SOFTWARE DESIGN DESCRIPTION

For

Entrepreneur Growth Guide

Version 1

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Table of Contents

1. Introduction:

1.1 Purpose:

The Entrepreneur Growth Guide is a Flutter-based mobile application designed to provide mentorship and business solutions for entrepreneurs in Karachi. The app connects business owners with experienced mentors, offers AI-driven recommendations, and integrates real-time communication via Tencent RTC and chatbots for business guidance.

1.2 Scope

This project aims to:

- Develop a user-friendly and secure mentorship platform.
- Enable real-time communication between mentors and mentees.
- Provide AI-driven recommendations via chatbots.
- Support multi-platform access (Android & iOS) using Flutter.
- Ensure secure authentication with Firebase.

1.3 Project Background:

In today's competitive business environment, entrepreneurs—especially in regions like Karachi—often face challenges related to limited access to expert guidance, mentorship, and strategic resources. Many startups and small business owners struggle to find tailored advice and experienced mentors who can guide them through various phases of business growth, funding, and operations.

To address this gap, the **Entrepreneur Growth Guide** mobile application was conceptualized as a centralized digital platform that connects **entrepreneurs** with **qualified mentors**, provides **AI-driven business recommendations**, and supports **real-time communication** through **Tencent RTC** and **chatbots**.

The idea is to create a smart, scalable, and user-friendly app using **Flutter** that not only simplifies the mentorship process but also empowers entrepreneurs with tools to make informed business decisions. By combining human expertise with artificial intelligence and live communication capabilities, the platform aims to foster innovation, support business sustainability, and encourage economic development within the local entrepreneurial ecosystem.

This project is being developed as a **Final Year Project (FYP)** by a team of four members from SIR Syed University of Engineering And Technology, with the intention of addressing real-world business needs through modern technology and practical design thinking.

1.4 Motivation:

The motivation behind developing the **Entrepreneur Growth Guide** stems from the increasing number of startups and small businesses in **Karachi** that lack access to structured mentorship, expert guidance, and strategic support. Despite having innovative ideas and strong potential, many entrepreneurs struggle to scale their businesses due to limited experience, poor decision-making tools, and a lack of connections within the industry.

Traditional mentorship programs are often inaccessible, unstructured, or time-consuming. This creates a need for a **digitally accessible, intelligent, and real-time solution** that bridges the gap between business owners and mentors. By integrating **AI-driven recommendations**, **chatbots**, and **real-time communication** through **Tencent RTC**, we aim to create a platform that delivers on-demand guidance and personalized business solutions.

Our motivation is to:

- Empower local entrepreneurs with expert knowledge.
- Simplify and digitalize the mentorship process.
- Promote business sustainability and innovation.
- Combine AI and human expertise to create smarter business decisions.
- Contribute to the local entrepreneurial ecosystem through technology.

This project is driven by a passion for solving real-world problems using modern software engineering practices, and by a strong belief in the transformative potential of tech-driven mentorship.

1.5 Project Objective:

1.5 Project Objective

The primary objective of the **Entrepreneur Growth Guide** mobile application is to develop a smart, user-friendly platform that connects **entrepreneurs** with **experienced mentors** and provides **AI-powered business recommendations** and **real-time communication tools**. This app is designed to help entrepreneurs in **Karachi** make informed decisions, solve business challenges, and grow sustainably through accessible digital mentorship.

Key Objectives:

- **Mentorship Matching**: Enable entrepreneurs to search for and connect with relevant mentors based on industry, expertise, and business needs.
- **Real-Time Communication**: Integrate Tencent RTC to allow live video and audio interaction between entrepreneurs and mentors.
- **AI-Driven Recommendations**: Provide personalized suggestions and business solutions using artificial intelligence based on user profiles and goals.
- **Chatbot Integration**: Offer instant answers to common business questions through an intelligent chatbot system.

- **User-Friendly Interface**: Design a Flutter-based mobile app that ensures a smooth and intuitive experience for all user types.
- **Secure User Management**: Implement secure login, registration, and profile management features for both entrepreneurs and mentors.
- **Admin Dashboard**: Allow administrators to manage users, approve mentors, and monitor platform activity.

2. Design Methodology and Software Process Model:

2.1 Design Methodology:

The development of the **Entrepreneur Growth Guide** application follows a **modular, user-centered, and agile-based design methodology**, ensuring scalability, maintainability, and responsiveness to user needs. The project is being developed using the **Flutter framework** for cross-platform mobile development, with a focus on separating concerns between the frontend, backend, and intelligent systems.

1. Agile Development Approach

We follow an **Agile methodology** with iterative development cycles (sprints), allowing continuous feedback, regular updates, and adaptability to changes in requirements. Each sprint focuses on developing and testing specific modules, starting from core features like user authentication to advanced features like AI recommendations and real-time video communication.

2. Modular Design

The application is divided into well-defined **modules/components**, such as:

- Authentication Module
- Mentor Search & Matchmaking Module
- AI Recommendation Engine
- Real-Time Communication Module
- Chatbot Support System
- Admin Management Panel

2.2 Design Patterns:

To ensure scalability, maintainability, and clean code architecture, the **Entrepreneur Growth Guide** app implements several well-known **software design patterns**. These patterns help organize the project structure, enhance code reusability, and simplify debugging and future upgrades.

1. MVC (Model-View-Controller) Pattern

- **Used in**: Flutter frontend structure
- **Purpose**: Separates business logic (Model), user interface (View), and control flow (Controller).
- **Benefit**: Makes the UI and business logic modular and easier to test and maintain.

2. Singleton Pattern

- **Used in**: Backend services, database connections, and API managers
- **Purpose**: Ensures only one instance of a class (e.g., API manager or database handler) is created and used throughout the app.
- **Benefit**: Reduces memory usage and avoids unnecessary instantiations.

5. Observer Pattern

- **Used in**: Notification system or real-time updates (e.g., new mentor messages, AI suggestions)
- **Purpose**: Allows components to listen for changes in data and respond automatically.
- **Benefit**: Supports real-time feedback and seamless communication without manual refreshes.

2.3 Software Process Model:

For the development of the **Entrepreneur Growth Guide** mobile application, the team has adopted the **Agile Software Development Model**. This model was chosen due to its flexibility, iterative approach, and ability to adapt to changing requirements throughout the development cycle.

Agile Process Overview:

The Agile process divides the project into small, manageable iterations (sprints), each delivering a potentially shippable product increment. It emphasizes continuous collaboration with stakeholders, regular testing, and iterative improvements, making it highly suitable for dynamic and user-driven applications like this one.

Using Agile, the development cycle consists of multiple sprints, where features are continuously developed, tested, and integrated into the system. This ensures that Application remains adaptable, scalable, and efficient throughout its lifecycle.

3. System Overview:

3.1 Architectural Design:

- Client-Server Model: Frontend (Flutter) communicates with backend (Firebase, Tencent RTC APIs).
- Cloud-Based Storage: Firebase Firestore used for storing mentor and user data.

3.2 Process Flow (Functional Requirements):

1. User logs in/signs up.
2. Explores available mentors and recommendations.
3. Initiates a chat or video consultation via Tencent RTC.
4. AI chatbot recommendation
5. Logs out securely.

This structured process ensures accuracy, efficiency, and ease of use for users and enterpreneur

4. Project Architecture:

4.1 Web/ Android module:

- UI designed using Figma and Canva.
- UX follows Material Design guidelines.

4.2 Database Module

- Justification: NoSQL (Firestore) chosen for scalability.

DDL:

- Users (UserID, Name, Email, Role)
- Mentors (MentorID, Name, Expertise, Availability)
- Messages (MessageID, SenderID, ReceiverID, Content, Timestamp)

4.3 Administration Module

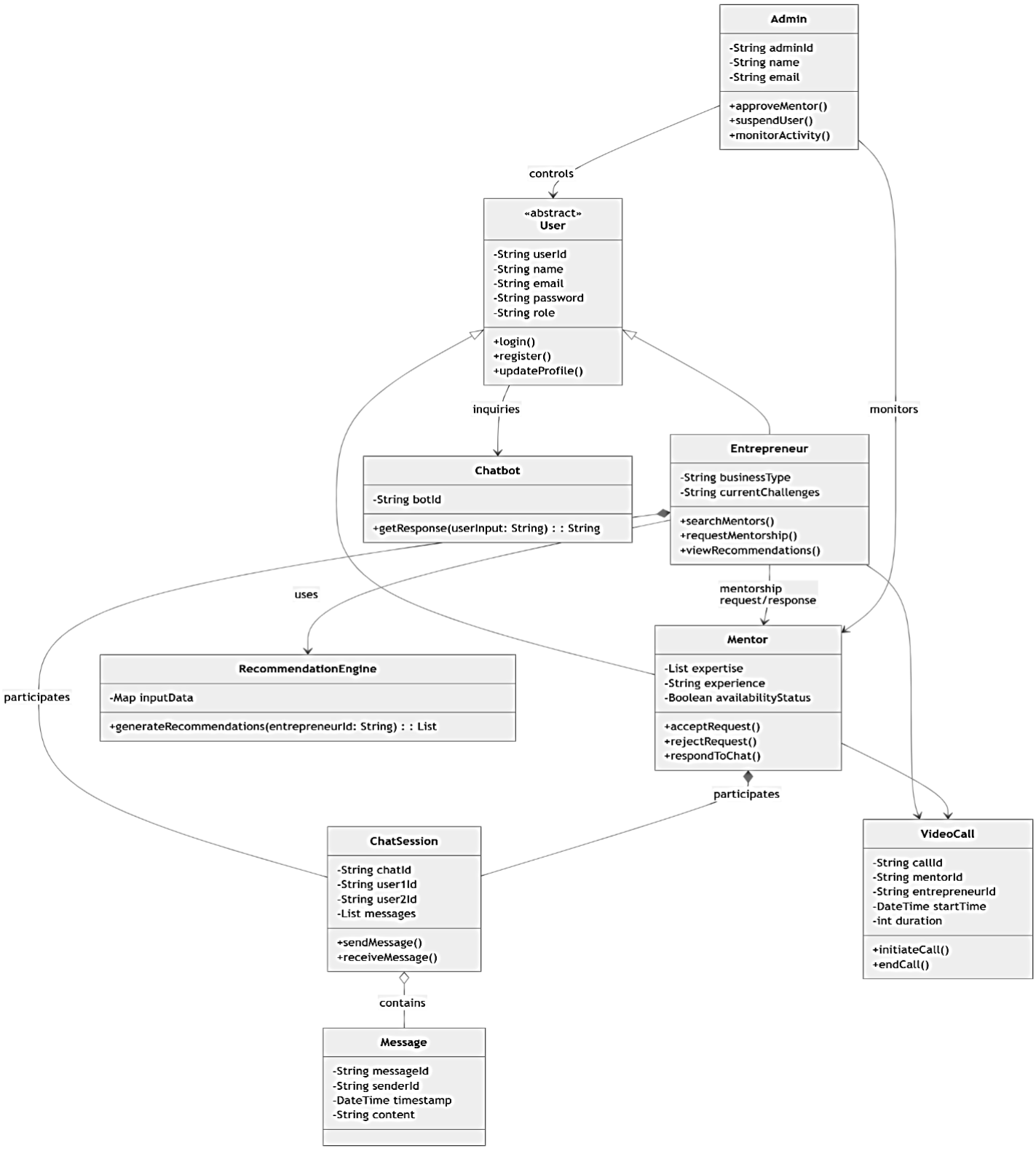
● Manages mentor approvals, content moderation, and performance tracking.

4.4 Data Dictionary

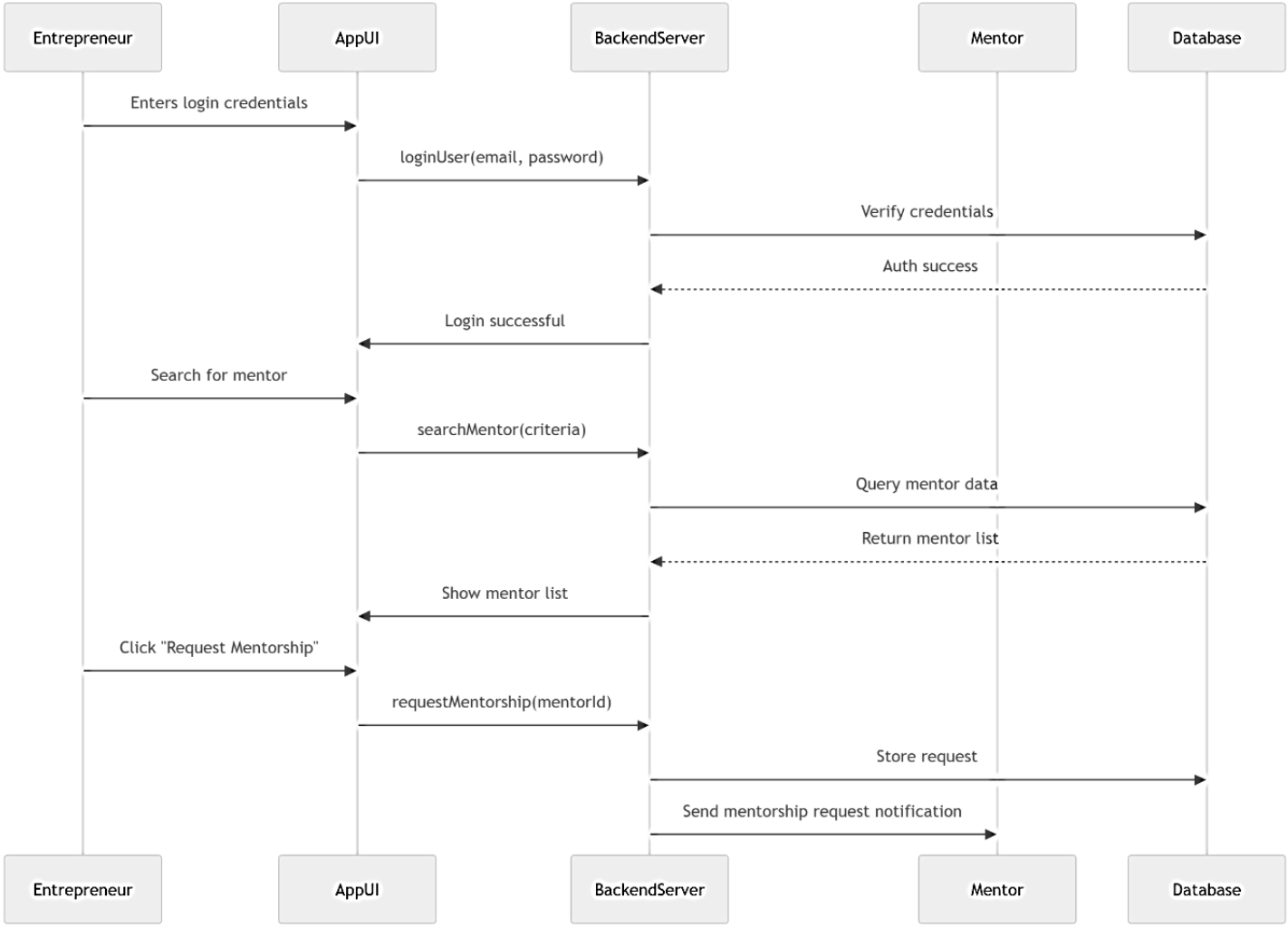
● Defines data types, attributes, and relationships for all entities.

5. System Analysis & Design Overview:

5.1 Class Diagrams:



5.2 System Sequence Diagrams:



5.3 State Transition Diagram: