

ATTENDANCE SYSTEM USING FACE RECOGNITION

MINI PROJECT

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PROJECT DEFINITION

Our project aims to develop an Automated Attendance System using state-of-the-art technologies.

The system leverage face detection and recognition techniques, incorporating the Haar Cascade Classifier for face detection and the FaceNet Convolutional Neural Network (CNN) algorithm for face recognition.

To enhance user accessibility, the system will be integrated into a Flutter-based application, providing a seamless and user-friendly experience.



PROJECT OBJECTIVES

Objective 1

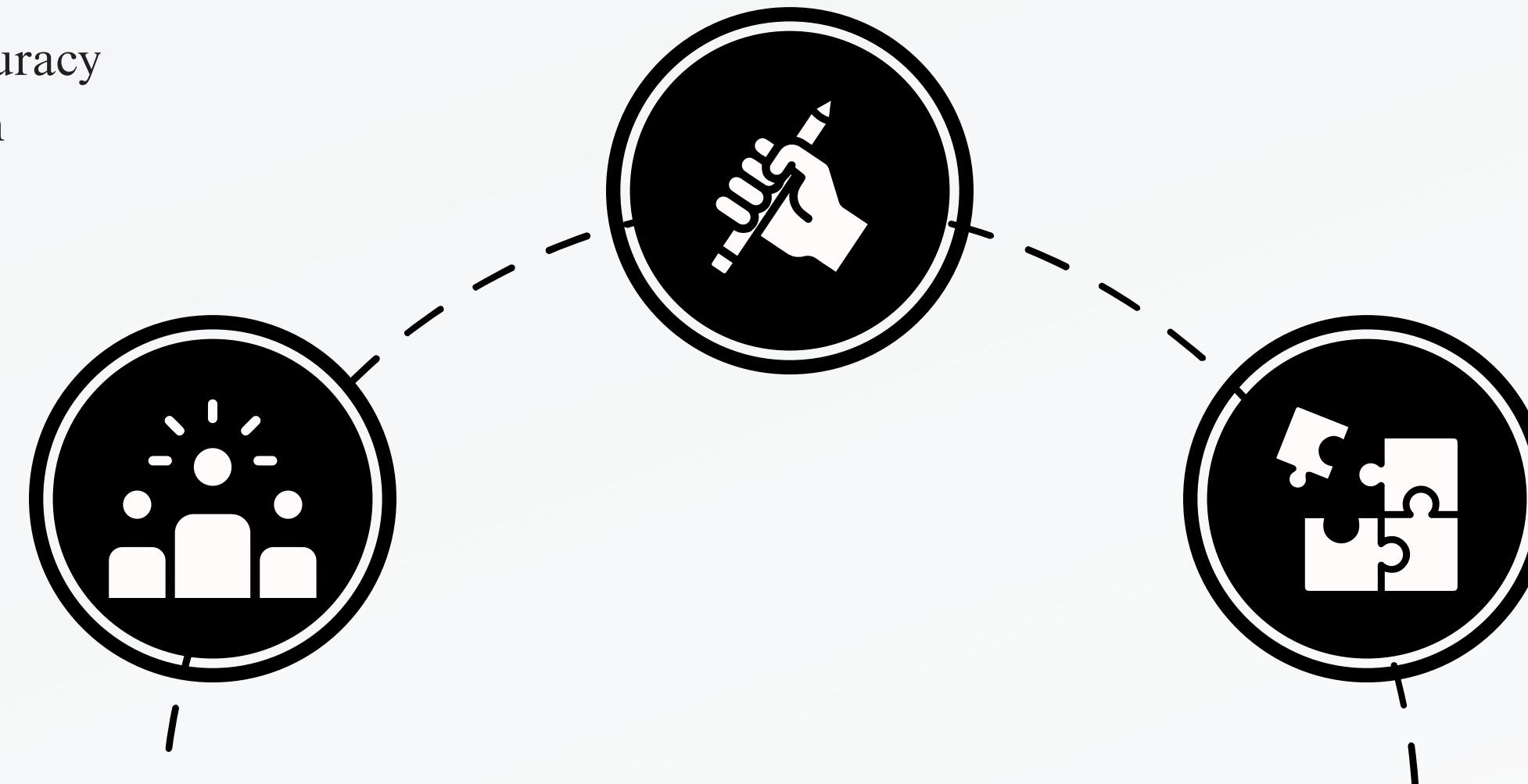
- To automate the attendance tracking process.
- To enhance accuracy and efficiency in attendance management.

Objective 2

- To streamline the overall attendance process, enabling quick and timely generation of attendance reports.

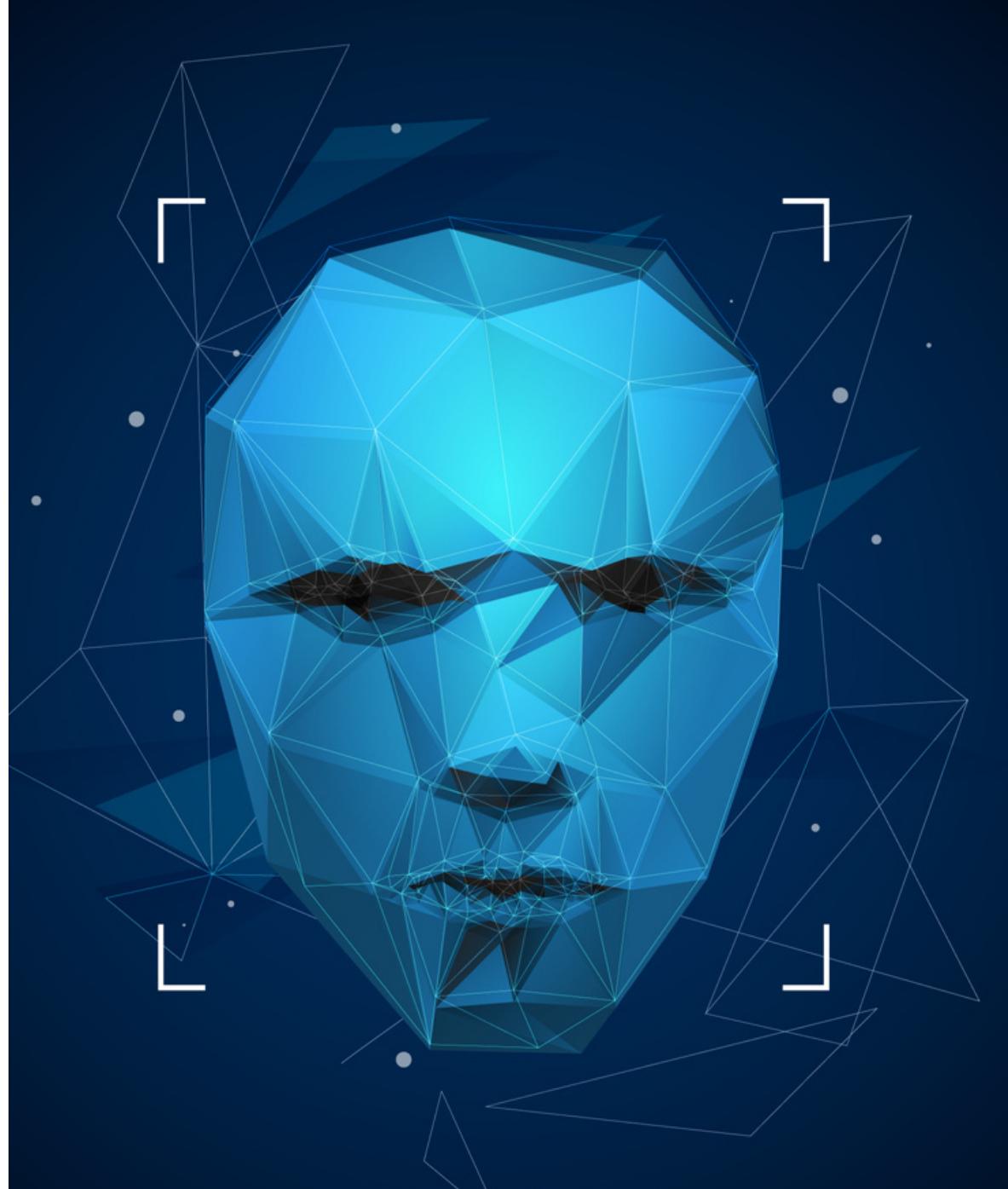
Objective 3

- To minimize administrative workload by automating repetitive tasks associated with attendance monitoring.



PROJECT SCOPE

- The project primarily focuses on automating the attendance taking process for companies or organizations are used for attendance taking using face recognition technology.
- The system will be designed to capture attendance streamlining the process to improve efficiency and accuracy.
- **Target Audience:** The target audience for the system is educational institutions and offices that want to enhance their attendance management process.



PROJECT MODULE

Registration and Login:

- To use various features of the app or the app the user has to register him/herself by the admin.
- Once the user is registered by the admin then the user will be asked to login in order to use the functionality of the app.
- Only the logged in user can use all the features of the app.

Face Detection and Recognition Module:

- Once the user(faculty) gets logged in, the mobile camera will detect the face of the user(student) and recognize it from the model.
- This module will provide the feature of face detection and attendance marking.

PROJECT MODULE

Attendance Tracking Module:

- This module contains a monthly calendar where the user can track his/her attendance or can have a glimpse of the monthly attendance.

Notification System:

- It provides notifications related to holidays, low attendance etc.

Attendance Report:

- Generating automated attendance reports with customizable parameters.

BASIC REQUIREMENTS

Hardware

- Mobile Device
- Server

Software

- Programming Languages: Dart, NodeJS, ExpressJS, Python.
- Framework: Flutter
- Server and Hosting: Render

LITERATURE REVIEW

- 2017 **Samuel John** presented a Face Recognition Attendance System with GSM Notification. This system uses the **Viola-Jones algorithm**. This algorithm used for detect faces. Also, Fisher faces algorithm was used to create **patterns** of the faces which were caught. That created templates stored in the database. This system used library which is **OpenCV** and used **Software Development Kit (SDK)** to create the graphical user interface.
- other paper, **Jenif D Souza** introduces a Automated Attendance Marking and Management System by Facial Recognition. This system marked students attendance automatically by the camera which captures the photo of student in the class. This system uses the algorithm called **Histogram**. Histogram algorithm used for face identification purpose. In this algorithm, The face image is converted to **matrix form**. Histogram are used for recognize of the **exact faces**. This system overcome the problem of **time consuming**.
- 2019 **Nandhini R.** introduced Attendance System based on face recognition. This system capture the video of the students, convert it into frames and store it in the database. Also, **Convolution Neural Network(CNN)** algorithm is used to **detect faces**. This System helps in improving the **accuracy** and **speed**.

FEASIBILITY STUDY

Technical Feasibility:

- Evaluate effectiveness of liveness detection in face recognition.
- Assess Flutter's suitability for integration.
- Ensure compatibility with mobile platforms and databases.

Operational Feasibility:

- Gauge user acceptance for attendance tracking.
- Determine training needs for users and administrators.
- Evaluate impact on existing workflows.

Economic Feasibility:

- Estimate costs for technology, development, training, and maintenance.
- Evaluate ROI considering security and accuracy benefits.

FEASIBILITY STUDY

Legal and Ethical Feasibility:

- Ensure compliance with privacy regulations.
- Implement transparent consent processes.

Schedule Feasibility:

- Assess development time for system and application.
- Plan testing and deployment phases.

Risk Analysis:

- Identify and mitigate liveness detection risks.
- Address potential user adoption challenges.

TECH REQUIREMENT GATHERING

User Stories and Scenarios:

- Develop user stories for administrators and students.
- Create scenarios to understand system interactions.

Surveys for User Preferences:

- Distribute surveys to understand user preferences.
- Gather feedback on desired user experience.

Requirement Workshops for Flutter Application:

- Host workshops for Flutter app requirements.
- Discuss features, UI/UX, and integration needs.

COMPARISION

Accuracy:

- Existing System: Reliant on traditional methods prone to fraud.
- Proposed System: Enhanced accuracy by reducing fraudulent attendance.

Security:

- Existing System: Relies on physical credentials with limited security.
- Proposed System: Biometric authentication and liveness detection for enhanced security.

COMPARISION

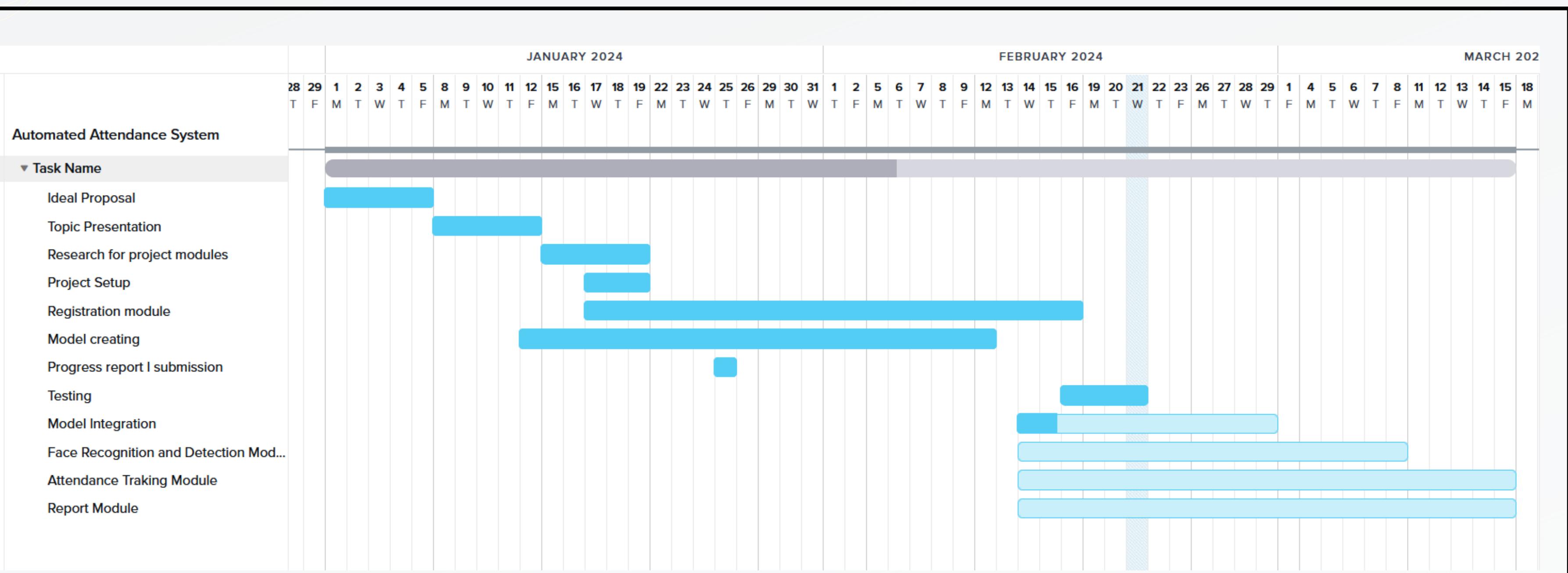
Usability:

- Existing System: Manual methods may be cumbersome.
- Proposed System: Implementing Flutter-based application, ensuring a smoother and more efficient user experience.

Cost:

- Existing System: Costs for physical credentials and maintenance.
- Proposed System: Involves initial setup costs for integrating Flutter technology, yet offers the potential for long-term savings due to decreased dependence on physical credentials and streamlined maintenance processes.

TIME LINE CHART



WORK DISTRIBUTION

UI Design, Frontend Application : By Prince Moradiya (21IT412)

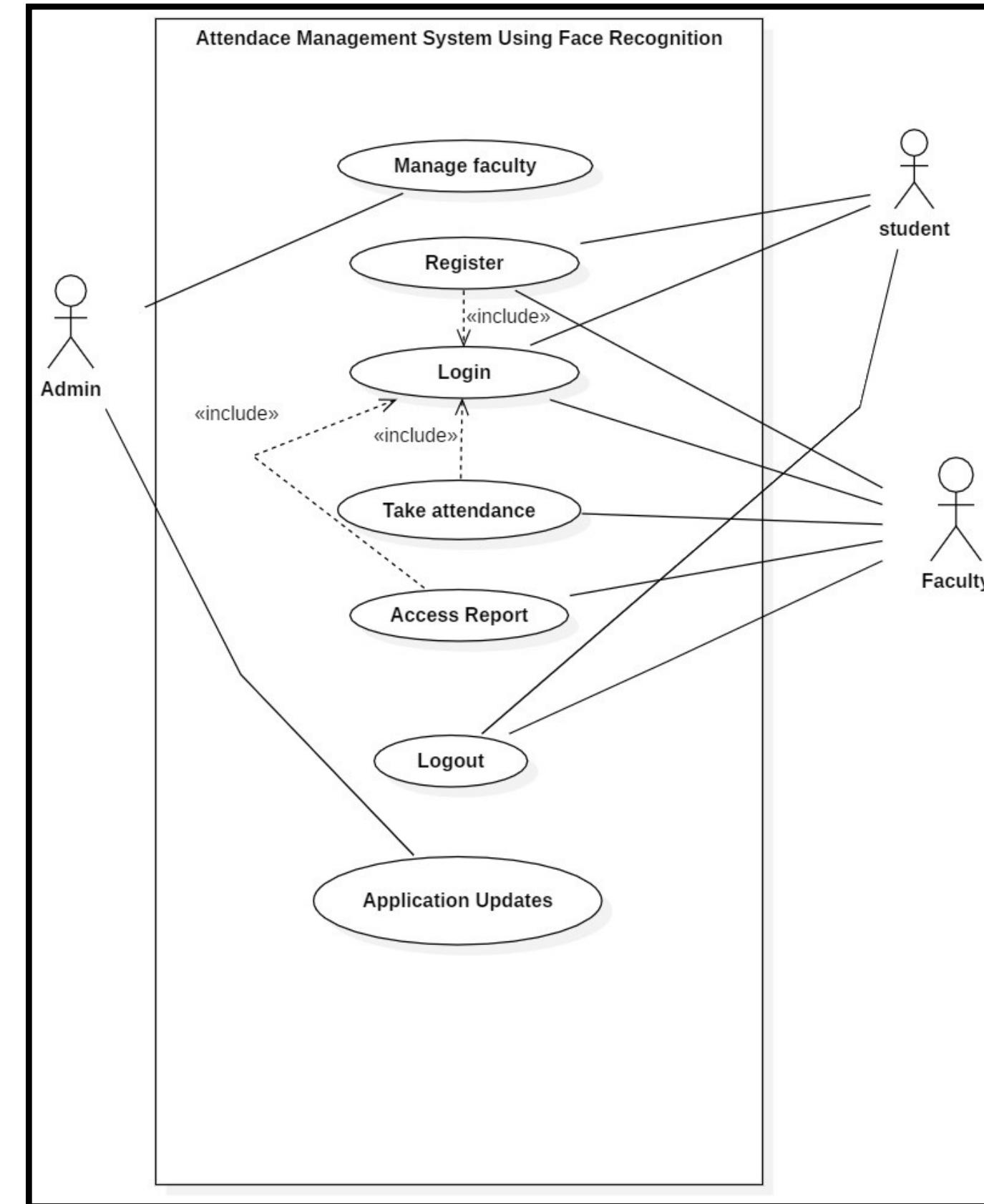
ML Model Creation : By Jay Butani(21IT407)

Backend : Together implemented and designed the schema for databases

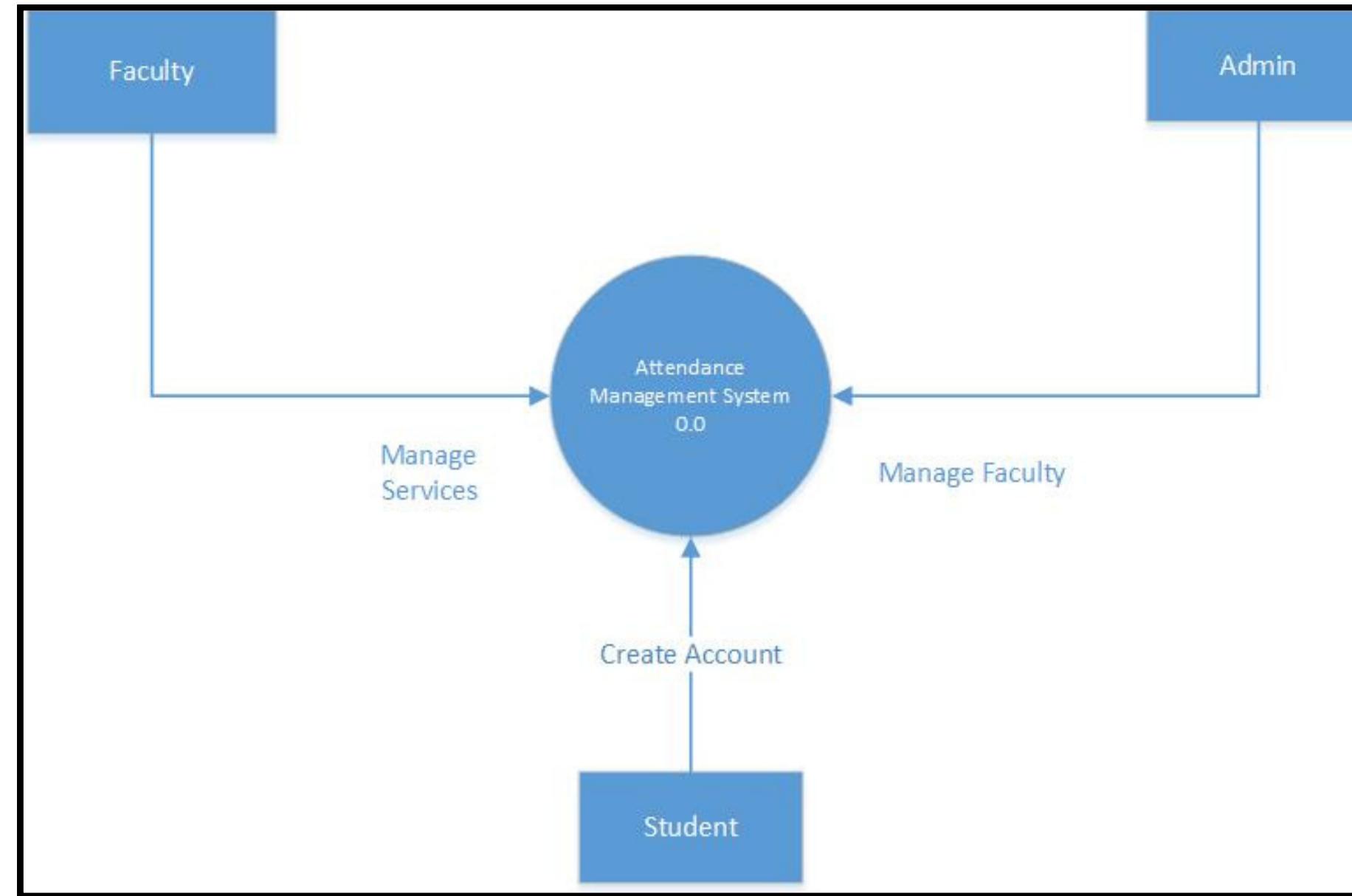
PROJECT DIAGRAMS



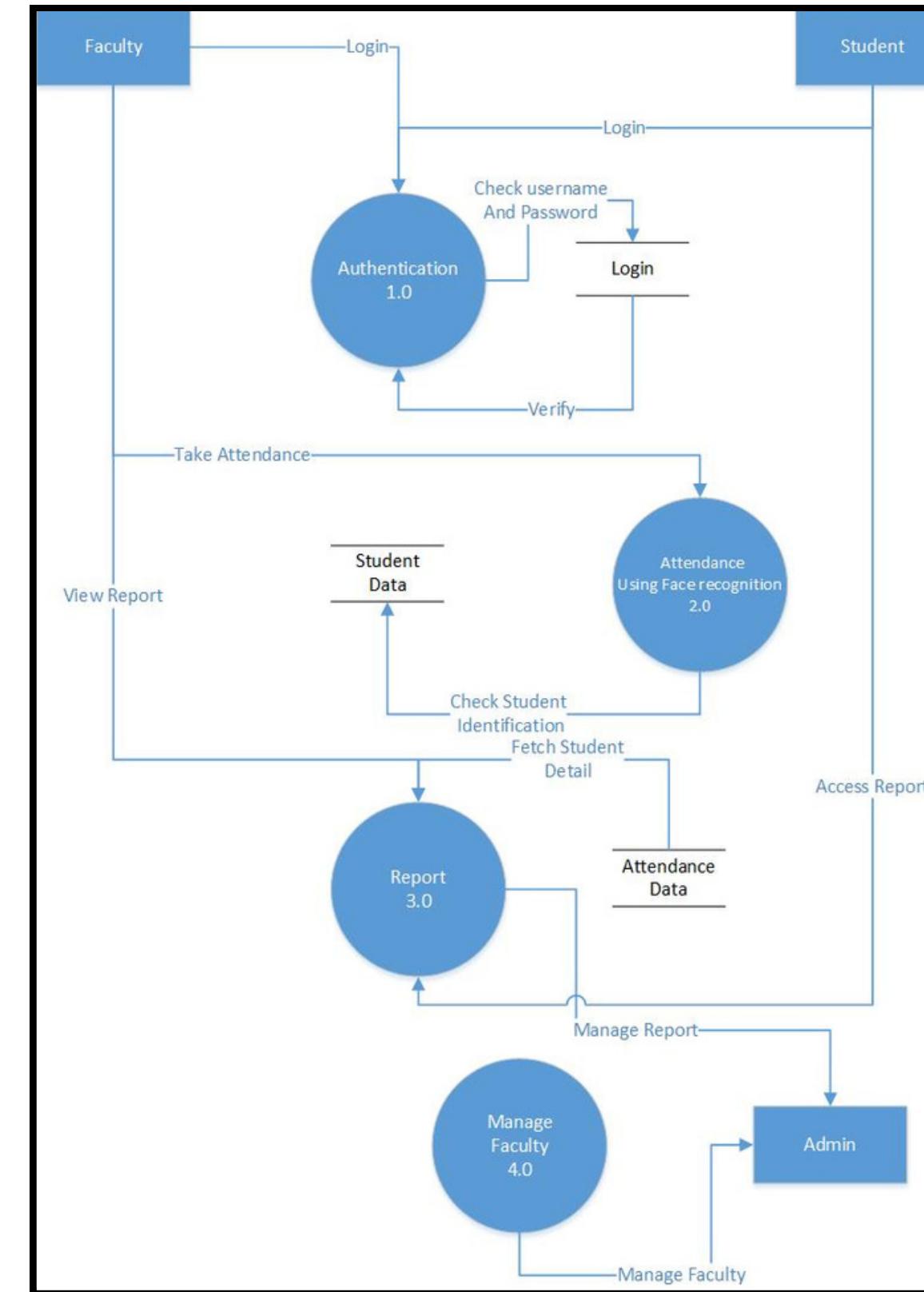
Use Case Diagram:



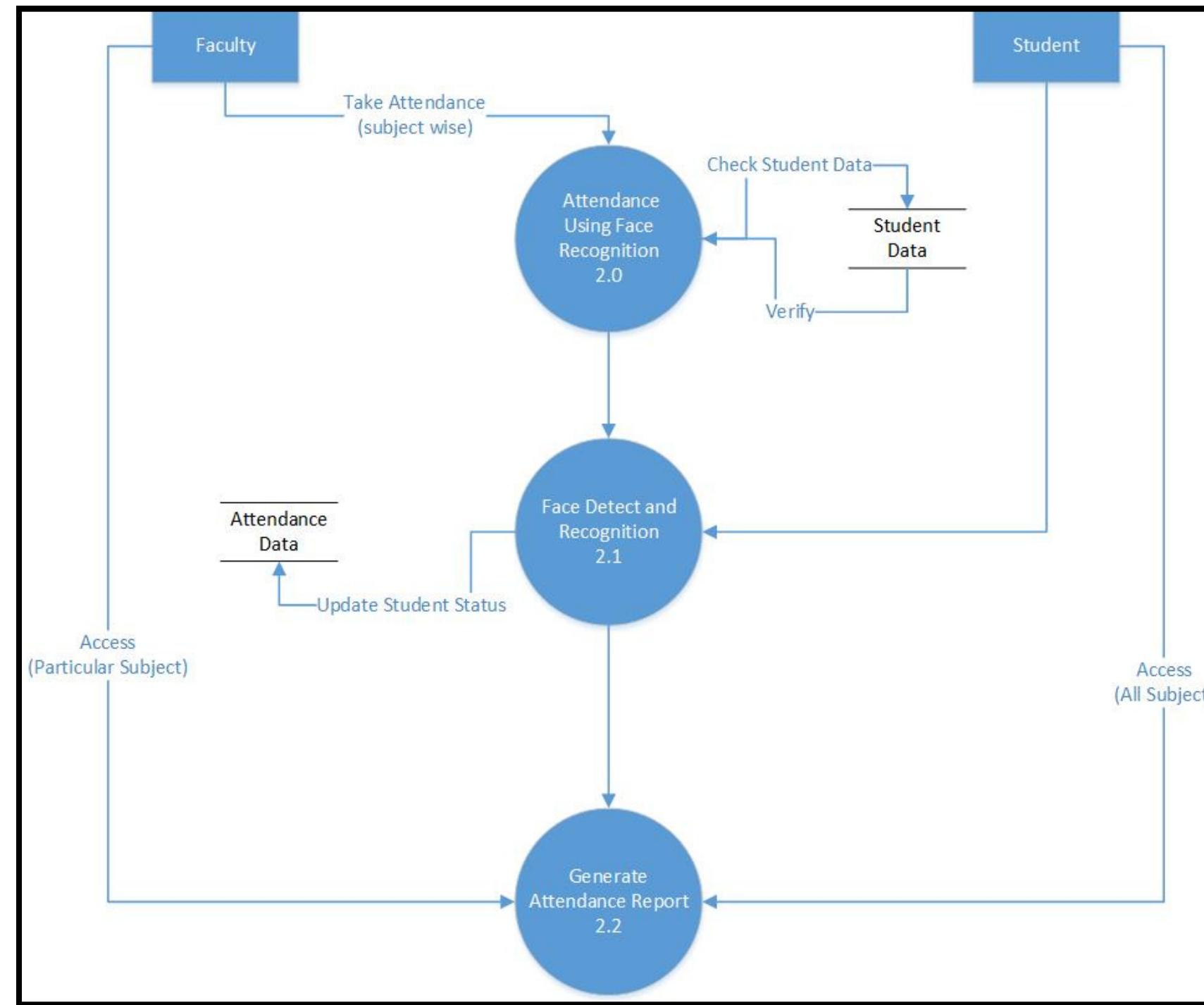
Data Flow Level-0 Diagram:



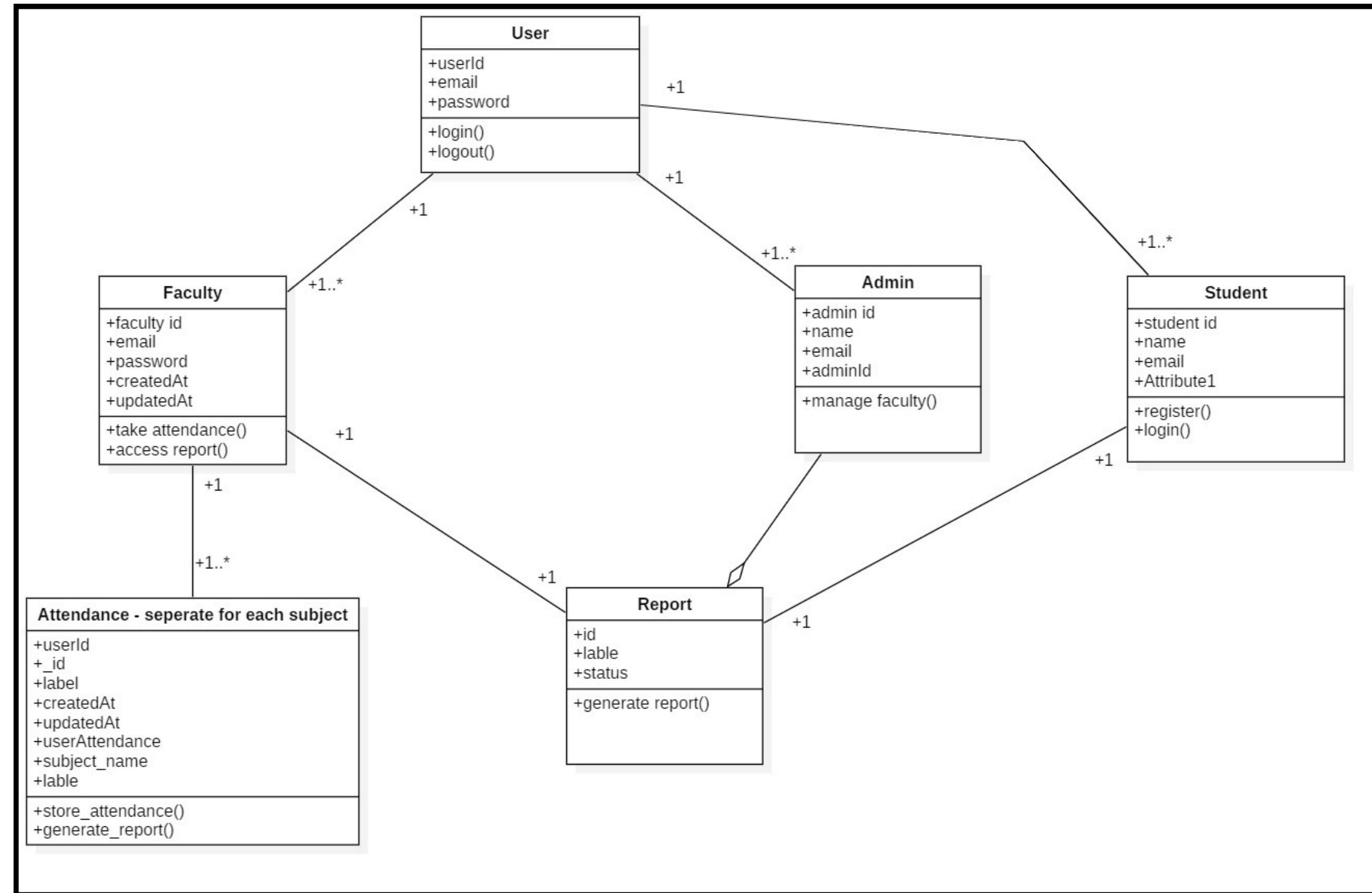
Data Flow Level-1 Diagram:



Data Flow Level-2 Diagram:

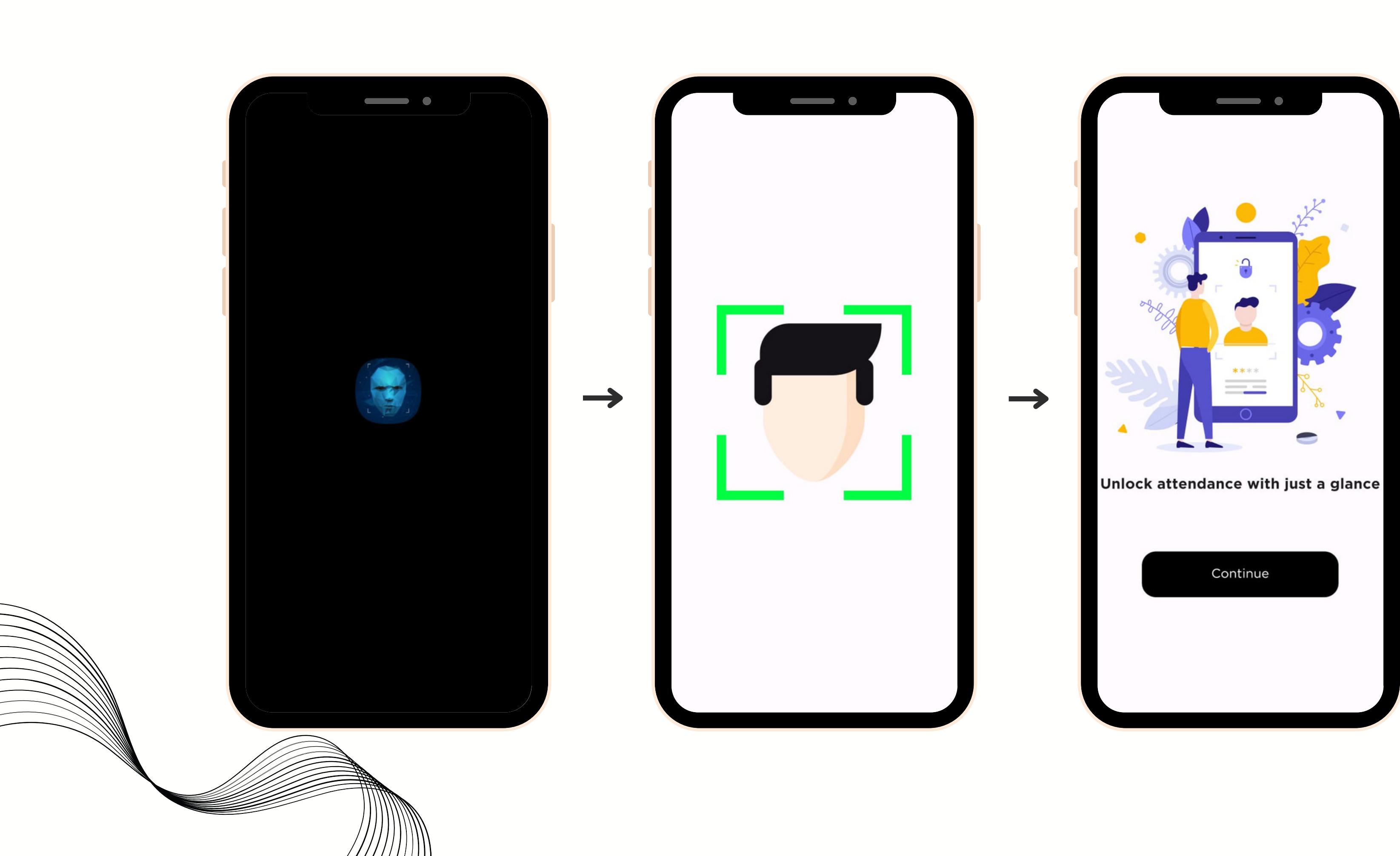


Class Diagram:

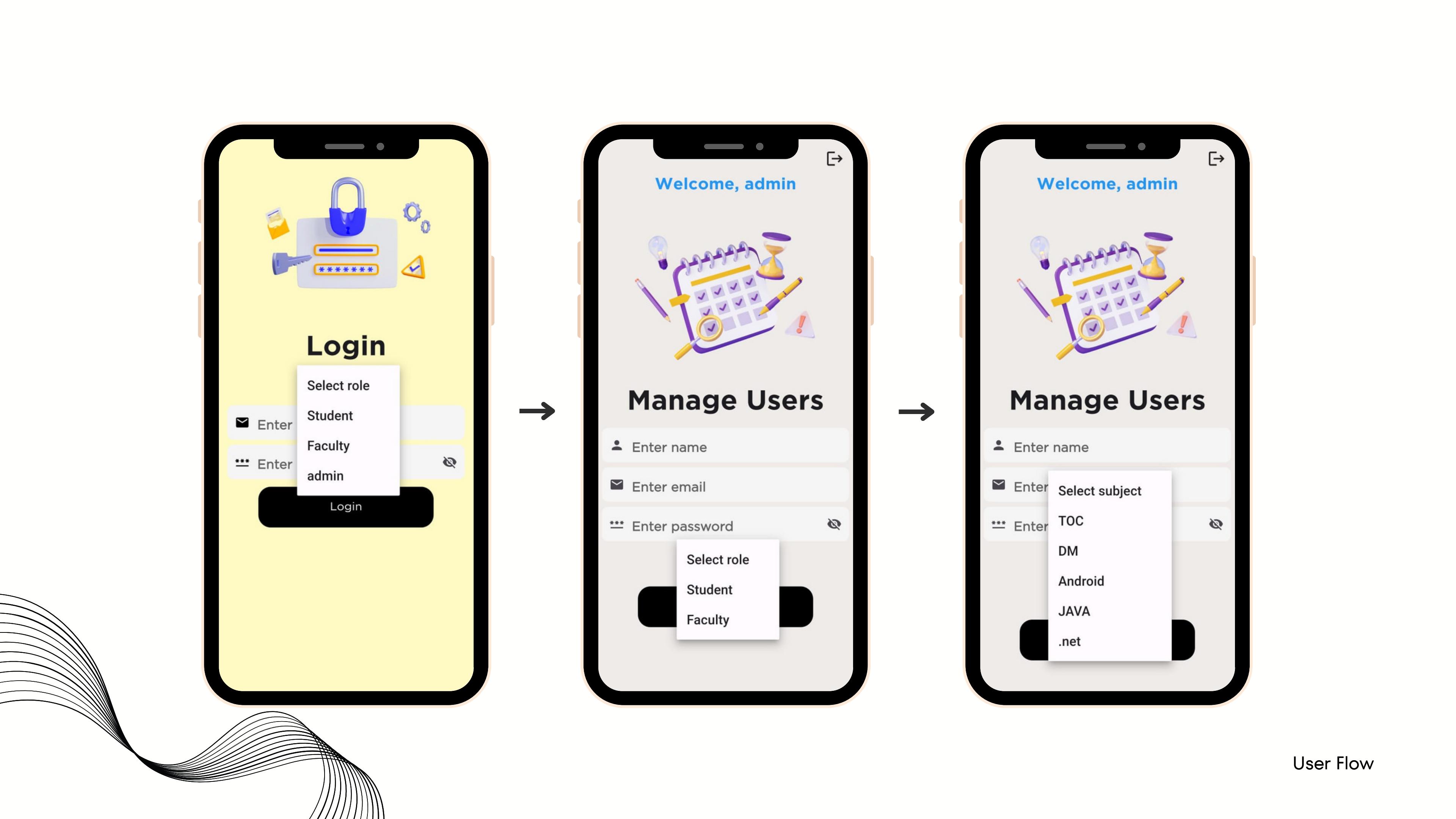


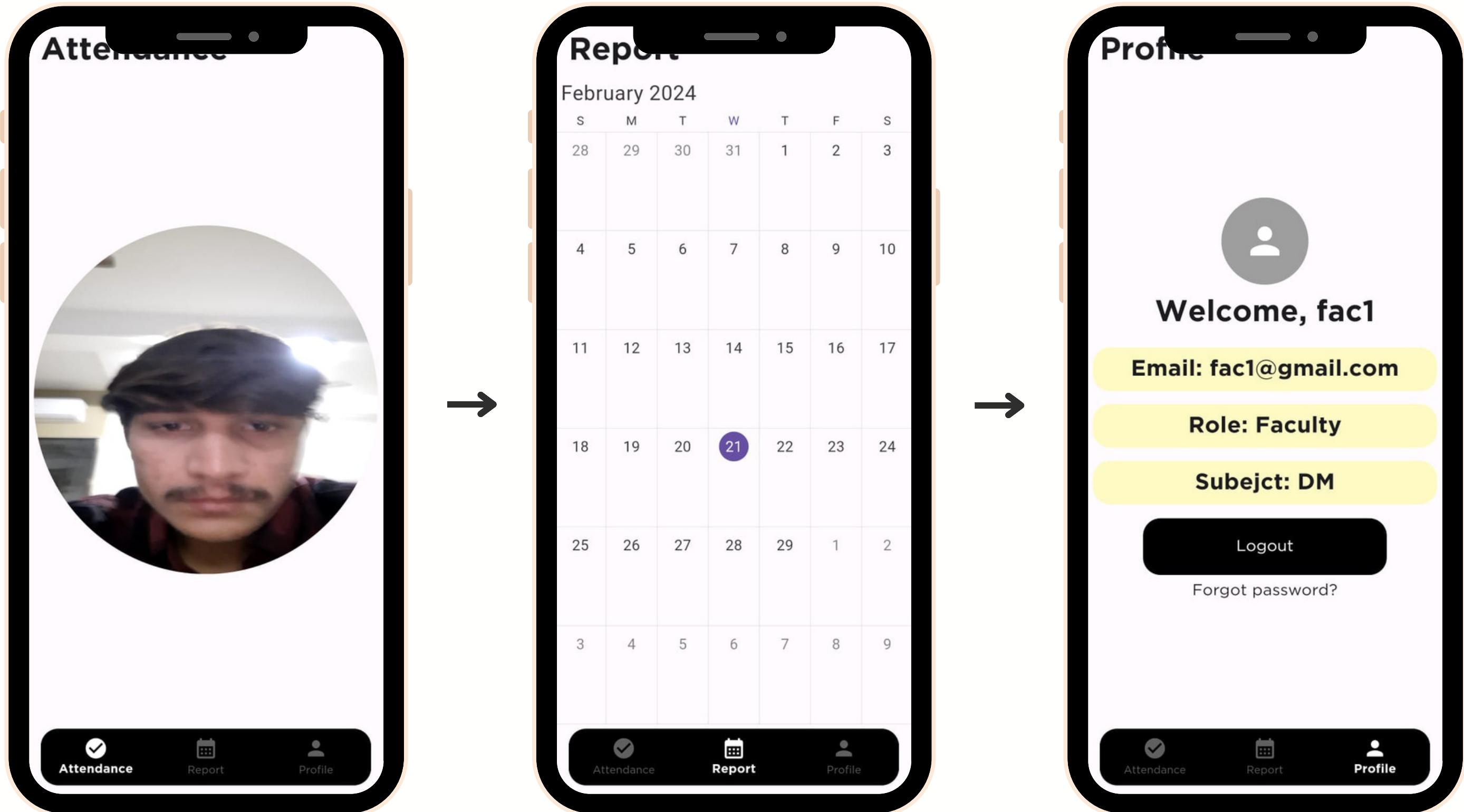
IMPLEMENTED

GUI

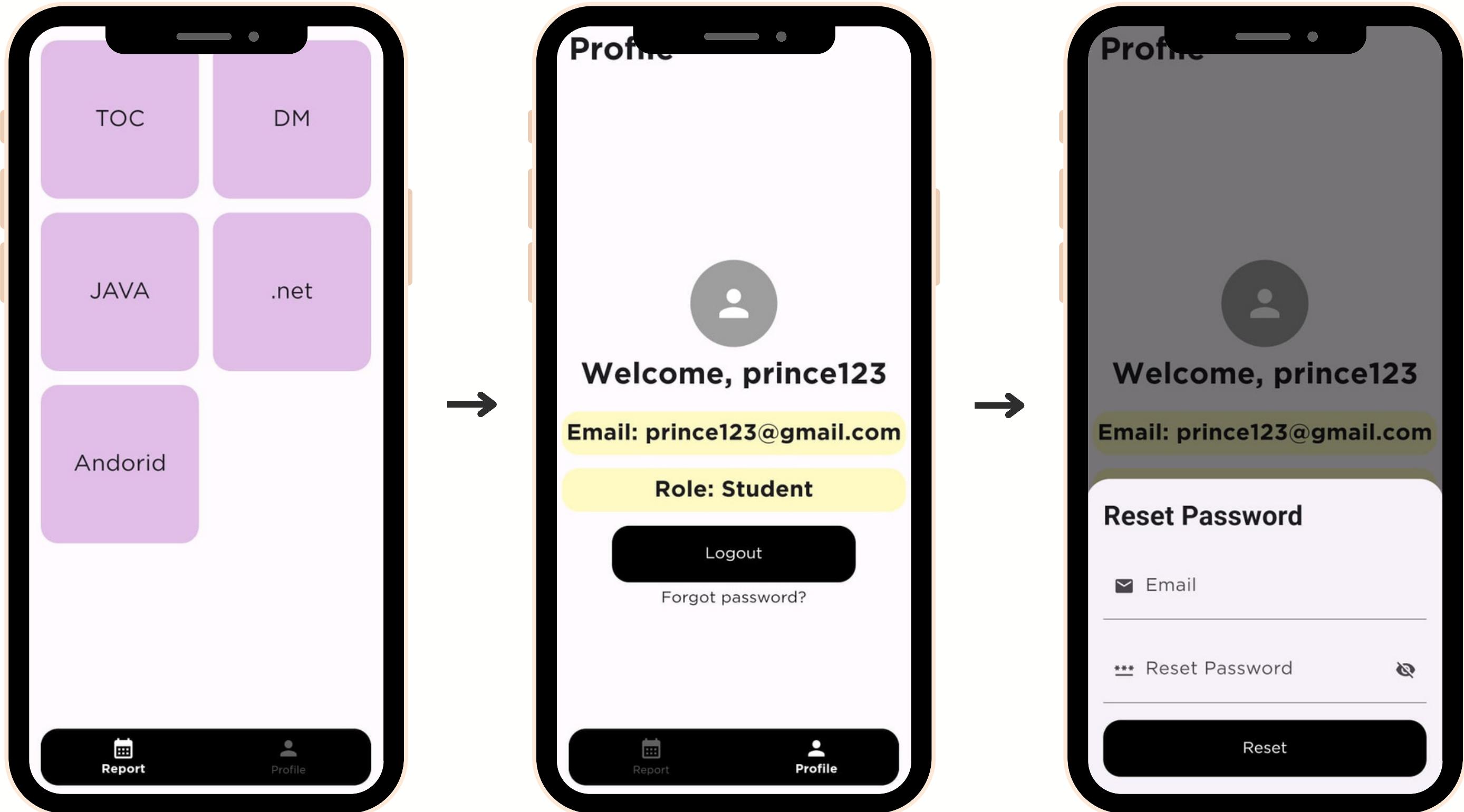


User Flow





User Flow



User Flow

MODEL TESTING



User Flow

IMPLEMENTATION DEMO

