Final Year Design Project

Smart FinSight

by

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For

Smart FinSight

under the supervision of

Muhammad Kamran

Session: 2022-2026

Project ID: 22-KS-BSIT-41

Faculty of Computing & Information Technology,
University of the Punjab, Lahore, Pakistan.
(2022-2026)

DECLARATION

The work reported in this project is carried by Somia Naseer (Roll no. 089344), Amina Javid (Roll no. 089288), under the supervision Muhammad Kamran, at Govt Graduate College, Civil Lines, Sheikhupura. We hereby declare that this project and the content of this project are the product of our research and no part has been copied from copyrighted written or published sources (Accept the references, standard mathematical or genetics models/equation/formulas/protocol, etc.). We further declare that this workquit has been submitted for the award of any other degree diploma.

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STATEMENT OF SUBMISSION

This is to certify that following students have successfully completed the final project named as: Smart FinSight at Govt. Graduate College, Civil Lines, Sheikhupura to fulfill the partial requirement of the degree of Bachelors of the Information Technology.

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PROOFREADING CERTIFICATE

It is certified that this Somia Naseer (089344) and Amina Javid (089288) have prepared documentation for their final year project (FYP) titled Smart FinSight at the Department of Computer Science, Government Graduate College, Civil Lines, Sheikhupura, in the partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology.

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Acknowledgement

We would like to express our sincere thanks to Muhammad Kamran, Lecturer at Government Graduate College, Civil Lines, Sheikhupura, for his valuable guidance, encouragement and support during the preparation of our project documentation.

We are also thanks to our friends and families for their quite support and motivation, which helped us stay focused throughout this phrase of our word.

Date: January 27, 2025

PREFACE

This is a final year project (FYP) report written by students of bachelor of Science in Information Technology at the University of the Punjab. We are Somia Naseer and Amina Javid, both of us are studying in BSIT at Government Graduate College, Civil Lines, Sheikhupura.

To enable you to understand the idea of our project and the implementation process in detail and systematically, this report is divided into topics; each topic with a specific focus. We hope this approach allows you to read and understand our project report easily. Lastly, if you have any comments, you are welcome to contact us at:

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Executive Summary

The Smart FinSight project aims to develop a personal finance app that will help the user track income, expenses, budgets and get full insights. The project proposal will explain the problem statement, objectives, scope, methodology and benefits of digitizing tasks like user registration, transactions, budget tracking and financial summaries. The SRS will define functional and non-functional requirements, use cases and system constraints ensuring all user needs will be well-documented. The SDS will convert these into system design, database structure and modules. The prototype will show core functionality such as login, transaction entry and financial summaries giving the user a clear idea of the system. Together these components will ensure Smart FinSight will be developed with clarity, efficiently and user centered.

FYDP Overview

FYDP Title _ Smart FinSight

Sr. No	**Roll Numbers**	**Name**	**Signatures**
1.	089344	Somia Naseer	
2.	089288	Amina Javid	
3.			
4.			
5.			

Table 1 Project Proposal Summary

FYDP Goals

- The project will create an easy-to-use app for tracking income and expenses.
- The app will help user manage budgets, save notes and set reminder.
- The system will display clear charts.
- The system will provide smart suggestions and predictions.
- The system will automatically save transactions through voice input.
- User will be able to generate reports.
- All financial records will be kept safe and secure.
- The app will be designed with simple and attractive user interface.

FYDP Objectives

- The system will maintain a complete and accurate record of income and expense.
- System will analyze user behavior and provide smart suggestions and predictions
- System will help user to set budgets and remaining amount will be counted automatically.
- Income, Expenses and overall summaries will be displayed clearly using charts.
- The system will provide reminder for important tasks and a notebook feature for saving notes.
- AI voice input will allow quick and automatic data entry in transaction list.

FYDP Success Criteria

The system will be successful if:

- The app will run smoothly and easy to use without error.
- User will be able to record income and expenses easily.

• User will be able to set budgets and track them efficiently. • The app will provide suggestions and predictions based on user activity. • The system will automatically save transaction through voice input. • User will be able to generate reports. • User will be able to set reminder and save notes effectively.
Assumptions:
• User will have basic knowledge of using app. • User will enter correct information into the system. • User will have internet access to use the app. • Firebase services will work properly and securely.
Risks & Obstacles
• Predictions may be wrong if there is not enough data. • Large amounts of stored data may slow the performance. • Poor internet connection may delay voice processing and cloud syncing. • Voice recognition may not work properly in noisy environment.
Organization Address: **FCIT, University of the Punjab, Lahore, Pakistan**
Target End Users: End-Users
Suggested Project Supervisor: Muhammad Kamran
Approved By: Muhammad Kamran
Date: January 28, 2025

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Chapter No 1

Project Proposal

1.1. Introduction

Traditional manual methods like notebooks, spreadsheets or mental calculations are time consuming, prone to mistake and inefficient. The Smart FinSight project will develop a digital finance app that will enable users to record income and expenses, set budgets and view summaries in one place. The app will give smart suggestions and predict future expenses to help users make better financial decisions. With voice input users will quickly add transactions without typing making tracking faster and easier. Overall Smart FinSight will help users understand spendings, control expenses and plan finances effectively.

1.2. Background

People still track their daily income and expenses manually. Many individuals still rely on notebooks, spreadsheets or mental calculations to track their spending. It's time consuming and inaccurate paper work which is not efficient. Using modern digital systems finance tracking will become easier, more accurate and less time consuming. A digital financial tracking system will help user record transactions, monitor balances and manage budgets more efficiently in one place.

1.3. Problem Statement

People use notebooks, spreadsheets to record their daily income and expenses. This is time consuming and records can easily be lost, damaged or misplaced. All calculations are done by hand which often leads to mistakes. Generating reports is also difficult and time consuming. Many people do not keep proper records of their spending so they are unable to understand where their money is going. They are unable to identify overspending patterns or future expense predictions. They are struggling to control their spending. These challenges highlight the need for a digital financial application to efficiently resolve these issues.

1.4. Stakeholders & Interests

Stakeholders	Description	Interests/Benefits
End-Users	Who will use the app to record income and expenses, set budget, and reminders, track daily finances, generate reports, receive smart suggestions and predictions.	Users will be able to track finances efficiently, understand spending patterns, receive alert notifications, get smart suggestions, predict future expenses and generate reports to improve budgeting decisions.

Table 2 Stakeholder & Interest

1.5. Objectives:

- User will be able to track their income and expenses.
- User will be able to set budget and track the remaining amount.
- System will analyze user behavior and provide smart suggestions and predictions.
- Income, expenses and overall summaries will be displayed clearly in charts.
- User will be able to save important notes and set reminders.
- System will allow user to generate reports.
- System will automatically record income and expenses through voice input.
- Tracking income and expenses will simple and efficient.

1.6. Scope:

Scope In:

- The project will develop a cross-platform to track income and expenses.
- User will be able to set budgets and view financial summaries in charts.
- User will be able to generate financial reports.
- Smart suggestions and expense prediction will be provided.
- User will be able to save notes and set reminders.
- AI voice input will allow automatic transaction entry.
- The app will ensure secure and organized financial records keeping.

Scope Out:

- Inaccurate voice input may lead to wrong data entry.
- An internet connection will be required for some features.

- The app will not support multiple languages.
- Real time bank account synchronization will not be available.

1.7. Assumptions

- User will have basic knowledge of using app.
- User will have internet access to use the app.
- User will enter correct information into the system.
- Firebase services will work properly and securely.

1.8. Risks

- Large amounts of stored data may slow app performance.
- Predictions may be wrong if there isn’t enough data.
- Poor internet connection may delay voice processing and cloud syncing.
- Voice recognition may not work properly in noisy environments.

1.9. Success Criteria

User Registration and Authentication
Financial Transaction
Voice-Based Transaction Entry
Financial Insights and Prediction
Report Generation
Charts and Financial Visualization
Budget Alerts
Reporting and Visualization
Notebook and Reminders
Alerts and Notifications
Security and Access Control
Performance and Responsiveness

Table 3 Success Criteria

1.10. Tools, Libraries & Technologies

Tools	**Tools**	**Version**	**Rationale**
	Visual Studio Code	1.106.3	IDE with extension
	Draw.io	15.8.7	UML Diagram
	GitHub	Latest	Version Control
	Flutter Dev Tools	2.22.0	Debug
Libraries	**Libraries**	**Version**	**Rationale**
	Firebase Authentication	5.15.0	User authentication
	Firebase Firestore	5.16.0	Data storage
	FI_chart	Latest	Charts
	Firebase cloud messaging	14.9.0	Notification and alerts
	Pdf	3.11.0	Pdf report
	Excel	4.0.3	Excel report
	Speech_to_text	6.6.0	Voice input
	Scikit-learn	1.2.2	ML
	NumPy	1.26.0	Data process
	Pandas	2.1.0	Data process
Technologies	**Technology**	**Version**	**Rationale**
	Flutter	3.35.7	Cross-Platform
	Firebase	4.6.0	Backend Services
	Gemini AI API	Latest	AI, ML
	Flask API	Latest	Backend services
	Python	3.12.0	Backend / ML

Table 4 Tools,Libries & Technology

1.11. Work Division

Sr. No	Roll Number	Name	Role Assignment & Work Division
1.	089344	Somia Naseer	Frontend, Backend and Documentation
2.	089288	Amina Javid	Frontend, Backend and Documentation

Table 5 Project Team Members Work Division

1.12. Conclusion

Smart FinSight will aim to transform personal finance management by introducing a central digital system that meets user needs. By digitizing processes like recording income and expenses, managing budgets, viewing summaries and providing smart suggestions the system will enhance accuracy, efficiency and ease of use. Smart FinSight will be designed to deliver a reliable, user-friendly solution that help users understand their spending, control expenses and plan their finances.

Chapter No 2

Literature Review

2.1 Literature Survey

Most personal finance tracking is still done manually with notebooks, spreadsheets or simple apps. This makes it slow, error prone and limited. Existing solutions usually do not include budget tracking, smart suggestions, predictions or voice input so managing money is difficult. Studies show the need for an integrated digital system that will combine all these features in one place. Smart FinSight will solve these problems by providing a complete, easy to use digital platform for managing personal finances.

2.2 Related Work:

Several finance tracking apps like CashBook, AndroMoney, MoneyTracker, Moneyfy, Vocash and Danalyze allow user to record income and expenses. These apps do not analyze user behavior and provide suggestions and predictions. These apps provide basic transaction tracking. Most of them lack voice-based transaction entry, budget planning, notebook, reminder, calendar and visual charts features. Many apps offer limited free features and required premium access for remaining features like report. The proposed Smart FinSight will overcomes these issues by using AI powered voice input, behavior based smart finance assistant, budget planning and report generation. The app will also provide notebook, reminder, calendar and visual charts making expense tracking smarter, easier and more efficient available all in one place.

2.3 Gap Analysis:

Existing Platform	**Limitations**	**Proposed Solution**
CashBook [1]	No AI voice entry, no behavior based smart assistant, reports required premium access, no budgeting support, no charts or visual spending analysis.	Our app will provide AI voice input, behavior based smart finance assistant, free PDF and Excel reports, budget tracking, visual tracking, visual charts for clear spending analysis.
AndroMoney [2]	No AI based transaction entry, no behavior-based assistant, complex	Our app will provide AI powered voice entry, behavior-based assistant, simple interface, free

	user interface, no PDF/Excel report generation.	PDF and Excel reports, budget tracking.
MoneyTracker [3]	No AI voice entry, no behavior-based assistant, does not support PDF/Excel report generation.	Our app will offer AI voice input, behavior-based assistant, simple and user-friendly interface, free PDF and Excel report generation
Moneyfy [4]	No AI based voice transaction entry, no behavior-based assistant, no PDF/Excel report generation, Limited budget planning features.	Our app will offer Ai voice auto transaction entry, behavior-based assistant, PDF/Excel reports, smart budget planning.
Vocash [5]	No behavior-based assistant, no budget planning, no notebook feature, limited free plan. complex user interface.	Our app will include behavior-based assistant, budget planning, Notebook feature, full free access and easy to use interface.
Danalyse [6]	AI chat available but doesn’t work and no data entry, no behavior-based assistant, no reminders, no notebook, no report generation.	Our app will offer AI voice transaction entry, manually transaction entry, behavior-based assistant, reminders, notebook and report generation.

Table 6 Gap Analysis

2.4 Summary

The literature review highlights the limitations of existing personal finance tracking apps which often lack AI-based voice input, smart suggestions, budget planning, reminders, notebook and visual charts. Previous solutions addressed only basic transaction recording, leaving gaps in efficiency, usability and comprehensive financial management. Smart FinSight will aim to overcome these challenges by offering a fully integrated, user-friendly digital system designed to make personal finance tracking smarter, easier and more efficient.

Chapter No 3

Software Requirements Specification

3.1 Requirements Analysis

The software Requirements Specification (SRS) for the Smart FinSight will describe all the functional and non-functional requirements of the system. The app will help users track their personal finances digitally and will reduce the need for manual record keeping. The system will allow users to record income and expense transactions manually or via voice input, set budgets and track spending, view transactions, charts and insights, generate reports in Pdf and Excel format, write and manage notes, set reminders, receive alerts and notifications. The SRS will clearly explain how the system will operate, what feature it must include and how users will interact with the app to efficiently track and control their financial activities.

3.2 User classes and characteristics[1]

User Class	User Characteristics
End-Users	A person who will use the Smart FinSight app to track personal finances. The user will be able to create an account, log in, add income and expense records, view transaction, input transaction via voice, set budget, view charts and insights, generate reports, write notes, set reminders, receive alerts and notifications and update profile information. The user will have basic app usage skills and will interact with the system through a touch-based interface for daily financial tracking.

Table 7 User Classes

3.3 Requirement Identifying Technique

- **Use Case Technique:** To identify the requirements for the Smart FinSight system the use case technique will be used. This technique will be suitable for system where users will perform multiple actions such as signup, logging in, adding income and expenses, setting budgets, viewing transactions, viewing charts and insights, generating reports, managing notes, voice input and receiving reminders. Use cases will describe each user action step by step and will clearly define the functional requirements of the system from the user’s perspective.

- **Storyboarding**: A storyboard technique will also use to support requirements identification for the Smart FinSight app. A storyboard will represent a visual sequence of app screens that shows how users interact with the system. It will help in understanding user flows. Storyboard will help visualize interface transitions and improves usability and navigation before the development phase.

3.4 Functional Requirements

Functional Requirements will specify that actions and behaviors that the system must perform to meet user needs. They will describe what the system should do to allow users to add income and expenses, set budgets, view transactions, charts and insights, generate reports, write notes, set reminders and use voice input to record their financial data easily.

Functional Requirement

FR-1: Sign up

Identifier	FR-1
Title	Sign up
Requirement	User will be able to register himself by proving username, email, password and confirm password.
Source	User
Inputs	Username, Email, Password, Confirm Password
Destination	Firebase Firestore
Outputs	Created successfully message
Rationale	Sign up will be required so user can securely track financial data.
Business Rule	Email must be unique
Dependencies	None
Priority	High

Table 8 Functional Requirement Specification For Sign Up

FR-2: Login

Identifier	**FR-2**
Title	Login
Requirement	User will be able to login using registered email and password to access the Home Screen.
Source	User

Inputs	Email, Password
Destination	User Home screen
Output	Login successfully or invalid Credentials message.
Rationale	Login will ensure that only authorized users will be able to access personal financial records.
Business Rule	Only registered users must be able to login.
Dependencies	FR-1
Priority	High

Table 9 Functional Requirement Specification For Login

FR-3: Forgot Password

Identifier	**FR-3**
Title	Forgot Password
Requirement	User will be able to reset their password by verifying registered email and receiving reset link.
Source	User
Inputs	Email
Destination	Firebase Firestore
Output	Password reset link sent successfully.
Rationale	It will help users when they forgot their password.
Business Rule	Reset link must be valid
Dependencies	FR-2
Priority	High

Table 10 Functional Requirement Specification For Forgot Password

FR-4: Add Income

Identifier	**FR-4**
Title	Add Income
Requirements	User will be able to add income with amount, category, payment method and note.
Source	User
Inputs	Amount, Category, Payment method, Note
Destination	Transaction list
Outputs	Income added successfully.
Rationale	User will need to record their earning for financial tracking.

Business Rule	Amount must be numeric and positive.
Dependencies	FR-2
Priority	Medium

Table 11 Functional Requirement Specification For Add Income

FR-5: Add Expense

Identifier	**FR-5**
Title	Add Expense
Requirement	User will be able to record expense with amount, category, payment method and note.
Source	User
Inputs	Amount, Category, Payment method, Note
Destination	Transaction list
Outputs	Expense added successfully.
Rationale	User will need to track expenses for budget.
Business Rule	Amount must be numeric and positive.
Dependencies	FR-2
Priority	Medium

Table 12 Functional Requirement Specification For Add Expense

FR-6: View Transaction

Identifier	**FR-6**
Title	View Transaction
Requirement	User will be able to view income and expense history and edit or delete records.
Source	User
Inputs	None
Destination	Transaction module
Outputs	Transaction list
Rationale	It will help users analyze their spending patterns.
Business Rule	Sorting must be accurate.
Dependencies	FR-2, FR-4, FR-5
Priority	Medium

Table 13 Functional Requirement Specification For View Transaction

FR-7: Voice Input

Identifier	**FR-7**
Title	Voice Input
Requirement	System will allow users add income and expense by speaking and automatically save it in the transaction list.
Source	User
Inputs	Voice Command
Destination	Transaction module
Outputs	Auto save income and expense entry
Rationale	Users will be able to add transactions quickly using voice.
Business Rules	The system must turn voice into transaction and save them automatically.
Dependencies	FR-2, FR-4, FR-5
Priority	Medium

Table 14 Functional Requirement Specification For Voice Input

FR-8: Set Budget

Identifier	**FR-8**
Title	Set Budget
Requirement	User will be able to set a budget.
Source	User
Inputs	Budget amount, Category
Destination	Budget module
Outputs	Budget set successfully.
Rationale	Budgeting will help user control spending.
Business Rule	Budget amount must be greater than zero.
Dependencies	FR-2, FR-6
Priority	Medium

Table 15 Functional Requirement Specification For Set Budget

FR-9: View Insights

Identifier	**FR-9**
Title	View Insights
Requirement	System will analyze user financial behavior and provide smart suggestion and future expense prediction.
Source	User
Inputs	Transaction module
Destination	Insights module
Outputs	Smart suggestion, future expense prediction
Rationale	It will help users understand spending and plan ahead.
Business Rule	Insights must be shown only when enough records are available.
Dependencies	FR-2, FR-6
Priority	Medium

Table 16 Functional Requirement Specification For View Insights

FR-10: View Charts

Identifier	**FR-10**
Title	View charts
Requirements	User will be able to view charts.
Source	User
Inputs	Transaction data
Destination	Charts module
Outputs	Charts displayed.
Rationale	It will help users visually understand financial status.
Business Rule	Charts must update automatically with new transactions.
Dependencies	FR-2, FR-6
Priority	Medium

Table 17 Functional Requirement Specification For View Charts

FR-11: Manage Notebook

Identifier	**FR-11**
Title	Manage notebook
Requirements	User will be able to add, edit and delete important financial notes.
Source	User
Inputs	Note, Date
Destination	Notebook module
Outputs	Notes saved successfully.
Rationale	Notes will help users remember financial details.
Business Rule	Note must not be empty

Dependencies	FR-2
Priority	Low

Table 18 Functional Requirement Specification For Manage Notebook

FR-12: View Calendar

Identifier	**FR-12**
Title	View calendar
Requirement	User will be able to view a daily financial overview.
Source	User
Inputs	Selected date
Destination	Calendar module
Outputs	Transaction displayed.
Rationale	It will provide a visual daily financial overview.
Business Rule	It must show only recorded data with their amount.
Dependencies	FR-2, FR-6
Priority	Low

Table 19 Functional Requirement Specification For View Calendar

FR-13: Generate Report

Identifier	**FR-13**
Title	Generate Reports
Requirement	User will be able to generate reports.
Source	User
Inputs	Date range
Destination	Download Folder
Outputs	Pdf/Excel report file
Rationale	Reports will help user track financial performance over time.
Business Rule	Reports must include all transaction in the selected range.
Dependencies	FR-2, FR-6
Priority	Medium

Table 20 Functional Requirement Specification For Generate Report

FR-14: Set Reminder

Identifier	FR-14
Title	Set Reminder
Requirement	User will be able to set reminders
Source	User
Inputs	Title, Date, Time, Note
Destination	Reminder module
Outputs	Reminder notification at set time
Rationale	It will help user remember important events.
Business Rule	Reminder must notify user at specified time
Dependencies	None
Priority	Medium

Table 21 Functional Requirement Specification For Set Reminder

FR-15: Notification

Identifier	**FR-15**
Title	Notification
Requirement	System will send notification.
Source	User
Inputs	None
Destination	Mobile notification service
Outputs	Notification sent successfully
Rationale	It will help user receive updates on time.
Business Rule	Notification must be sent at time.
Dependencies	FR-2
Priority	Medium

Table 22 Functional Requirement Specification For Notification

FR-16: Update Profile

Identifier	**FR-16**
Title	Update Profile
Requirement	User will be able to update their profile information and change their password.
Source	User
Inputs	Name, Email, New Password, Confirm Password

Destination	User profile section
Outputs	Profile updated successfully
Rationale	User will be required to keep their information secure and updated.
Business Rule	Password must be minimum length.
Dependencies	FR-2
Priority	Medium

Table 23 Functional Requirement Specification For Update Profile

FR-17: Logout

Identifier	**FR-17**
Title	Logout
Requirement	User will be able to securely logout of the system.
Source	User
Inputs	Logout button clicks.
Destination	Login page
Outputs	Logged out successfully.
Rationale	The system will allow the user to securely end their session.
Business Rule	Must end session completely.
Dependencies	FR-2
Priority	High

Table 24 Functional Requirement Specification For Logout

3.5 Non-Functional Requirements

Non-functional requirement will describe how the system will behave and the quality standards it must follow. These requirements do not describe features, they define the performance, reliability, security and quality of the software. All non-functional requirements will be specific, measurable and testable.

1. Reliability

The Smart FinSight will maintain reliable operation during normal usage and will achieve a Mean Time Between Failure (MTBF) of 24 hours. In case of any system failure or crash the system will recover and restart within 30 seconds. An incremental backup will be performed automatically every day. The system will preserve data accuracy by maintaining 95% data integrity. It will ensure that data user data remains correct and will not allow incorrect or incomplete information to be saved.

2. Usability

The Smart FinSight app will be simple and easy to use for all users. Users will be able to add income or expenses in no more than three taps. The system will support the English language for better accessibility. Clear buttons, readable text and on-screen guidance messages will help user understand each step and avoid mistakes. The app will work smoothly on all devices with a clear layout and touch friendly buttons. It will achieve at least 85% user satisfaction during testing.

3. Performance

The Smart FinSight app will work efficiently during normal daily use. Home and other main screens will open in less than 5 seconds. When users add income and expenses the data will be saved within 2 to 4 seconds. System will generate insights within 2 to 5 seconds. Charts and summaries will update within 1 to 3 seconds after new data is added. The system will response correctly to at least 95% of user action and will use cross-platform devices resources efficiently without slowing down the device.

4. Security

The Smart FinSight app will protect all users financial and personal data stored in Firebase from unauthorized access. The system will block invalid login attempts and will lock a user after 5 consecutive failed login attempts. All sensitive actions such as adding, updating or deleting income and expense record will be securely processed and logged by the system. User account details, transaction records, notes and summaries will remain protected at all time to ensure privacy and data security.

3.6 External Interface Requirements

The Smart FinSight will work smoothly on cross-platform devices. It will securely connect with firebase services to store and retrieve user financial data. The app will interact with devices such as touchscreen for user input and microphone for voice-based transaction entry. The system will display data correctly on different screen sizes. All data communication between the app and firebase will be encrypted and secure to protect information.

1. User Interfaces Requirements

The Smart FinSight will provide a clean, simple and consistent user interface that is easy to use for users to understand and use. All screens will follow the same design style to avoid confusion and improve usability. The app will work properly on cross-platform devices.

The system will follow these user interface rule:

- Each screen will display clear navigation options such as Home, Insights, Budget and setting.
- All buttons will use simple and meaningful labels such as Add, Save, Edit and Delete.
- Input fields will be arranged in a logical order so users can enter information easily without mistakes.

2. Software Interfaces

The Smart FinSight will be developed using Flutter to create a simple and smooth user interface for cross-platform devices. Visual Studio Code will be used for coding, Flutter DevTools for debugging and Draw.io for designing UML diagrams. The app will use Firebase Authentication for signup and login and Firebase Firestore for storing and retrieving financial data. F1_chart will be used for display charts, while pdf and excel libraries to generate reports. Voice-based transaction entry will be supported using speech-to-text with the Gemini AI API to convert voice input into text. Python libraries like NumPy, Pandas and Scikit-learn will be used through a flask API for fast processing and insight generation.

3. Hardware Interfaces

The Smart FinSight app will run on cross-platform. Users will need a basic device with an internet connection to use the app and syn data. The backend services of the system will operate on cloud-based Firebase services so no local server or special hardware is required. The app will work smoothly on cross-platform devices.

4. Communications Interfaces

The Smart FinSight app will communicate securely with Firebase services. An active internet connection will be required to use authentication, saving and retrieving transaction, updating budgets and accessing financial records. All data related to income, expense, budget, notes and reports will be securely transmitted in the background to ensure a smooth, reliable and safe user experience.

3.7 Use case Analysis

Use Case #1(Sign up – UC1)

UC Identifier	**UC1**
UC Name	Sign up
Requirement Traceability	FR-1
Purpose	It will allow a new user to create an account.
Priority	High
Preconditions	User is not already registered.
Post conditions	User account is successfully created.
Actors	User
Extends	None
Main Success Scenario	• User will open sign up screen. • System will ask for username, email, password and confirm password. • User will enter all required details. • System will validate entered data. • System will create new user account. • System will display registration successfully.
Alternate Flows	If email already exist system will display an error message.
Exceptions	If system error occurs while saving data the account will not be created.
Includes	None

Table 25 Use Case Description For Sign Up

Use Case #2(Login – UC2)

UC Identifier	**UC2**
UC Name	Login
Requirement Traceability	FR-2
Purpose	It will allow user to access their account.
Priority	High

Preconditions	User must already be registered.
Post conditions	User is logged in and Home screen appears.
Actors	User
Extends	None
Main Success Scenario	• User will open login screen. • System will ask for email and password. • User will enter required credentials. • System will log user in and redirects to Home page.
Alternate Flows	If password incorrect system will display an error message.
Exceptions	If system in unable to verify credentials sue to server error login will fail.
Includes	None

Table 26 Use Case Description For Login

Use Case #3(Forgot Password – UC3)

Uc Identifier	**UC3**
UC Name	Forgot Password
Requirement Traceability	FR-3
Purpose	It will allow user to reset their password.
Priority	High
Preconditions	User must have valid registered email.
Post conditions	Password is updated.
Actors	User
Extends	None
Main Success Scenario	• User will click on forgot password. • System will ask for registered email address. • User will enter email address. • System will send a password reset link. • User will open link and enters a new password. • System will update password successfully.

Alternate Flows	If entered email is not registered system will display an error message.
Exceptions	If reset link expires or email delivery will fail.
Includes	None

Table 27 Use Case Description For Forgot Password

Use Case #4(Add Income – UC4)

Uc Identifier	**UC4**
UC Name	Add Income
Requirement Traceability	FR-4
Purpose	It will allow user to add their income.
Priority	Medium
Preconditions	User must be logged into the system.
Post conditions	Income entry saved in transaction list and totals updated.
Actors	User
Extends	None
Main Success Scenario	• User will open Add Income page. • System will ask for amount, category, payment method and note. • User will enter income details. • System will store income successfully.
Alternate Flows	User will use voice input to add income details.
Exceptions	If required fields are missing system will display an error message.
Includes	None

Table 28 Use Case Description For Add Income

Use case #5(Add Expense – UC5)

UC Identifier	**UC5**
UC Name	Add Expense
Requirement Traceability	FR-5
Purpose	It will allow user to add their expense.
Priority	Medium

Preconditions	User must be logged into the system.
Post conditions	Expense entry saved in transaction list and total updated.
Actors	User
Extends	None
Main Success Scenario	• User will click on Add Expense page. • System will ask for amount, category, payment method and note. • User will enter expense details. • User will save expense record. • System will store expense successfully.
Alternate Flows	User will use voice input to add expense details.
Exceptions	If required fields are missing system will display an error message.
Includes	None

Table 29 Use Case Description For Add Expense

Use case #6(View Transaction – UC6)

UC Identifier	**UC6**
UC Name	View Transaction
Requirement Traceability	FR-6
Purpose	It will allow user to view all income and expense transaction.
Priority	Medium
Preconditions	User must be logged into the system.
Post conditions	Transaction list displayed.
Actors	User
Extends	Edit transaction, Delete transaction
Main Success Scenario	User will open transaction page. System will retrieve transaction records. System will display transaction list.
Alternate Flows	If no transactions are available system will display an empty list message.

Exceptions	If the system is unable to load transaction an error message will be shown.
Includes	None

Table 30 Use Case Description For View Transaction

Use case #7(Voice Input – UC7)

Uc Identifier	**UC7**
UC Name	Voice Input
Requirement Traceability	FR-7
Purpose	It will allow user to record to income and expense using voice input.
Priority	Medium
Preconditions	User must be logged into the system. Microphone permission must be enabled.
Post conditions	Transaction recorded
Actors	User
Extends	None
Main Success Scenario	• User will tap voice input tab. • System will start listening to voice input. • User will speak transaction details. • System will convert voice input into transaction list.
Alternate Flows	If voice input is not detected system will ask user to repeat the input.
Exceptions	If voice is not detected system will display an error message.
Includes	None

Table 31 Use Case Description For Voice Input

Use case #8(Set Budget – UC8)

UC Identifier	**UC8**
UC Name	Set Budget
Requirement Traceability	Fr-8
Purpose	It will allow user to set budget limit.
Priority	Medium

Preconditions	User must be logged in.
Post conditions	Budget is saved successfully.
Actors	User
Extends	Edit Budget, Delete Budget
Main Success Scenario	• User will open budget module. • System will ask for budget details. • User will enter budget details. • User will store budget successfully.
Alternate flows	User will update an existing budget.
Exceptions	If invalid amount is entered system will display an error message.
Includes	View Budget, Add Budget

Table 32 Use Case Description For Set Budget

Use case #9(View Insights – UC9)

UC Identifier	**UC9**
UC Name	View Insights
Requirement Traceability	FR-9
Purpose	It will allow user to view smart suggestion and future expense prediction.
Priority	Medium
Preconditions	User must be logged in and transaction data must exist.
Post conditions	Insights are displayed successfully.
Actors	User
Extends	None
Main Success Scenario	• User will open insights module. • System will display smart suggestion and future prediction. • User will view insights.
Alternate Flows	If not, enough data is available system will display an appropriate message.
Exceptions	If the insights module fails to load system will display an error message.
Includes	None

Table 33 Use Case Description For View Insights

Use case #10(View Charts – UC10)

UC Identifier	**UC10**
UC Name	View Charts
Requirement Traceability	FR-10
Purpose	It will allow user to view charts of income, expense and summary.
Priority	Medium
Preconditions	User must be logged in and transaction data must exist.
Post conditions	Chars are displayed successfully.
Actors	User
Extends	None

Main Success Scenario	User will open chart section. System will calculate totals and display charts. User will view charts.
Alternate Flows	If no data is available system will display an appropriate message.
Exceptions	If chart loading fails system will display an error message.
Includes	None

Table 34 Use Case Description For View Charts

Use case #11(Manage Notebook – UC11)

UC Identifier	**UC11**
UC Name	Manage Notebook
Requirement Traceability	FR-11
Purpose	It will allow user to add, edit and delete notes.
Priority	Low
Preconditions	User must be logged in.
Post conditions	Notes are saved and displayed successfully.
Actors	User
Extends	Edit note, Delete note
Main Success Scenario	• User will open notebook section. • System will display existing notes. • User will add a new note. • System will store the note successfully.
Alternate Flows	User will edit or delete an existing note.
Exceptions	Is an empty note is entered system will display an error message.
Includes	Add Note

Table 35 Use Case Description For Manage Notebook

Use case #12(View Calendar – UC12)

UC Identifier	**UC12**
UC Name	View Calendar
Requirement Traceability	FR-12
Purpose	It will allow user to view transaction on calendar.
Priority	Medium
Precondition	User must be logged in.
Post conditions	Calendar with transaction amount is displayed.
Actors	User
Extends	None
Main Success Scenario	• User will open calendar section. • System will display calendar.
Alternate Flows	If no transaction exist for a selected date zero amount is shown.
Exceptions	If calendar fails to load system will display an error message.
Includes	None

Table 36 Use Case Description For View Calendar

Use case #13(Generate Reports – UC13)

UC Identifier	**UC13**
UC Name	Generate Reports
Requirement Traceability	FR-13
Purpose	It will allow user to generate financial reports.
Priority	Medium
Preconditions	User must be logged in and transaction data must exist.
Post conditions	Report is generated successfully.
Actors	User
Extends	Download Report
Main Success Scenario	• User click on report section. • User will select pdf/excel format.

	- System will generate report. - User will download report.
Alternate Flows	User will cancel the report generation will stop.
Exceptions	If file generation fails system will display an error message.
Includes	None

Table 37 Use Case Description For Generate Report

Use case #14(Set Reminder – UC14)

Uc Identifier	**UC14**
UC Name	Set Reminder
Requirement Traceability	FR-14
Purpose	It will allow user to set reminder for financial tasks.
Priority	Low
Preconditions	User must be logged in.
Post conditions	Reminder is saved and scheduled.
Actors	User
Extends	Edit reminder, Delete reminder
Main Success Scenario	User will open reminder section. User will enter reminder details. User will save the reminders. System will schedule reminder.
Alternate Flows	If user cancels the reminder before saving system will not store the reminder.
Exceptions	If an incorrect date is entered the reminder will be triggered on the entered date.
Includes	Add reminder

Table 38 Use Case Description For Set Reminder

Use case #15(Update Profile – UC15)

UC Identifier	**UC15**
UC Name	Update Profile
Requirement Traceability	FR-16
Purpose	It will allow user to update profile information.
Priority	Medium
Preconditions	User must be logged into the system.
Post conditions	Profile is updated successfully.
Actors	User
Extends	Change Password
Main Success Scenario	User will open profile section. User will update profile information. User will save change. System will update profile successfully.
Alternate Flows	If user cancels profile update system will not save changes.
Exceptions	If invalid data is entered system will display an error message.
Flows	None

Table 39 Use Case Description For Update Profile

Use case #16(Logout – UC16)

UC Identifier	**UC16**
UC Name	Logout
Requirement Traceability	FR-17
Purpose	It will allow user to securely logout.
Priority	High
Preconditions	User must be logged in.
Post conditions	User session is terminated successfully.
Actors	User
Extends	None

Main Success Scenario	User will select logout option. System will end the user session. System will redirect to login page.
Alternate Flows	None
Exceptions	If a system error occurs during logout the system will log it and notify the user.
Includes	None

Table 40 Use Case Description For Logout

5. Use Case Diagram

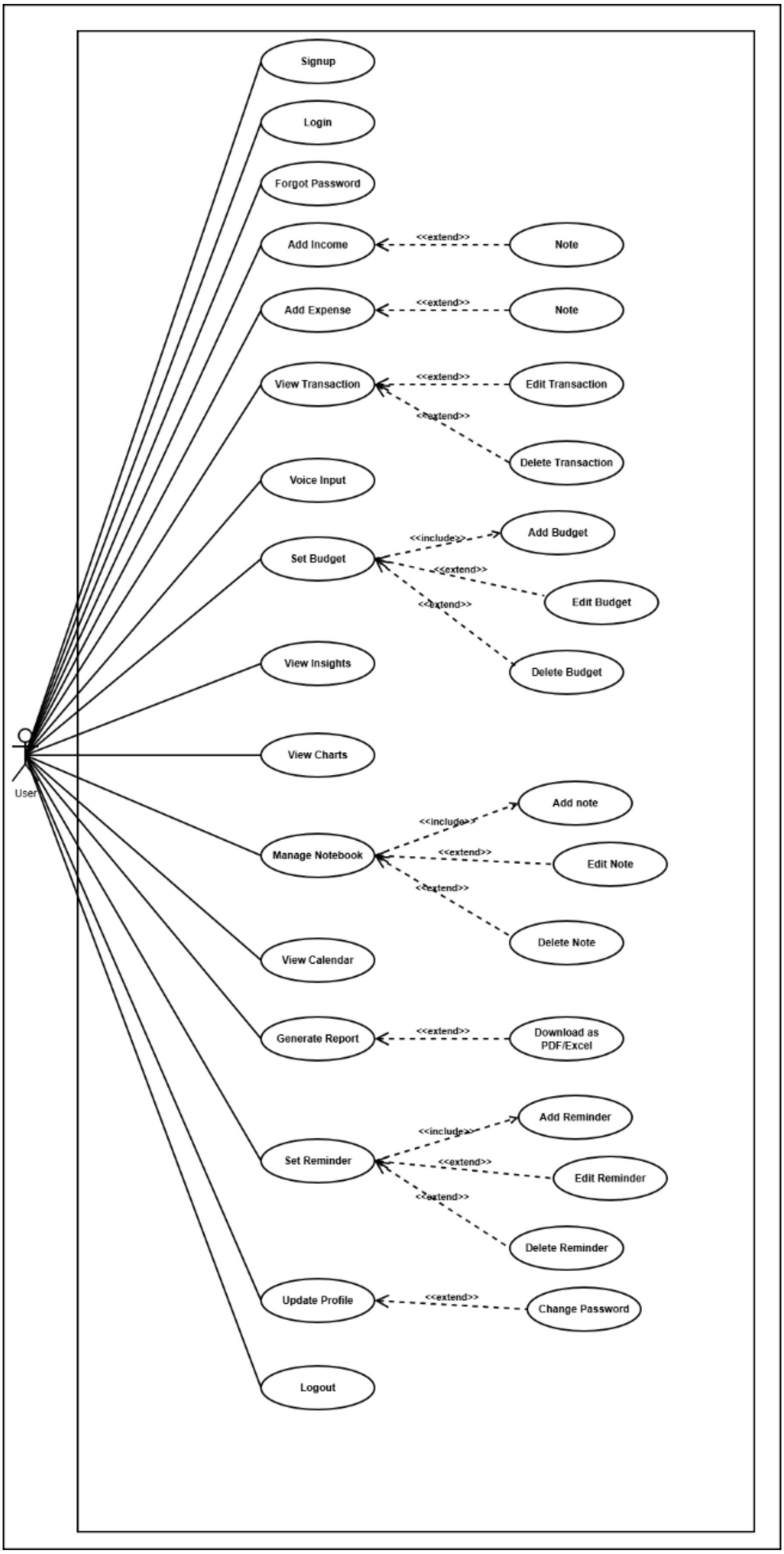


Figure 1 Use case Diagram

3.4 Storyboards

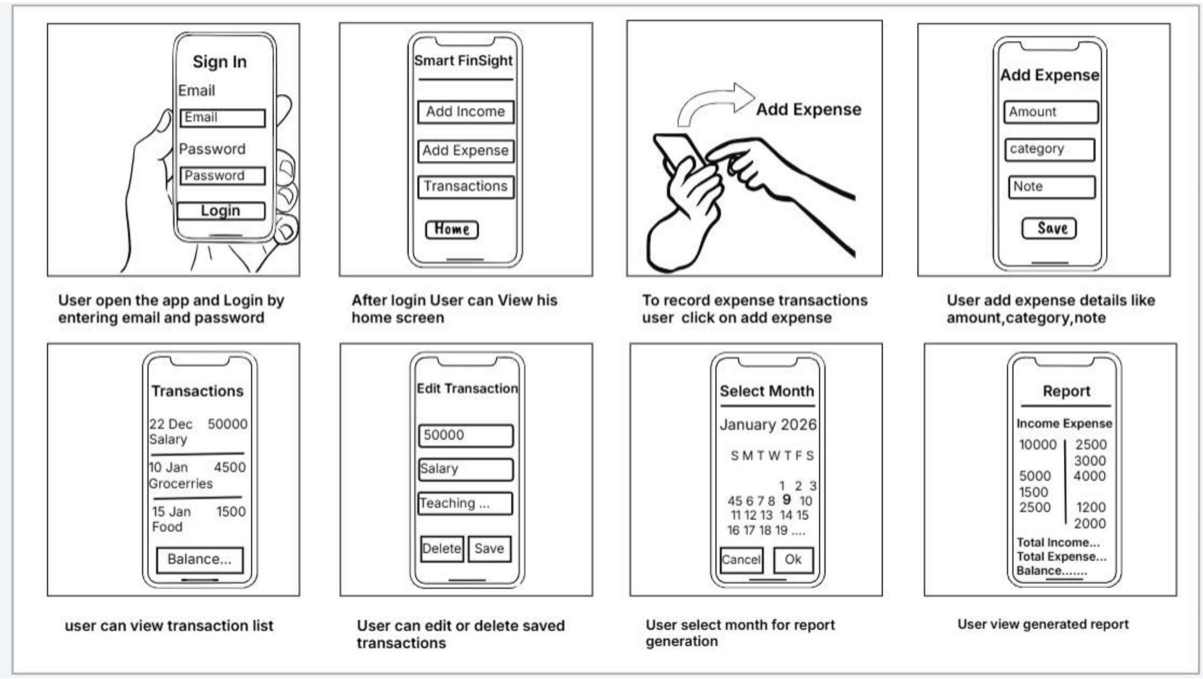


Figure 2 User Storyboard

3.5 Summary

The requirement identification and use case analysis for Smart FinSight will involve identifying stakeholder need, gathering functional and non-functional requirements and defining user-system interactions through use cases. These requirements will be prioritized, documented and validated to align with project goals. This process will ensure all important functionalities are covered, helping the system succeed in managing personal finances effectively.

Chapter No 4

Software Design Specification

4.1 System Design

Product Perspective:

Smart FinSight will operate as a cross-platform application especially designed for tracking and managing personal finances. It will depend on a stable internet connection and cloud services for all users of the app.

Design Constraints:

- The system will handle multiple users at the same time without slowing down.
- It will work smoothly on all devices with a cross-platform design.
- It will use cloud services for data storage and hosting.
- It will keep all user data secure and follow privacy rules.
- Updates will be applied without stopping the system using version control.

4.2 Design Considerations

1. **Assumptions and Dependencies**:
    - Users will have internet connection and basic knowledge to use the app.
    - The app will use cloud services for login, data storage and notifications.
    - Devices will support cross-platform access.
2. **Limitations**:
    - The app will require internet to function properly.
    - Biometric login will not be included.
3. **Risks:**
    - Large amount of storage data may slow down the performance.
    - Internet or server problems may affect app access.
    - Updates or maintenance may temporarily interrupt the app.

4.3 Requirements Traceability Matrix

Requirement ID	**Scope**	**Requirement Description**	**Design Specification**
R1	User Authentication	The system will allow the user to sign up and login securely.	Module “Authentication”
R2	Financial Records	The system will store and retrieve user income and expense data.	Module “Transaction”
R3	Budget Tracking	The system will allow the user to set and manage the budget.	Module “Budget”
R4	Financial Insights	The system will analyze financial data and provide insights.	Module “Insights”

R5	Reports	The system will generate financial reports for the user.	Module “Report”
R6	Notifications	The system will send alerts and reminders to the user.	Module “Notification”
R7	Profile	The system will allow the user to view and update profile information.	Module “profile”
R8	Visualization	The system will display financial data in graphical form.	Module “Charts”

Table 41 Requirement Traceability Matrix

4.4 Design Models

1. Design Class Diagram (DCD)class

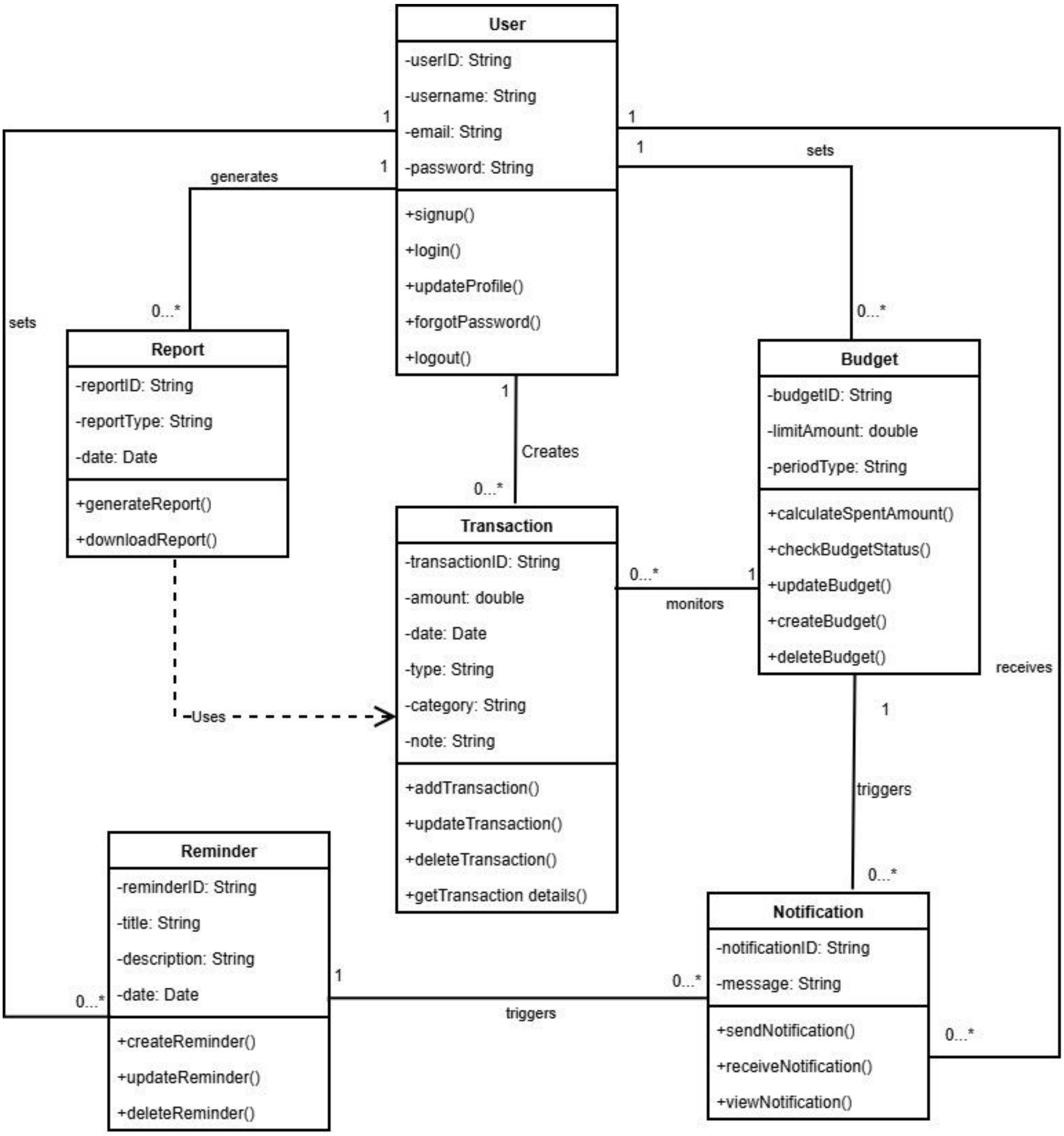


Figure 3 Class Diagram

2. Interaction Diagram (Either sequence or collaboration)

Sign Up Sequence Diagram

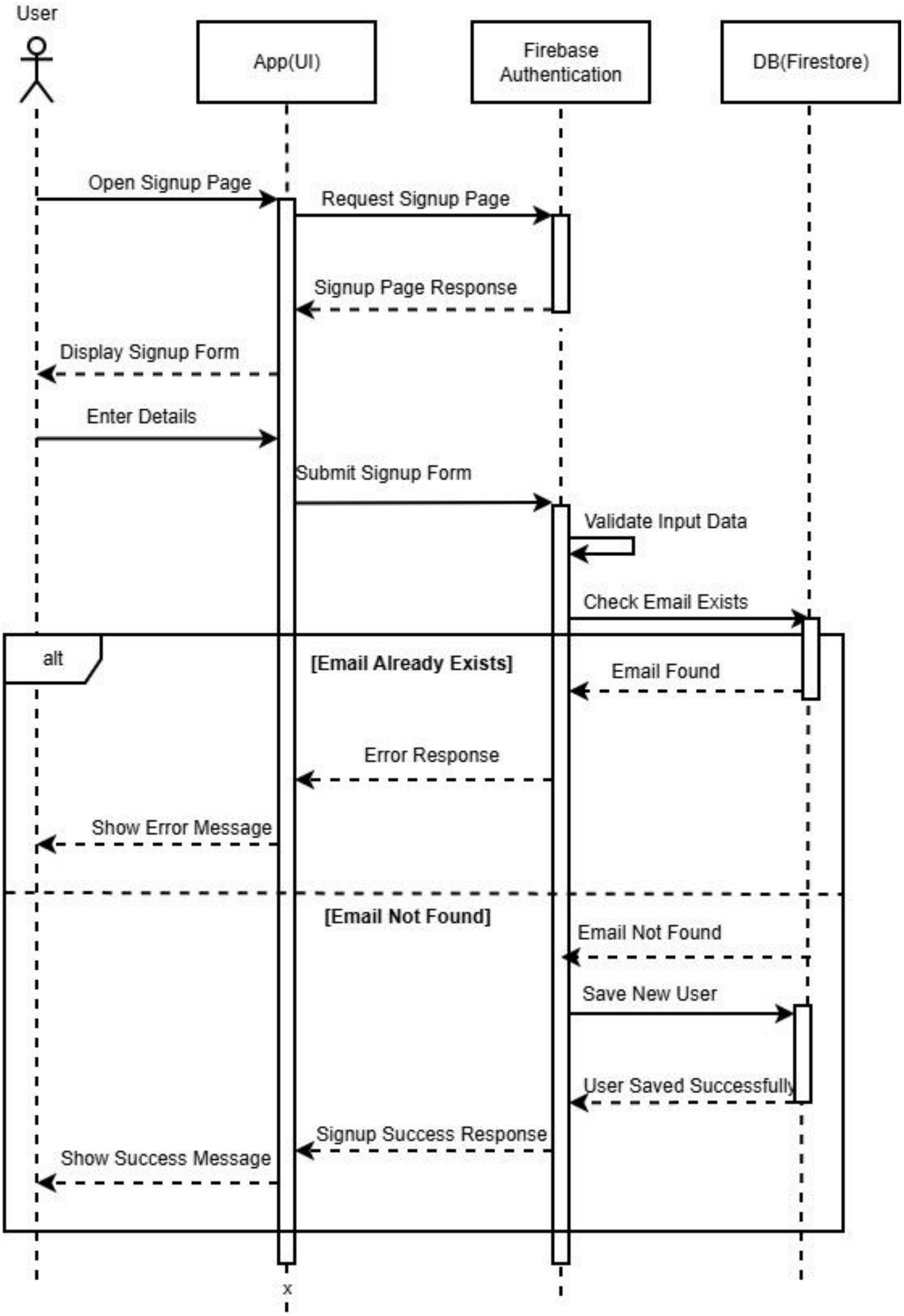


Figure 4 Sign Up sequence Diagram

Login Sequence Diagram

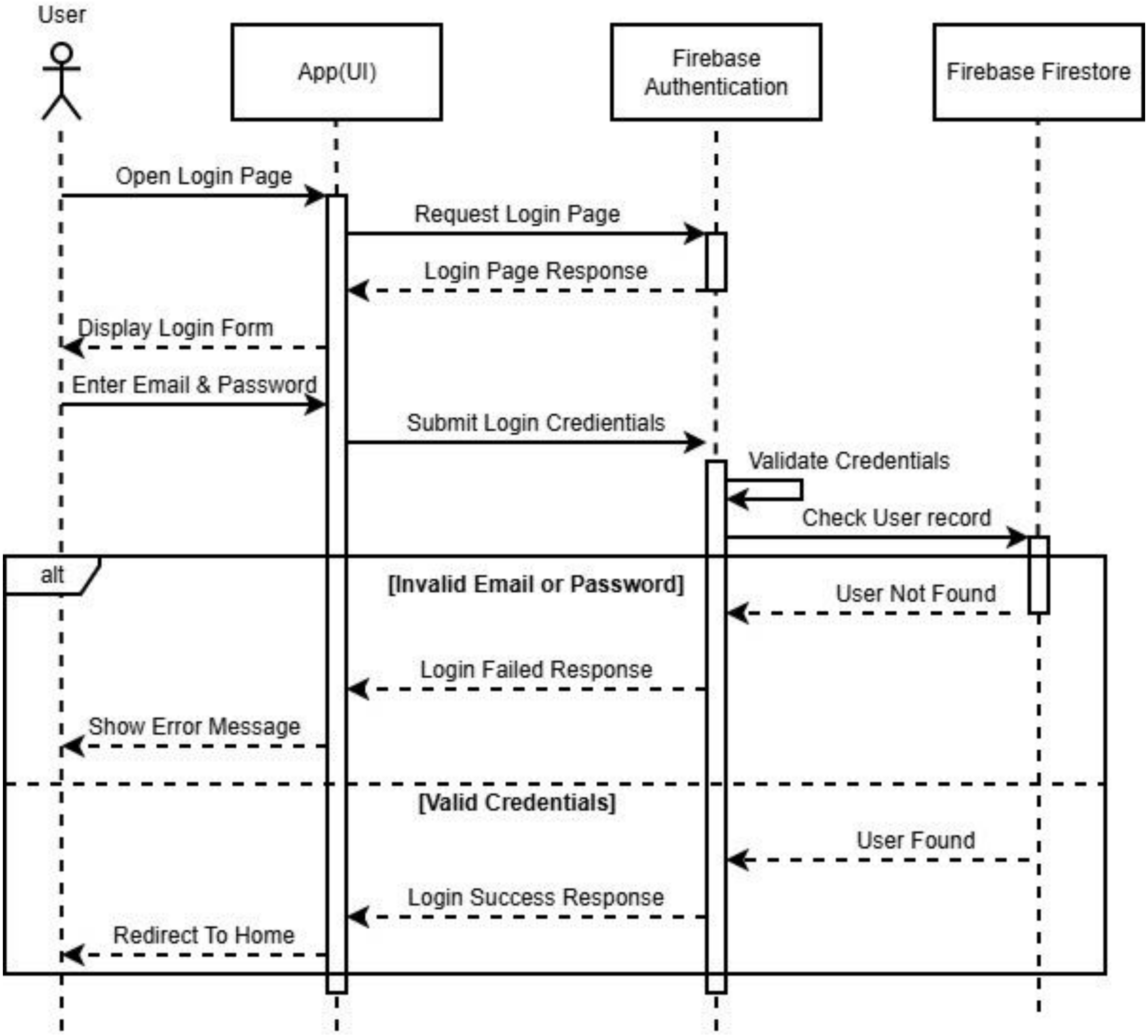


Figure 5 Login sequence Diagram

Forgot Password Sequence Diagram

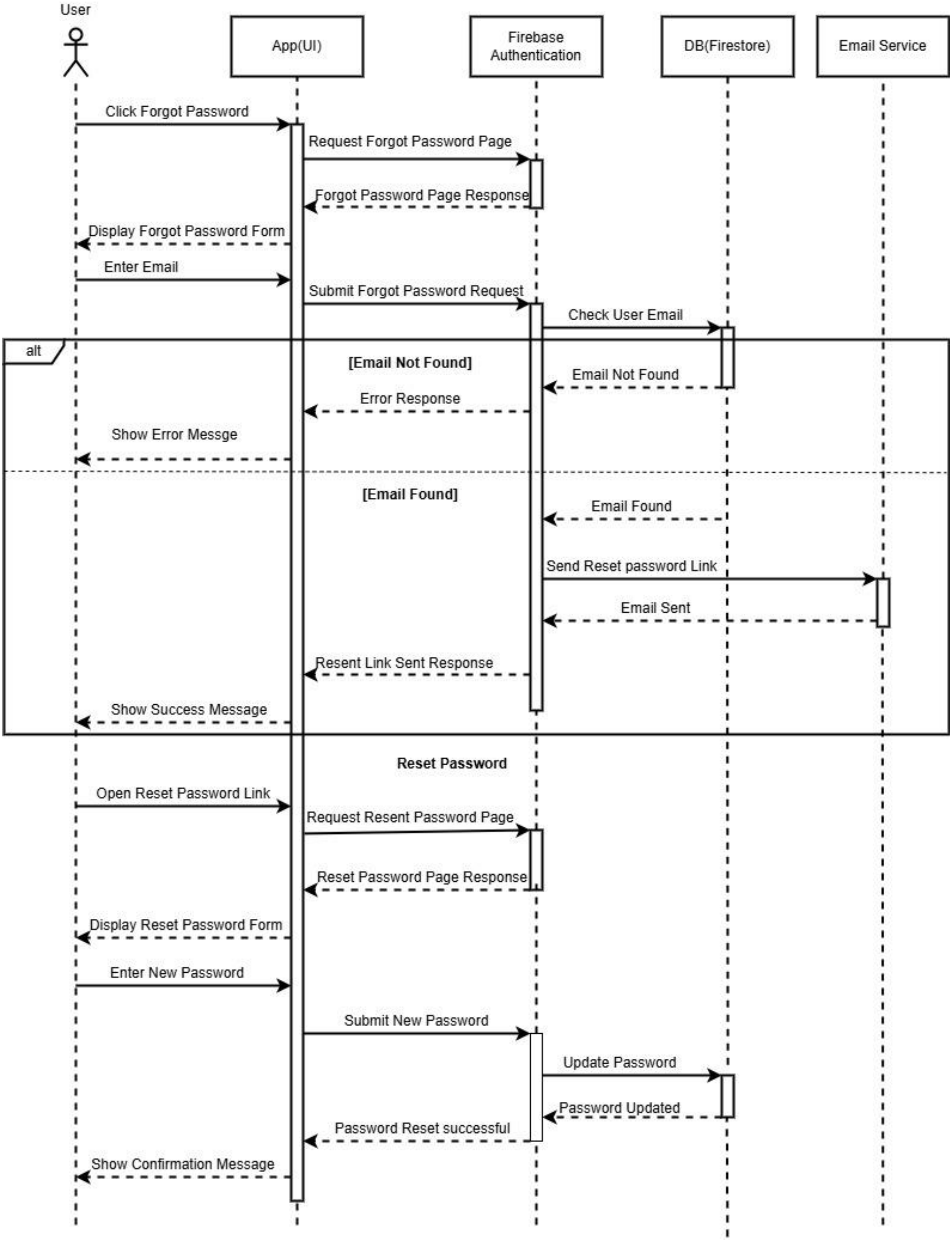


Figure 6 Forgot Password sequence Diagram

Add Income Sequence Diagram

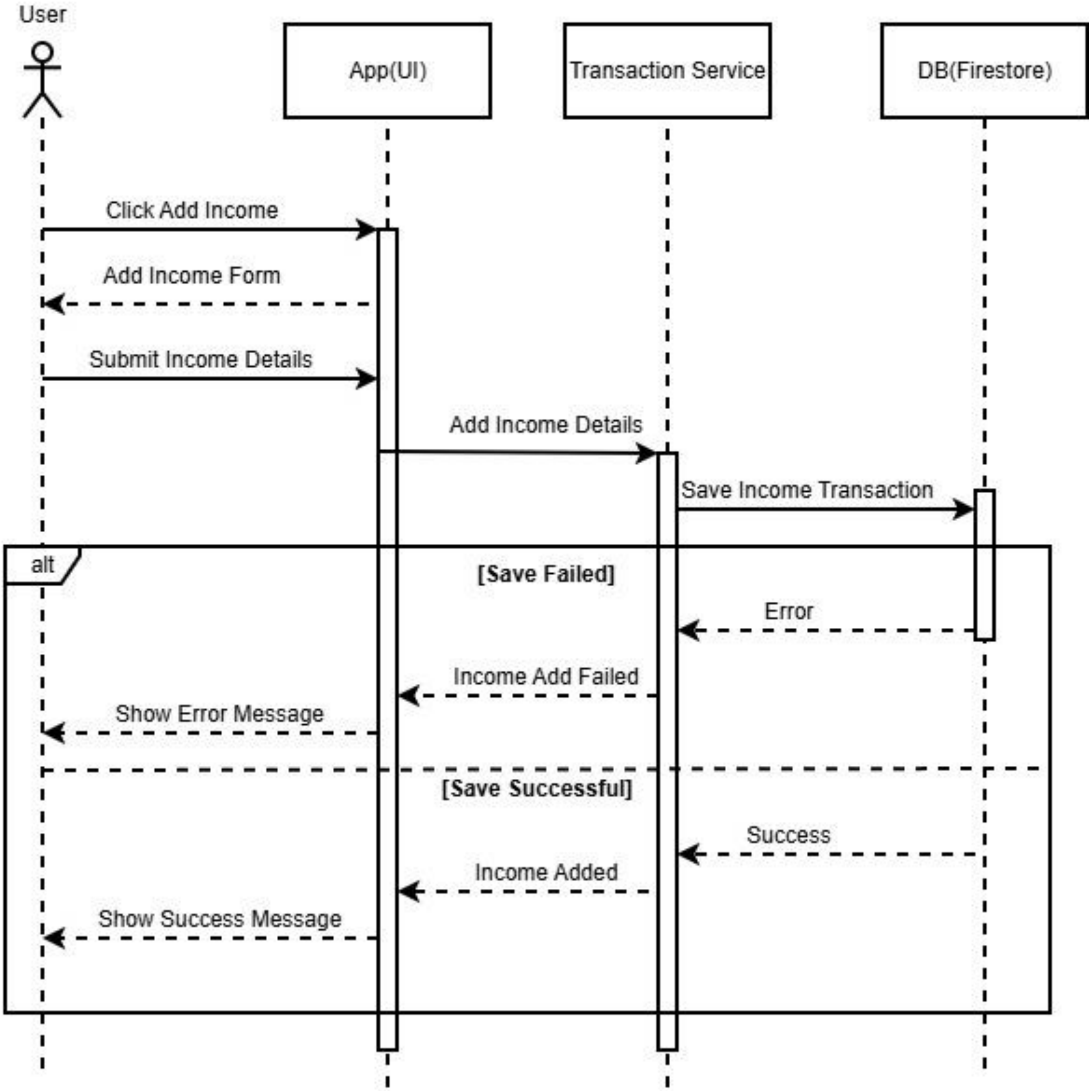


Figure 7 Add Income sequence Diagram

Add Expense Sequence Diagram

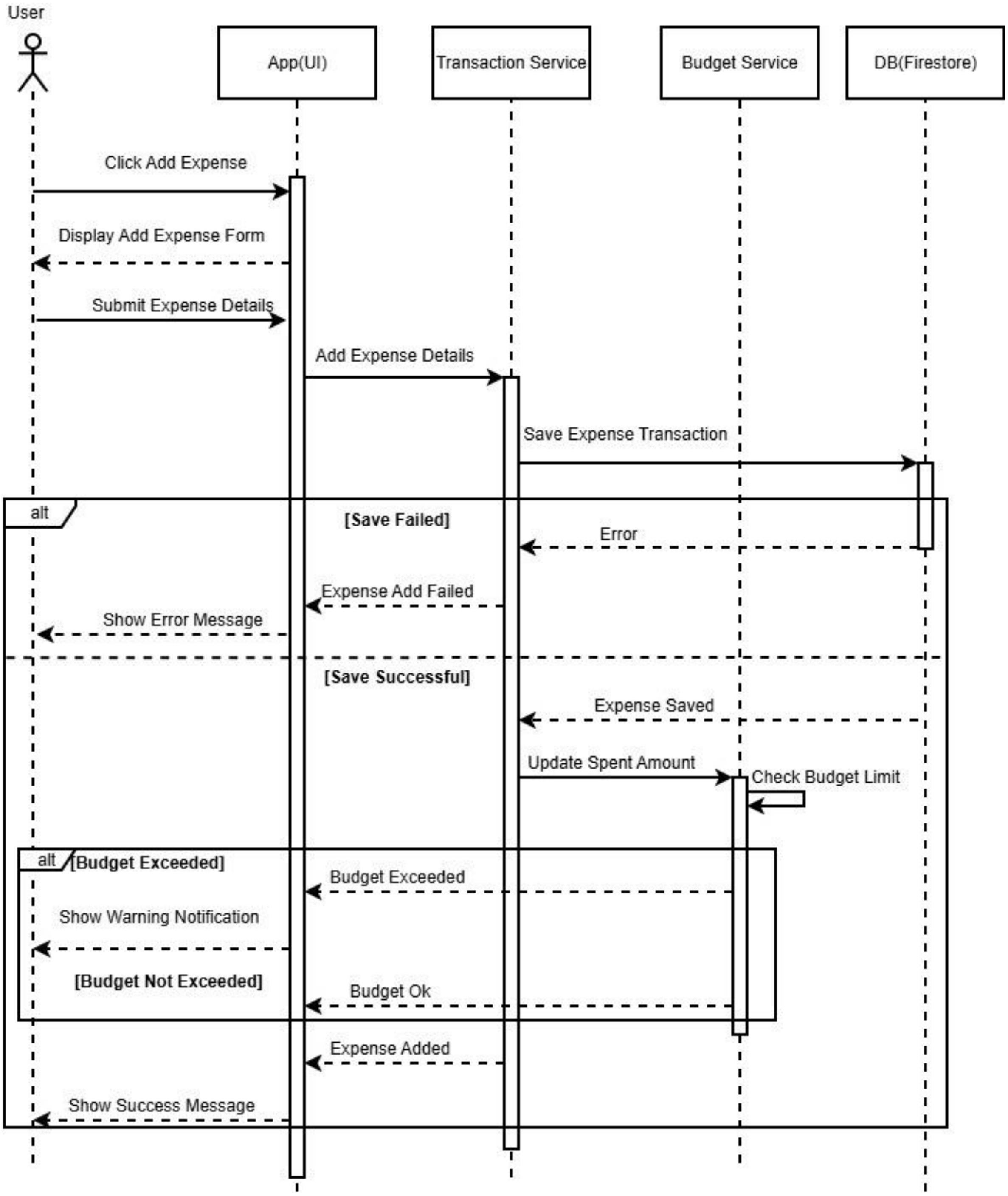


Figure 8 Add Expense Sequence Diagram

Transaction Sequence Diagram

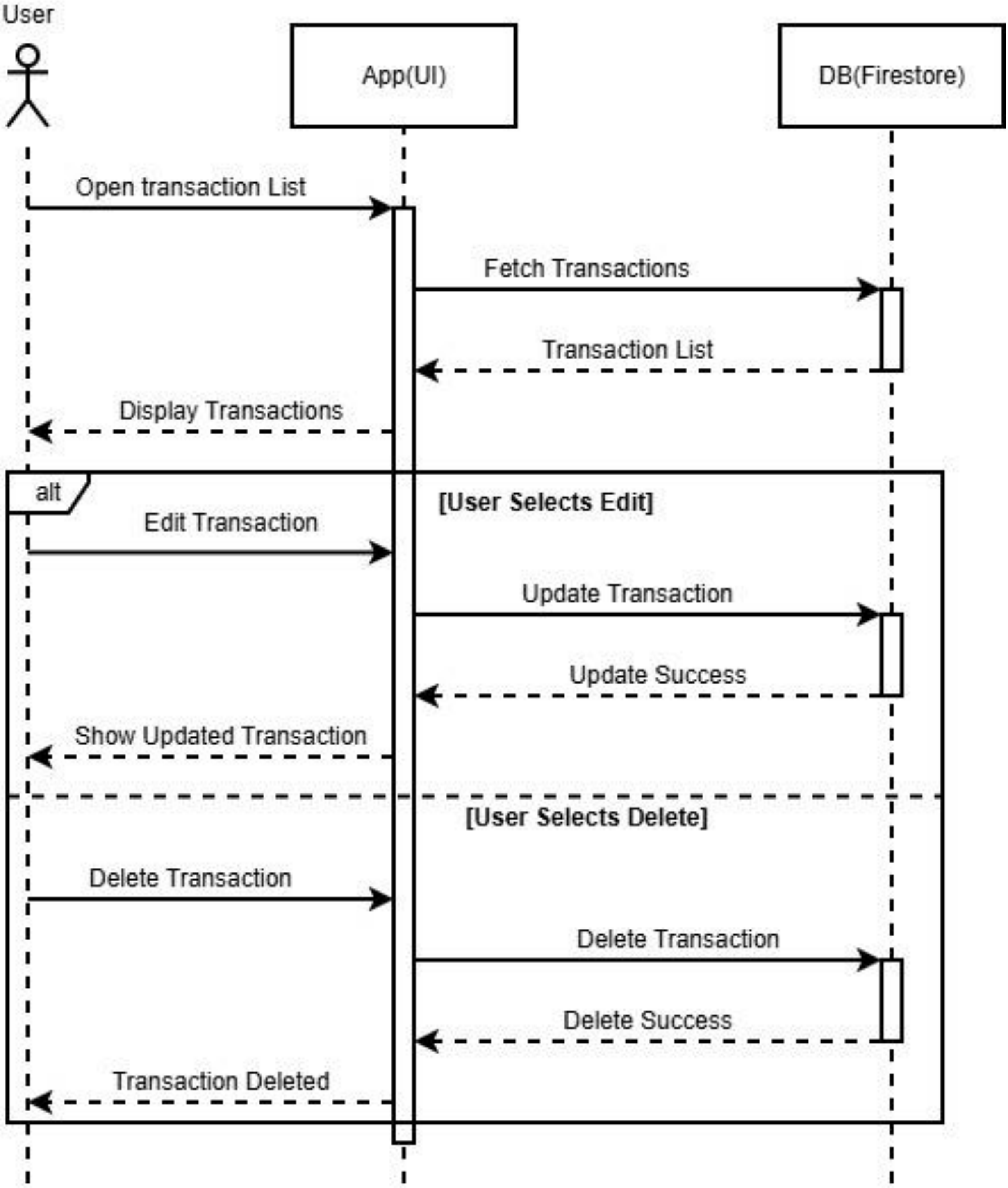


Figure 9 Transaction Sequence Diagram

Generate Report Sequence Diagram

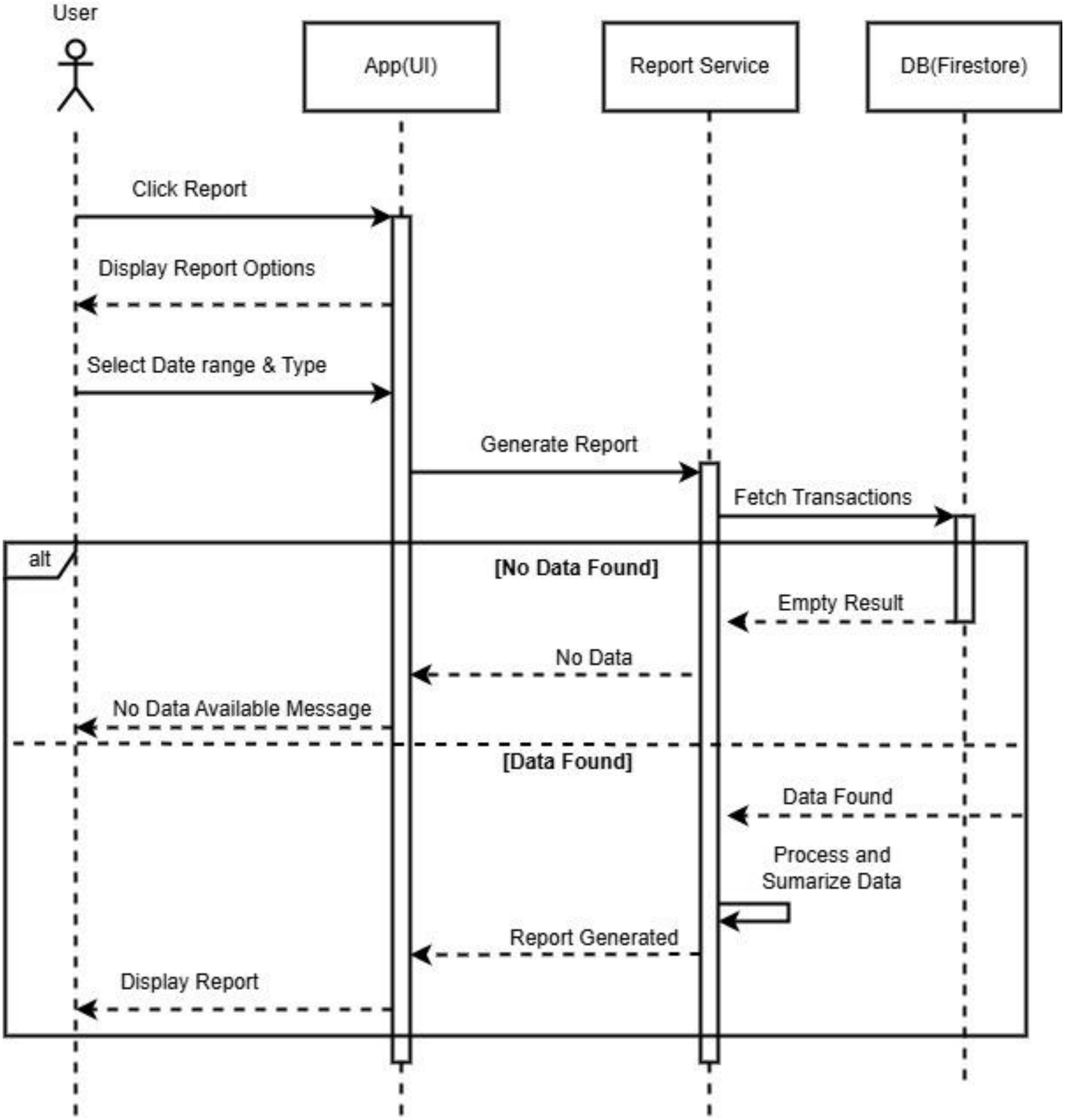


Figure 10 Generate Report Sequence Diagram

Update Profile Sequence Diagram

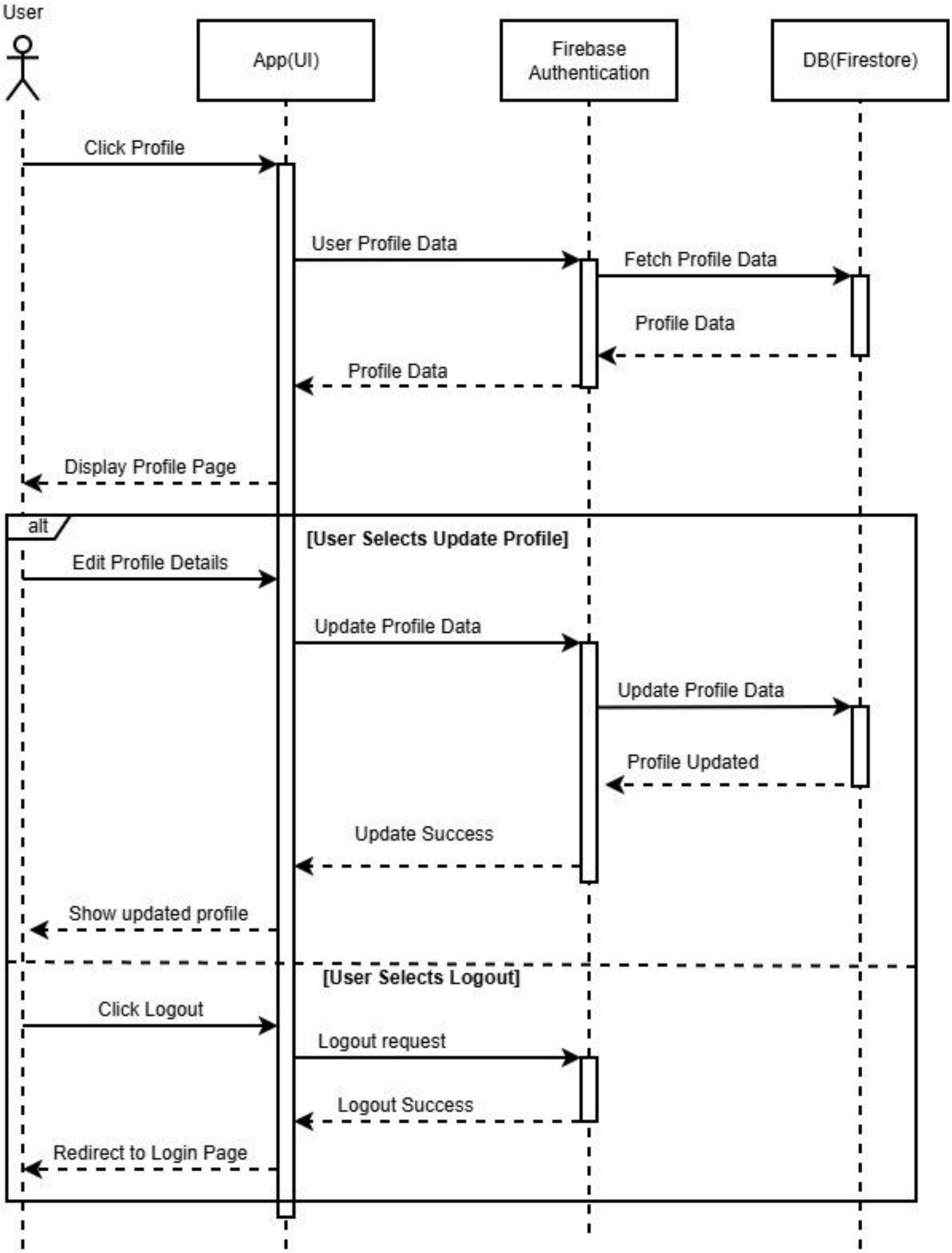


Figure 11 Update Profile Sequence Diagram

State Transition Diagram

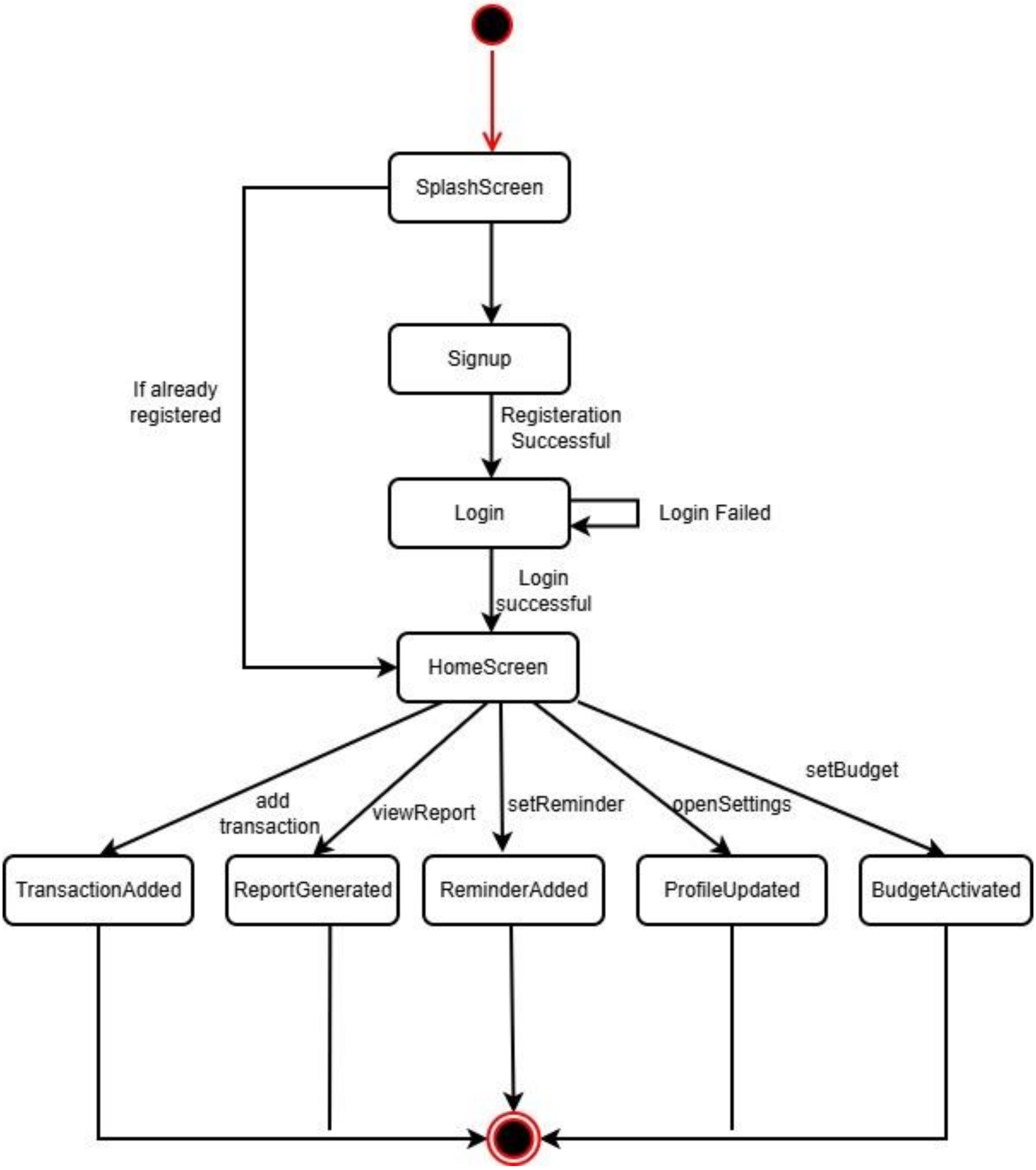


Figure 12 State Diagram

4.5 Architectural Design

1. UML Component diagram

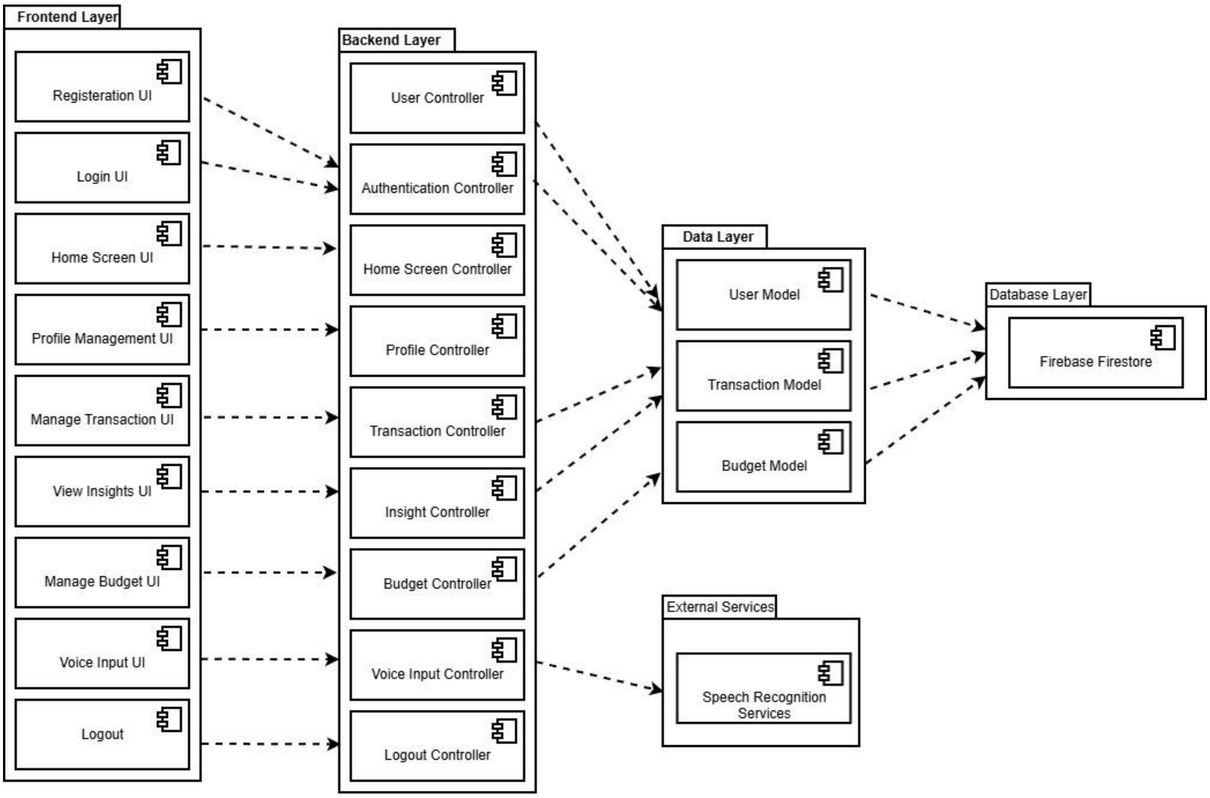
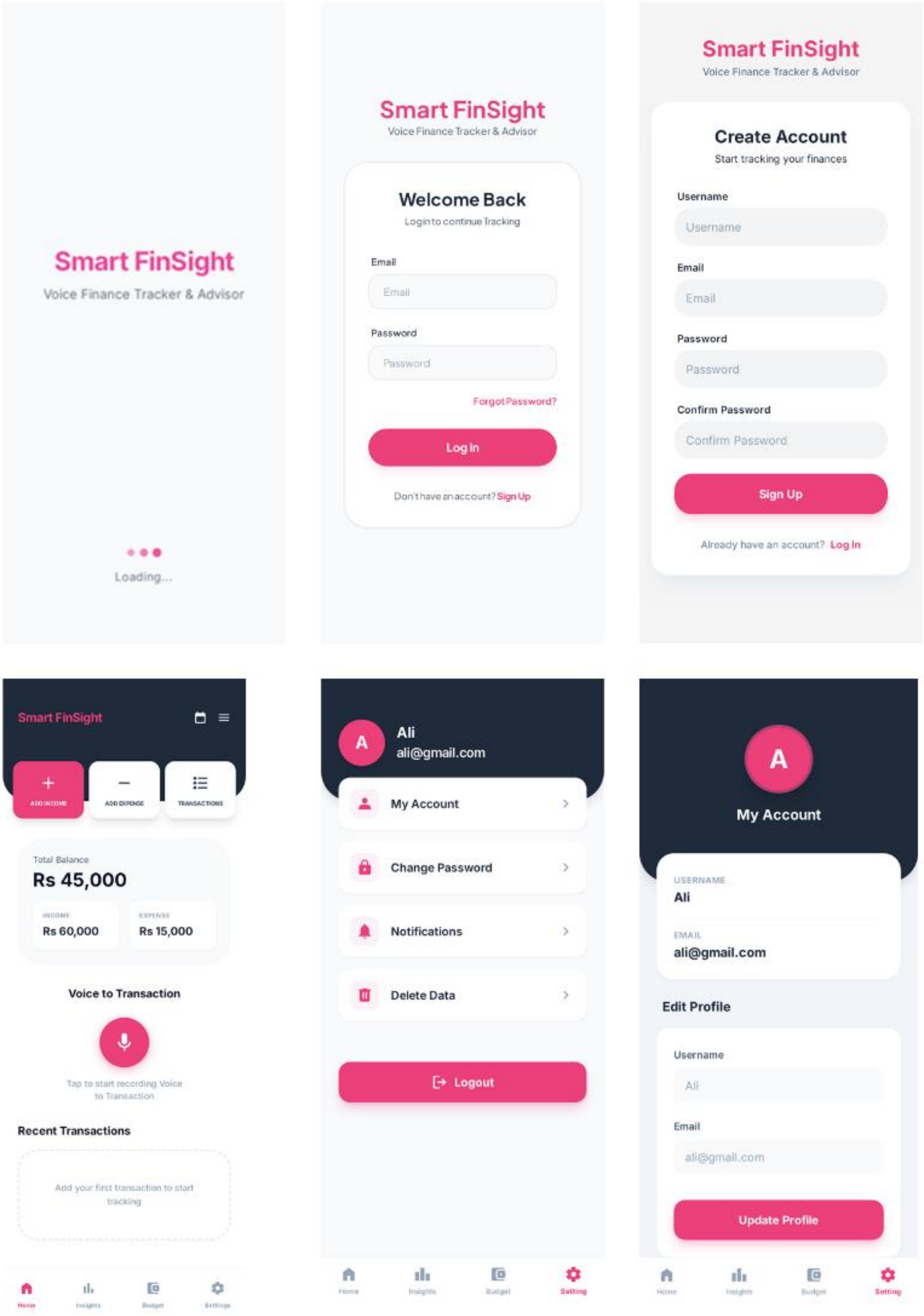


Figure 13 Component Diagram

4.6 User Interface Design

The user interface of the Smart FinSight application will be a simple and easy to use. After login, users will be directed to home screen where they can view a summary of their financial activities. User will be able to easily navigate to add income or expenses, set budgets, view reports and view insights. The interface will provide clear feedback for every action such as confirmation message and alerts. Notification will inform users about important updates helping them manage their finances smoothly.

1. Screen Images



Smart FinSight

Voice Finance Tracker & Advisor

Loading...

Smart FinSight

Voice Finance Tracker & Advisor

Welcome Back

Login to continue Tracking

Email

Email

Password

Password

Forgot Password?

Log In

Don't have an account? Sign Up

Smart FinSight

Voice Finance Tracker & Advisor

Create Account

Start tracking your finances

Username

Username

Email

Email

Password

Password

Confirm Password

Confirm Password

Sign Up

Already have an account? Log In

Smart FinSight

ADD INCOME

ADD EXPENSE

TRANSACTIONS

Total Balance

Rs 45,000

INCOME

Rs 60,000

EXPENSE

Rs 15,000

Voice to Transaction

Tap to start recording Voice to Transaction

Recent Transactions

Add your first transaction to start tracking

Home

Insights

Budget

Settings

A

Ali

ali@gmail.com

My Account

Change Password

Notifications

Delete Data

Logout

Home

Insights

Budget

Setting

A

My Account

USERNAME

Ali

EMAIL

ali@gmail.com

Edit Profile

Username

Ali

Email

ali@gmail.com

Update Profile

Home

Insights

Budget

Setting

Figure 14 User Interface

4.7 Summary

In this chapter we will explain the design of our Smart FinSight app. We will describe different models like class diagram, sequence diagram, state transition diagram and architecture design. We will show how the system will work for users. We will also explain how Firebase will store data securely and how the user interface will be kept simple and easy to use. This design will provide a strong foundation for implementation and make the app reliable, efficient and user-friendly.

References

References

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