Task 4: System Modelling and Design

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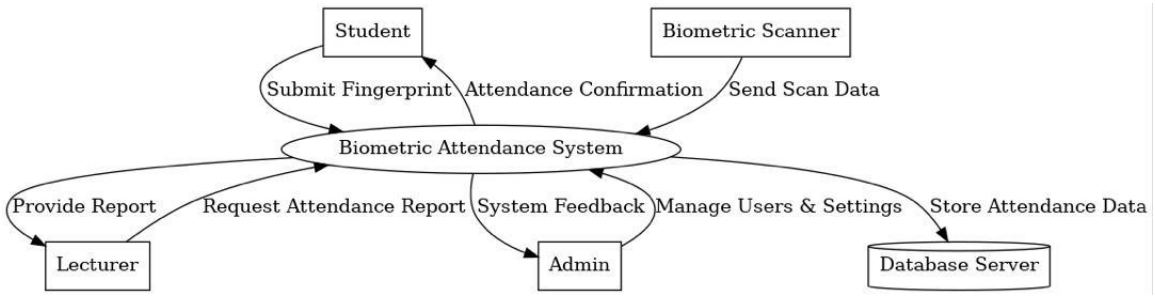
Introduction

This section presents the modeling and design of the Biometric Student Attendance Mobile Application. It provides a comprehensive visual and conceptual overview of the system's structure, interactions, and deployment architecture. Six key diagrams are used to describe the system from different viewpoints: the Context Diagram, Data Flow Diagram (DFD), Use Case Diagram, Sequence Diagram, Class Diagram, and Deployment Diagram.

4.1 Context Diagram

The context diagram illustrates the system boundaries, external entities, and data flow between the system and its environment. It shows how users interact with the application and which data flows in and out of the system.

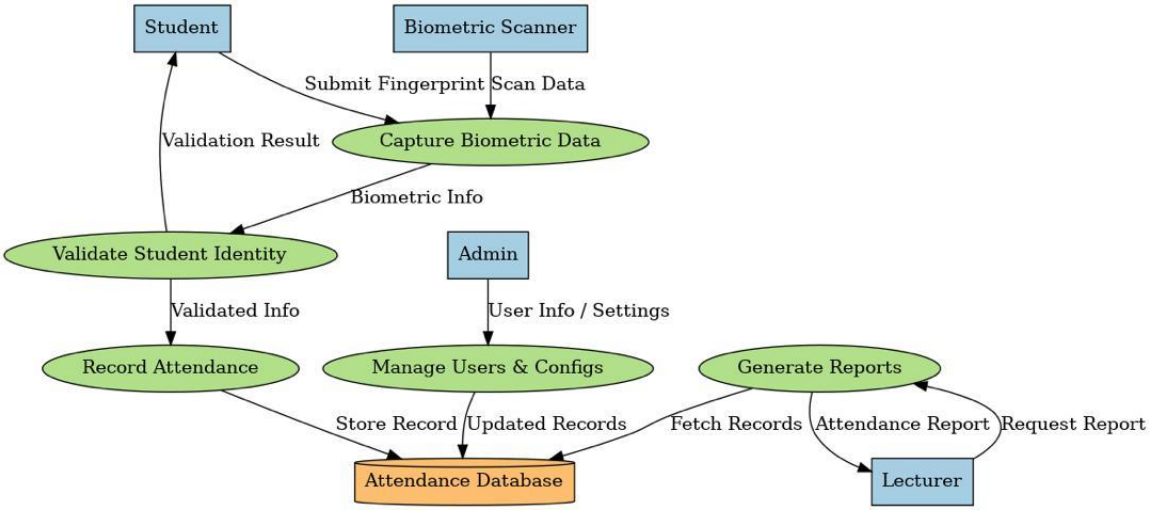


Description:

- External entities include Admin, Lecturer, and Student.
- The system receives inputs (login credentials, attendance data) and produces outputs (attendance reports, notifications, etc.).
- This diagram helps define the scope of the application clearly.

4.2 Data Flow Diagram (DFD)

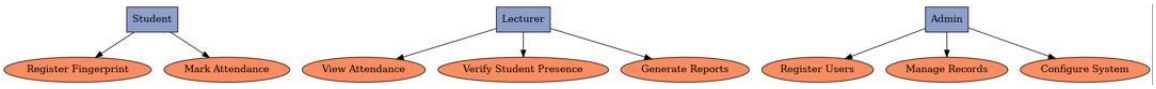
The DFD models how data moves through the system. It breaks down the system processes and illustrates the flow of information between them and the data stores.



Description:
- *Key processes*: Login, Register, Take Attendance, View Records, Generate Reports.
- *Data stores*: User Database, Attendance Records, Course Info.
- The DFD helps in understanding the transformations that occur on the data as it flows through the system.

4.3 Use Case Diagram

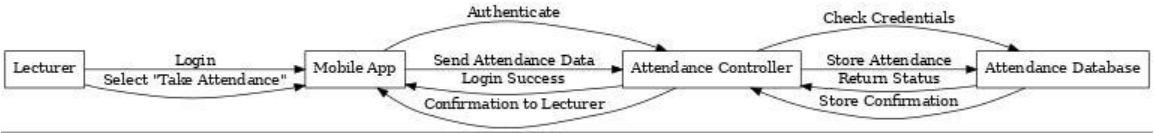
This diagram describes the interactions between the users (actors) and the system through use cases.



Description:
- *Actors*: Admin, Lecturer, Student.
- *Use Cases*: Login, Register Student, Take Attendance, View Records, Generate Reports, Send Notifications.
- The diagram ensures that all system functionalities related to users are captured.

4.4 Sequence Diagram

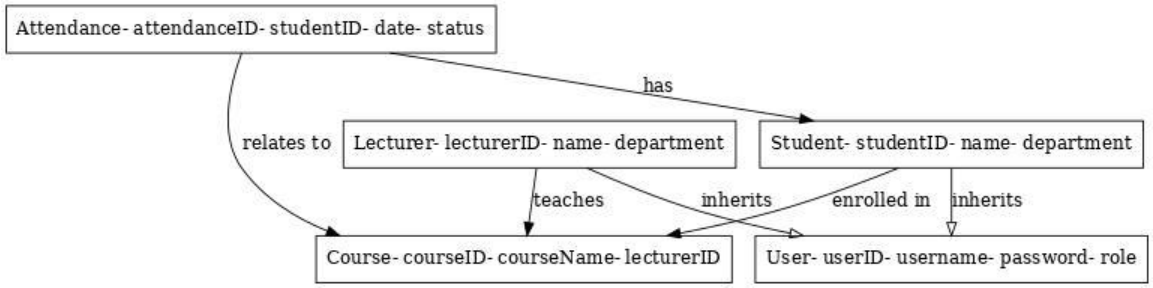
The sequence diagram models the step-by-step interaction between the system components during the “Take Attendance” process.



Description:
- *Actors*: Lecturer, Mobile App, Attendance Controller, Database.
- Illustrates how the attendance-taking process flows from login to storing attendance.
- Helps visualize time-based interactions and message flows between objects.

4.5 Class Diagram

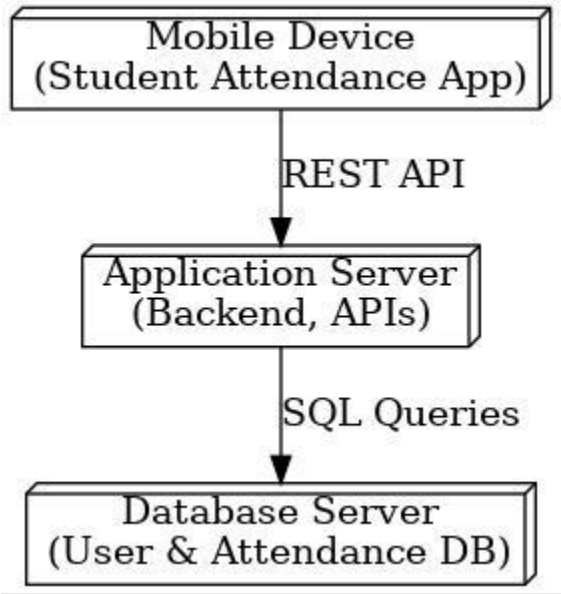
The class diagram defines the system's main classes, their attributes, and relationships.



Description:
- *Main Classes*: User, Student, Lecturer, Course, Attendance.
- Inheritance from the User class enables role-based access and operations.
- Shows 'teaches', 'enrolled in', and 'has' relationships that structure the system.

4.6 Deployment Diagram

The deployment diagram illustrates the system's hardware environment and how software components are deployed across physical devices.



Description:
- *Devices*: Mobile Device (Client), Application Server, Database Server.
- Mobile App interacts with backend over the internet.
- Backend server communicates with the database to store and retrieve data.

Conclusion

The six diagrams collectively provide a multi-dimensional view of the system architecture. From data flow and user interaction to backend structure and deployment layout, these diagrams are crucial for guiding the development and implementation of the Biometric Student Attendance Mobile Application.