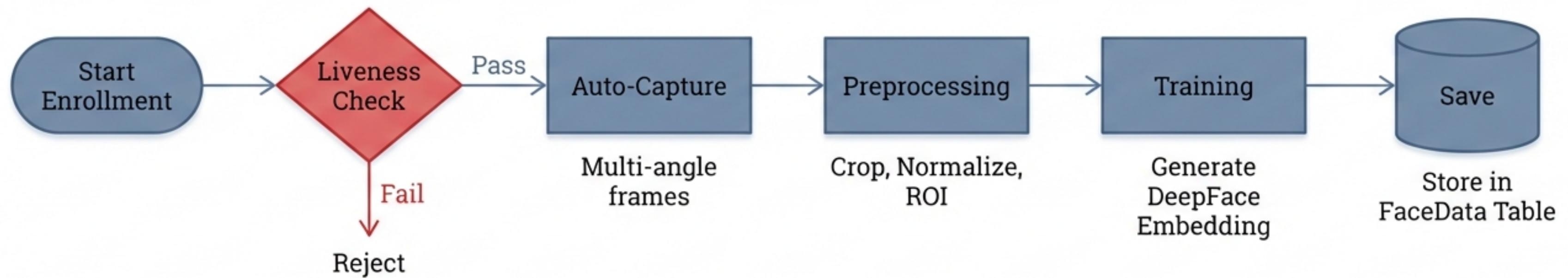


Database: SQLite / MySQL

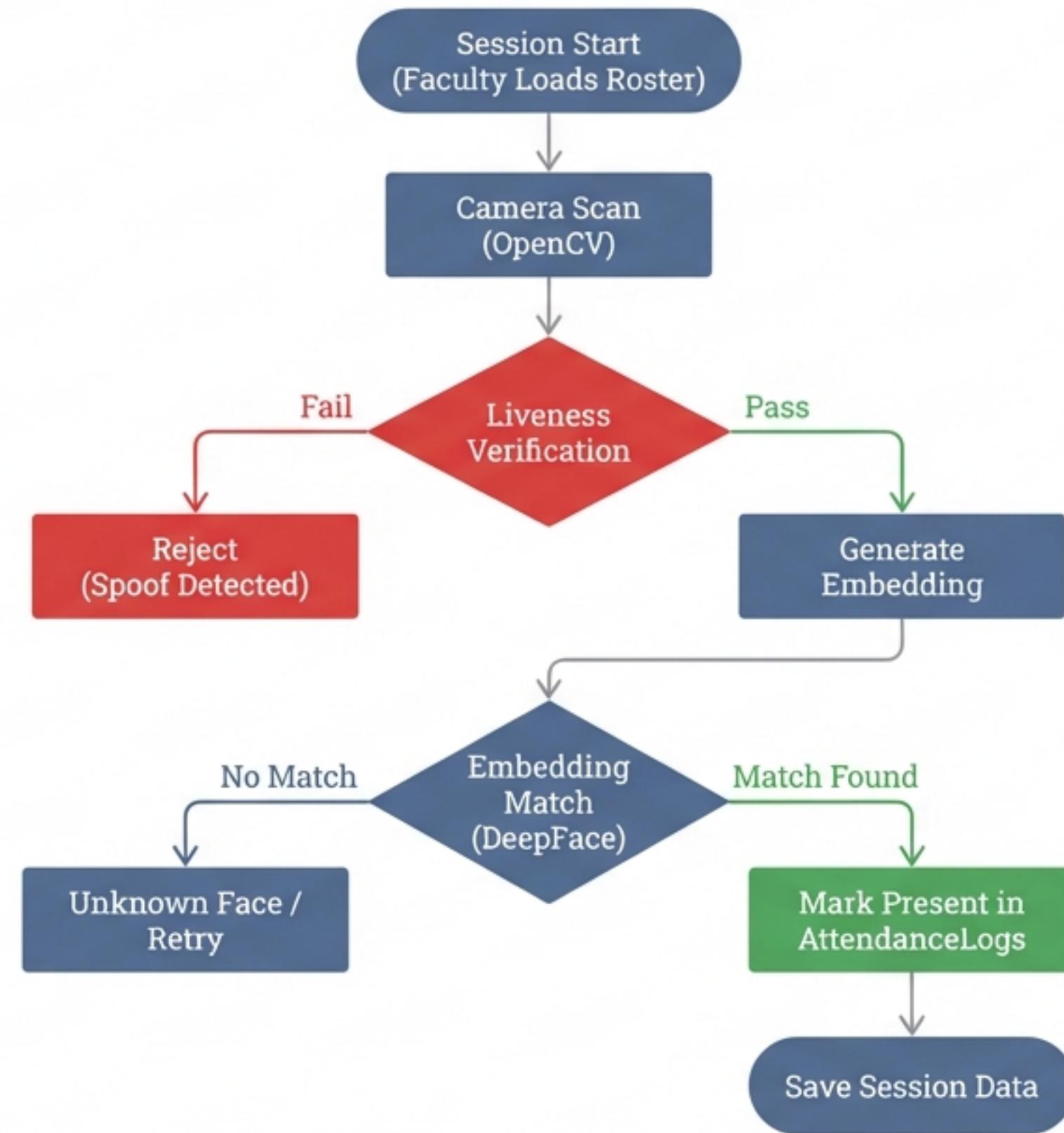


Cloud: Firebase Authentication (Identity),
Firebase Cloud Storage (Images)

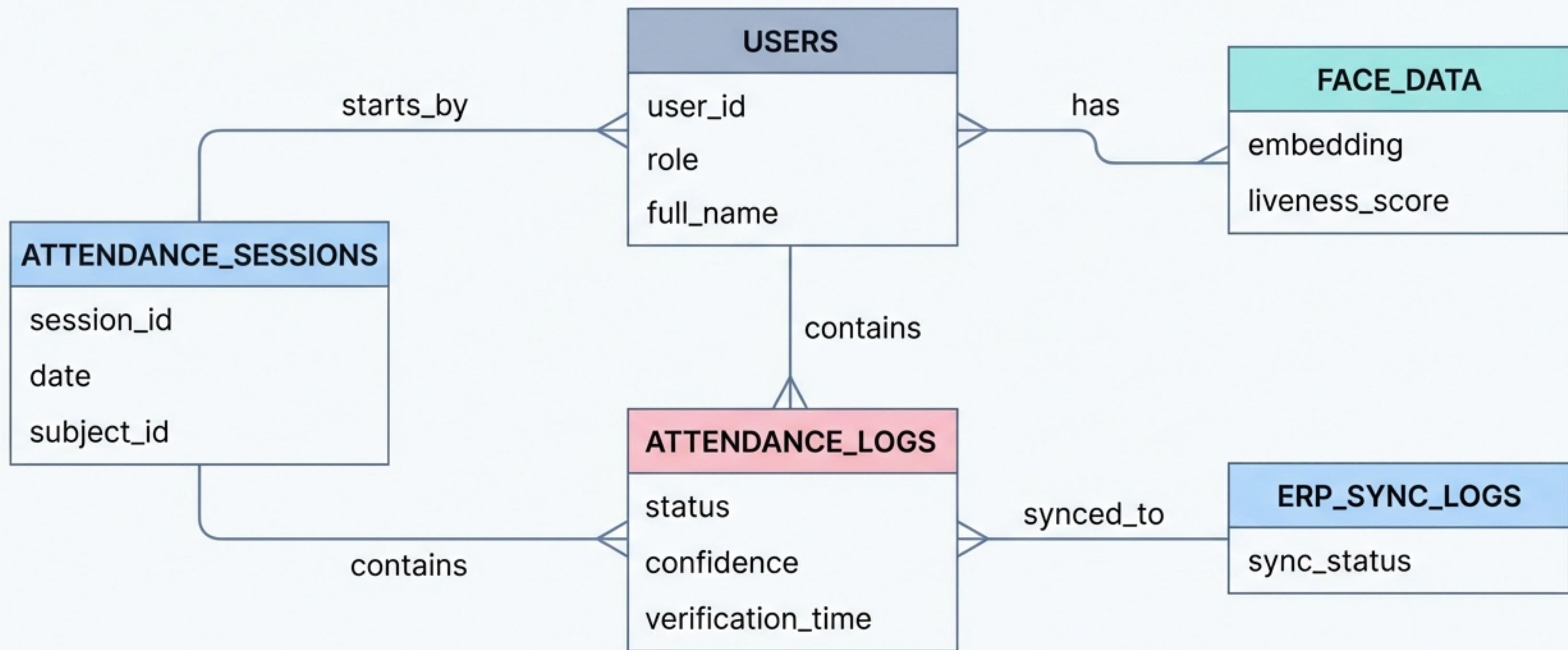
Core Mechanism: Face Enrollment Strategy



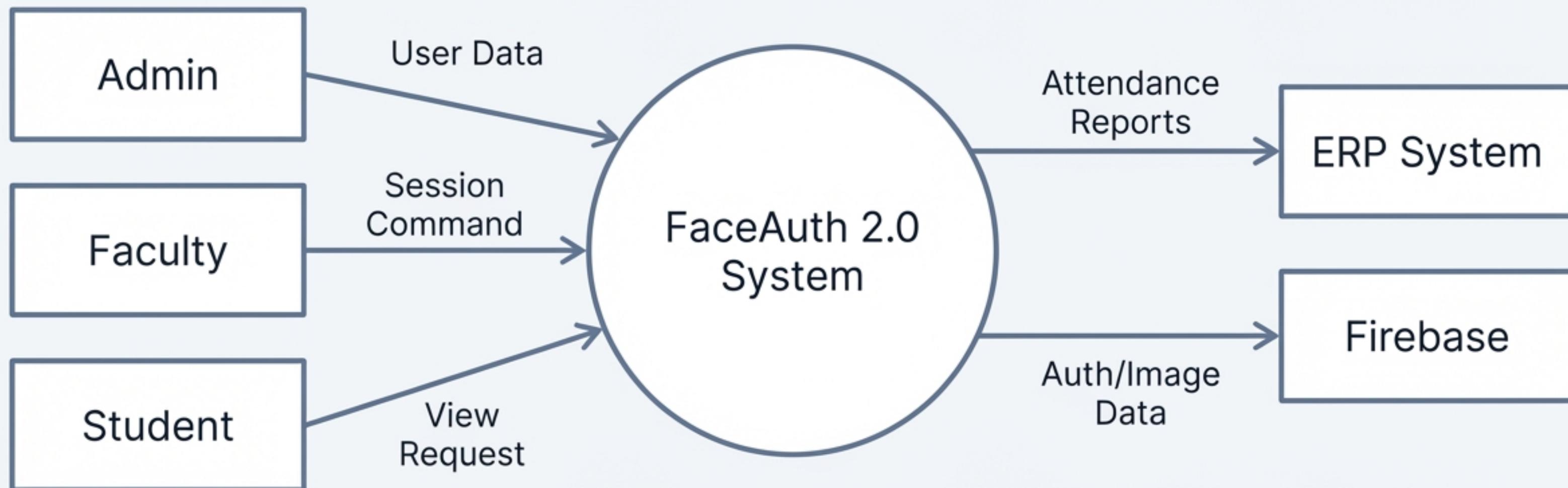
Core Mechanism: Real-Time Recognition Logic



Data Design & Entity Relationships



System Process Flow (DFD Level 0)



Module-Wise Functional Specifications



Admin Module

Add/Delete Faculty & Students

Manage Academic Structure

Execute Face Enrollment (Auto-Training)

Trigger ERP Sync



Faculty Module

Login via Face Auth

Start/Stop Attendance Sessions

Real-time verification

Export Reports (PDF/Excel)



Student Module

Secure Login

View Subject-wise History

Low-Attendance Alerts (<75%)

Gap Analysis: Comparative Advantage

	Manual	RFID	Fingerprint	FaceAuth 2.0 (Proposed)
Accuracy	✗ Low	✗ Medium	✓ High	✓ High (DeepFace)
Proxy Prevention	✗ Fail	✗ Fail (Card Swap)	✗ Medium (Spoofable)	✓ Success (Biometric)
Liveness Detection	✗ N/A	✗ N/A	✗ No	✓ Yes (Active)
Contactless	✗ No	✗ No	✗ No	✓ Yes (100%)
Processing Speed	✗ Slow	✓ Fast	✗ Medium	✓ Real-Time

Implementation Requirements & Constraints

System Requirements



Hardware (Dev): GPU support (NVIDIA) recommended; 720p webcam.



Hardware (Mobile): Android 8.0+ / iOS 12+; 8MP+ Camera.



Software: Python 3.10, Flutter SDK, Firebase Console.

Operational Constraints



Lighting: Requires adequate ambient light for high accuracy.



Face Visibility: Cannot detect through heavy masking or helmets.



Connectivity: Internet required for Firebase Auth and ERP sync.

Future Scope & Enhancements

Predictive Analytics

AI forecasting for student dropout risk.



Automated Scheduling

Timetable-based auto-session initiation.



Communication API

WhatsApp/SMS gateways for absence alerts.



Full ERP API

Real-time REST API integration.



FaceAuth 2.0 represents a scalable foundation for the Smart Campus of the future.

Project Team & Acknowledgements

Project Guide

Dr. Varsha Grover

Associate Professor, MMICT & BM (MCA)

Development Team

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Institutional Credit

**M.M. Institute of Computer Technology & Business Management
Maharishi Markandeshwar (Deemed to be University), Mullana-Ambala**

Completed in partial fulfillment of Bachelor in Computer Application (Data Science).