SmartStyle Guidelines for Final Year Project Reports Smart Business Insider

Final Year Project

Session 2020-2024

A 4th Year Student

A project submitted in partial fulfilment of the

Government College University Faisalabad

of

BS in Computer Science (BSCS)

Department of Computer Science

Government College University Faisalabad

1 oct 2024

Project Detail

Type (Nature of project)				Development			
Area of specialization				Mobile Application Development with BI			
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Abstract

Smart Business Insider is an application to keep track of store's inventory and generate online bills with the proper record of date, time etc. It has Business Intelligence like forecasting the sales, reminders when the stock of items is about to run out. Artificially calculate all the profit and loss ratio to keep updating the user. It enables apps to send bills on WhatsApp which reduces paper use. The development of this mobile application will focus on people with the small stores who need to convert their Bookkeeping to digital applications. As many of the small store owners do not have the access to desktop computers but most of them have access to smartphones. So the main motive of this mobile application is to give the same facility to small stores which all the big stores have of online or digital management. In addition to that they will get business techniques through which they can reach the success in their business and will utilize many more features that are useful for their business.

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1 Chapter 1: Introduction

1.1 Introduction

Business management is a headache when it comes to Bookkeeping. As a business owner it is a difficult task to evaluate the total expenses of all the profit loss and purchasing of new products. A man in any business field needs to know what product is selling the most and what profits that product is giving. In these times when the world is too fast everyone is using digital markets one with the old techniques of saving records evaluating his/her total sales, choosing between the products that are more useful to the business, products that are sold out most comparing to remaining stock and still believing that the only way of promoting business is from becoming cadger or transferring one's business by mouth-to-mouth communication will never succeed.

Every businessman in today's world has some sort of digital application that helps him/her in his business management more efficiently and effectively but what about the people with less setup of business or who initially started with zero backup and have less investment who cannot afford the customized application.

As there is already much headache in managing an everyday routine, this application is aimed to make store or business owners feel free from the business techniques, daily sales, product purchasing, proper stock availability, trends, ratio of profit and loss etc. The techniques that are used for these purposes are mostly based on Artificial Intelligence. The business intelligence techniques that are going to be used are:

- Data Visualization
- Dashboards
- Data Analysis
- Inventory Management
- Bill Generation
- Report Generation
- Profit and Loss Forecasting

Users will be recommended to start using this app from the very basic level which is generating bills for every single customer and save the copy of the bill.

To get its more features, the user must do some manual work which is entering his/her stock list which he has purchased from the market. Users must enter the total amount of stock and need to specify his/her business. Every time when the user will deal with the customer to generate a bill, he must enter all the names of the products which customer needed to purchase. Initially this mobile app does not have the scanning feature like barcode because the main purpose of this application is to provide small businesses a great management application on mobile which is very cheap or free but as we are planning to launch it in a market so then we will add it if it is needed. According to the

specified business this application will suggest users to adopt some business techniques which can be done in app using Machine Learning Libraries and Algorithms. This application needs the user to enter his/her country which will be later used for evaluating the holidays and events. It also consists of all companies' contact details that whenever a user tries to call the vendors for the product order, he/she can easily contact from the contact addresses given in the app.

Total sales of the day will be evaluated on the 24h time frame using the sum of the total sales also from this profit and loss will be evaluated on the monthly basis. Overall, this application will work as a business manager and a business advisor simultaneously.

1.2 Objectives:

In this section we will discuss the objectives of our mobile application.

1.2.1 Convenience

In every application, it is very important to provide as much as possible as convenience to the user. In our application, user can keep the inventory of his/her business, can generate digital and physical invoices of all customers, keep record of how his/her business is going through analytics, can update one of special occasions which can be holidays and can get AI based recommendation of how to grow business based on current business situation.

1.2.2 Security

Our mobile application is completely secured for our users. We make sure that any personal data of our users must be kept private. No one except users have the access to look into the personal data of any other user profile. The user must have to enter the email or username and password for logging into their profiles.

1.2.3 Performance

We have used the React native for the development of our mobile application which is a general-purpose language. So that our users don’t have to face any type of difficulties during the use of the application. The mobile will always be updated and maintained according to the feedback of users. The performance of the application will be the same on any type of android mobile and mac mobiles.

1.2.4 User Experience

To provide the user smooth and fast experience during the use of mobile applications we have developed the UI design of the app using advanced technologies for making it cognitive. The interface of the application is developed in such an efficient way that the user can easily access any functionality of the application very quickly.

1.3 Problem Statement

Every businessman in today's world has some sort of digital application that helps him/her in his business management more efficiently and effectively but what about the people with less setup of business or who initially started with zero backup and have less investment who cannot afford the customized application. This application is aimed to make store or business owners feel free from the business techniques, daily sales, product

purchasing, proper stock availability, trends, ratio of profit and loss etc. The techniques that are used for these purposes are mostly based on Artificial Intelligence.

1.4 Assumption and Constraints

1.4.1 Assumptions

The assumptions of the project are given below:

• Users must have the knowledge about usage of phone.

• The internet must be required to send receipts to customer digitally on WhatsApp.

• Users must have the knowledge to understand English language.

• Users must know how to use the application accurately.

• Users must know how to fill the slots correctly in the inventory.

1.4.2 Constraints

The constraints of the project are given below:

- Users don't have the full control of the application like he cannot access several features without logging in to his/her account.
- Application is completely based on the English language.
- User access is limited to only its profile.
- Users can access only AI techniques after specifying his/her business type and by keeping all the records of his/her business into the app.

1.5 Project scope

In this modern era, with the help of advanced technologies we are trying our best to find out the solution of many problems. The daily inventions give us the ideas to find the solution of social problems. We as a team have decided to develop something which benefits most people who can't afford expensive customized applications for their business management. Smart Business Insider application is aimed to make store or business owners feel free from the business techniques, daily sales, product purchasing, proper stock availability, trends, ratio of profit and loss etc.

Our team is trying to launch the best product in the market with a beautiful interface and efficient performance. We will give our best to complete this project efficiently within 6-7 months. We will make sure that the application must fulfil market standards. In future, after the launch of our product in the market we will utilize and update the application according to the feedback of users.

2 Chapter 2: Requirements Analysis

2.1 Literature review / Existing system study

So far there are many mobile applications developed for business management like generating invoices and for other tasks, but no application has developed yet that has the business intelligence. There are also some Desktop Applications that do business intelligence, but we are combining business management and business intelligence in a mobile application.

The following applications have been developed to combat business management are:

2.1.1 FreshBooks

FreshBooks mobile bookkeeping app is used by contractors, businesses, and other professionals for organizing expenses and managing receipts. Creating and tracking invoices is easy too with this bookkeeping software. As the best accounting app, FreshBooks offers a good number of collaboration tools for managing files, feedback, and conversations. [1]

2.1.2 Zoho Books

Automate all your business workflows with Zoho Books accounting book app. This best accounting app is preferred by businesses big and small for managing finances as well as ensuring GST compliant accounting procedures. Payment reminders, retail invoices or returns filing, all can be handled with ease using Zoho Books accounting software for mobile and pc. [1]

2.1.3 Wave Accounting Software

Organize expenses and income into neat categories with Wave bookkeeping software. Wave is one of the best free accounting software because of its robust report creation capabilities. You can prepare reports for cash flows, bills, and overdue invoices with ease with this mobile bookkeeping app. The best part about using this accounting book app is it offers this double entry system for generating year-end financial statements. [1]

2.1.4 FreeAgent

FreeAgent bookkeeping app offers support for managing multiple processes like invoices, bills, expenses, payrolls, and mileage. You can also monitor cash flows and track time for keeping a check on tax bills. The accounting software allows end users to manage a project's performance through its profitability and expense reporting module. [1]

2.1.5 GoDaddy Bookkeeping

With the GoDaddy bookkeeping app, you can track expenses, import income, and generate invoices with GoDaddy mobile bookkeeping app. Small business owners, contractors and such self-employed professionals use the software for calculating taxes, managing inventory as well as handling bill payments. The unique feature of this daily

accounting app is that it can be integrated with e-commerce sites for bookkeeping purposes. [1]

2.2 Stakeholders list (Actors)

Following are the users that will interact with this app.

- User
- Developer

Table 1 Stakeholders list

Actor	Computer knowledge level	Business knowledge level	Frequency of use
Developer	Must have good knowledge about integration of components and cross platform compatibility.	Must a good knowledge of advanced business ideas	Only use when required e.g., testing purposes
Business Owners / Users	Basic knowledge of app usage in either iOS or android.	Must have good knowledge of his/her business.	Daily Basis

2.3 Requirements elicitation

2.3.1 Functional requirements

Table 2 FR01

Requirement ID	**Requirement Definition**
FR 01	**Sign Up**
FR01-01	The user will enter his first name, last name, email, password and confirm password.
FR01-02	Application will allow the user to enter unique and valid email.
FR01-03	The application will confirm if the password and confirm password matches.

FR01-04	After verification, the user will be registered in the database and the application will navigate to the home screen.

Table 3 FR02

Requirement ID	Requirement Definition
FR 02	**Login**
FR02-01	The user will enter the username/email and password on the login screen. The application will send the login request to the server.
FR02-02	At the backend, the application will check the email and password. If the email exists and the password is correct, then the user will successfully login into his profile and the application will navigate to the home screen.
FR02-03	If the password is incorrect or the email does not exist, then the application will display a message “Invalid Credentials”.
FR02-04	When the user clicks on the forgot password option. Application will send the password recovery link on the user Email ID. From there the user can reset his password.

Table 4 FR03

Requirement ID	Requirement Definition
FR 03	**Overview / Home Page**
FR03-01	The Application will show an overview of the user's business.
FR03-02	The Application will visualize daily sales growth and forecasted sale for the next week in the form of graphs
FR03-03	The Application will show the best and least selling item of the month.

Table 5 FR04

Requirement ID	Requirement Definition
FR 04	**Analytics**
FR04-01	The Application will show the net sales, profit and loss ratio, monthly profit, Sales Tracking along the year, Running costs e.g., Inventory cost etc.
FR04-02	The AI based system will Forecast the monthly sales, profit, and loss.
FR04-03	The Application will also show a list of best and least selling items.

Table 6 FR05

Requirement ID	Requirement Definition
FR 05	**Generate Report**
FR05-01	When the user clicks on generate, the application will generate a monthly report of the business insights in a pdf format.

Table 7 FR06

Requirement ID	Requirement Definition
FR 06	**Billing**
FR06-01	The user will be able to enter the customer's name and his/her contact number.
FR06-02	The user will be able to add items in the bill based on item code or item name, and quantity of the item.
FR06-03	The Application will calculate the total bill for all the items added.

Table 8 FR07

Requirement ID	Requirement Definition
FR 07	**Generate Bill**
FR07-01	When the user clicks on the generate bill button, the system will generate the bill in the pdf format and the details of the bill will also be saved in the database.
FR07-02	Once the bill is generated, the user can save the bill locally and can also send the bill to customers WhatsApp. The system will achieve this using WhatsApp API.

Table 9 FR08

Requirement ID	Requirement Definition
FR 08	**Inventory Management**
FR08-01	When the user clicks on add item, user will be able to add item by entering the items name, purchasing cost, selling price and quantity. The system will then generate a unique item code and then add the item in the database.
FR08-02	Users will be able to edit item name, purchasing cost, selling price and quantity by clicking on the edit icon next to each item in the list.
FR08-03	The user will be able to delete an item by clicking on the trash icon next to each item in the list.
FR08-04	The Application will show all the items in the form of a list. The user will be able to sort the list based on alphabetical order, item code, quantity, purchasing price or selling price.

Table 10 FR09

Requirement ID	Requirement Definition
FR 09	**Settings**
FR09-01	The User will be able to change the application to dark mode or light mode.
FR09-02	The User will be able to change name and profile picture.

FR09-03	When the user clicks on change password, the application will navigate to change password screen.
FR09-04	The user will be able to log out by clicking on the log out button.

Table 11 FR10

Requirement ID	Requirement Definition
FR 10	**Change Password**
FR10-01	The User will enter an old password, new password and confirm password.
FR10-02	When the user clicks change password, the application will match the previous password to the user's current password in the database. If the password matches the system will then match the new password and confirm password, if both passwords match, the password will be updated in the database and the user will be navigated back to the settings screen.

Table 12 FR11

Requirement ID	Requirement Definition
FR 11	**Navigation / Menu**
FR11-01	The Application will have a menu on every page through which the user will be able to navigate between pages.

2.3.2 Non-functional requirements

- NFR-01 Usability
  \

Table 14 NFR01

NFR 01-01	Helps the user to get all insights about his/her business
NFR 01-02	Helps to maintain inventory record
NFR 01-03	Helps to generate Bills and Analytics report s

- NFR-02 Portability

Table 15 NFR02

NFR 02-01	The application will operate in both Android and IOS system.

- NFR-03 Availability

Table 16 NFR03

NFR 03-01	The application will be accessible 24/7

- NFR-04 Privacy

Table 17 NFR04

NFR 04-01	Application won't allow the system to reveal the personal information of the user or his/her business.
NFR 04-02	Application will take care of the credentials of each user.

2.4 Requirements traceability matrix

Table 18 Requirements Traceability Matrix

Requirement Traceability Matrix						
Project Name:		**Smart Business Insider**				
Project Description:	The project aims to develop a mobile application which allows the user to detect the disease which they have and then make an appointment with the doctor who can cure that disease.					
Requirement ID	**Requirement Description**	**WBS Deliverables**	**Activity Diagram**	**Sequence Diagram**	**Use Case**	**Test Case**

FR01	**Sign Up**	**1**	**AD01**	**SQ01**	**UC-01**	**1**
FR02	**Login**	**2**	**AD02**	**SQ02**	**UC-02**	**2**
FR03	**Overview / Dashboard**	**5**	**AD03**	**SQ03**	**UC-03**	**3**
FR04	**Analytics**	**3.2**	**AD04**	**SQ04**	**UC-04**	**4**
FR05	**Generate Report**	**3.2.2**	**AD05**	**SQ05**	**UC-05**	**5**
FR06	**Billing**	**3.1**	**AD06**	**SQ06**	**UC-06**	**6**
FR07	**Generate Bill**	**3.2.1**	**AD07**	**SQ07**	**UC-06**	**7**
FR8	**Inventory Management**	**5.1**	**AD08**	**SQ08**	**UC-08**	**8**
FR9	**Settings**	**4.1**	**AD09**	**SQ09**	**UC-09**	**9**
FR10	**Change Password**	**4**	**AD10**	**SQ10**	**UC-10**	**10**
FR11	**Navigation / Menu**	**4.1**	**AD11**	**SQ11**	**UC-11**	**11**

2.5 Use case descriptions

Table 19 UC-01

Use Case ID	**UC-01**
Use Case Name	**Sign Up**
Actors	Business Owner / User
Description	Application will allow the users to register themselves.
Trigger	
Preconditions	1. The user must have a valid email address to register. 2. The user doesn't have an account on the application before registering on the application.
Post Conditions	Users successfully registered and can use the application.
Normal Flow	1. User opens the application. 2. User enters the email address and password and confirms the password. 3. User enters his/her name. 4. User clicks the Sign-Up button.
Variations: [Alternative Flow 1 – Not in Network]	

Exceptions	1. If the user enters the invalid email address, then the invalid email message shows. 2. The application will show an alert message if he already has an account on application. 3. The Application will show an alert message if password and confirm password do not match.

Table 20 UC-02

Use Case ID	**UC-02**
Use Case Name	**Login**
Actors	Business Owner / User
Description	Users will login into the application by entering username/email and password.
Trigger	
Preconditions	User must have registered himself into the application.
Post Conditions	User successfully logged in the application
Normal Flow	1. User will open the application. 2. Enter email address and password on the login page. 3. Click the login button. 4. Users will be taken into the application main page.
Variations: [Alternative Flow 1 – Not in Network]	
Exceptions	1. If the user enters the invalid password, then the application will show the invalid password alert. 2. If the Username / email does not exist, then email does not exist alert shows.

Table 21 UC-03

Use Case ID	**UC-03**
Use Case Name	**Overview / Home Page**
Actors	Business Owner / User
Description	User can see an overview about his / her business.
Trigger	
Preconditions	Users must log in to the system.
Post Conditions	User Can successfully see his / her business insights.

Normal Flow	1. Users will log in. 2. After successfully logging in, the user will be taken to the main page. 3. User can see his/her business insights. 4. Users can also see the latest trends and news.
Variations: [Alternative Flow 1 – Not in Network]	1. User clicks on the menu icon. 2. Navigation menu pops up. 3. User clicks on the Home Screen. 4. Users will be taken to the home screen.
Exceptions	1. The user fails to log in the system.

Table 22 UC-04

Use Case ID	**UC-04**
Use Case Name	**Analytics**
Actors	Business Owner / User
Description	Users can see detailed insights about his / her business. The Application will visualize the data in the form of charts and graphs.
Trigger	
Preconditions	Users must be logged in to the system.
Post Conditions	User Can successfully see his / her business's detailed insights with data visualization.
Normal Flow	1. User clicks on the menu icon. 2. Navigation menu pops up. 3. User clicks on the Analytics. 4. Users will be taken to the Analytics Screen.
Variations: [Alternative Flow 1 – Not in Network]	1. User clicks on see more links next to his / her business overview on the home screen. 2. The user will be taken to the Analytics Screen.
Exceptions	The user fails to log in the system. The Data is not enough to show insights or visualization.

Table 23 UC-05

Use Case ID	**UC-05**
Use Case Name	**Generate Report**
Actors	Business Owner / User
Description	Users can generate a monthly report of his / her business in a pdf format.
Trigger	
Preconditions	Users must be on the Analytics Page.

Post Conditions	Report generated successfully.
Normal Flow	1. User clicks on the generated report. 2. Report is generated in pdf format.
Variations: [Alternative Flow 1 – Not in Network]	
Exceptions	1. The user fails to log in the system. 2. User is not connected to the internet. 3. The Data is not enough to generate the report.

Table 24 UC-06

Use Case ID	**UC-06**
Use Case Name	**Billing**
Actors	Business Owner / User
Description	Users can make a bill for the customer.
Trigger	
Preconditions	Users must be on the Billing Screen.
Post Conditions	Users can successfully add and delete items from the bill.
Normal Flow	1. User clicks on the menu icon. 2. Navigation menu pops up. 3. User clicks on the Billing. 4. Users will be taken to the Billing Screen. 5. User clicks on the add item. 6. User enters the item code / item name. 7. User Selects Item. 8. Items are added to the bill. 9. User clicks on the delete button next to the icon. 10. Item is deleted from the bill.
Variations: [Alternative Flow 1 – Not in Network]	1. User clicks on the menu icon. 2. Navigation menu pops up. 3. User clicks on the Billing. 4. Users will be taken to the Billing Screen. 5. User clicks on the scan barcode. 6. User Scans the barcode of the item. 7. User Selects Item. 8. Items are added to the bill. 9. User clicks on the delete button next to the icon. 10. Items are deleted from the bill.
Exceptions	1. If the user fails to log in the system. 2. If the item code / item name / item scanned entered is not in the

	inventory, no such item message will be displayed.

Table 25 UC-07

Use Case ID	**UC-07**
Use Case Name	**Generate Bill**
Actors	Business Owner / User
Description	Users can Generate a bill copy for the customer.
Trigger	
Preconditions	Users must be on the Billing Screen.
Post Conditions	A Bill copy is successfully generated and sent to customers' WhatsApp number.
Normal Flow	1. User Clicks on Generate Bill. 2. A Bill Copy is generated. 3. User clicks on send to WhatsApp. 4. Bill copy is sent to customers' WhatsApp accounts. 5. Bill Details will also be saved in the database.
Variations: [Alternative Flow 1 – Not in Network]	
Exceptions	1. If the user fails to log in the system. 2. If there are no items in the bill, an Empty Bill message will be displayed.

Table 26 UC-08

Use Case ID	**UC-08**
Use Case Name	**Inventory Management**
Actors	Business Owner / User
Description	Users can manage inventory here.
Trigger	
Preconditions	Users must be on the Inventory Screen.
Post Conditions	Users can successfully add and delete items in the inventory.
Normal Flow	1. User clicks on the menu icon. 2. Navigation menu pops up. 3. User clicks on the Inventory. 4. Users will be taken to the Inventory Screen. 5. User clicks on the add item. 6. A pop up will appear asking the user to enter item name, purchasing

	price, selling price and quantity. 7. User enters details. 8. User clicks on Done. 9. Unique code will be assigned to the item and the item will be added to the inventory by updating the database. 10. User clicks on the trash icon next to any item in the inventory. 11. The Item will be deleted. 12. User clicks on the Edit icon next to the item. 13. User edits Item name, quantity, purchase price and selling price. 14. Item record will be updated in the database.
Variations: [Alternative Flow 1 – Not in Network]	1. User clicks on the menu icon. 2. Navigation menu pops up. 3. User clicks on the Inventory. 4. Users will be taken to the Inventory Screen. 5. User clicks on the add item. 6. A pop up will appear asking the user to enter item name, purchasing price, selling price, item quantity and barcode. 7. User enters details. 8. User clicks the Scan Barcode. 9. User scans the item from the barcode scanner. 10. Barcode is updated. 11. User clicks on Done. 12. Unique code will be assigned to the item and the item will be added to the inventory by updating the database. 13. User clicks on the trash icon next to any item in the inventory. 14. The Item will be deleted. 15. User clicks on the Edit icon next to the item. 16. User edits Item name, quantity, purchase price and selling price. 17. Item records will be updated in the database.
Exceptions	1. If the user fails to log in the system. 2. If the item code / item name entered is not in the inventory, no such item message will be displayed.

Table 27 UC-09

Use Case ID	**UC-09**
Use Case Name	**Setting**
Actors	Business Owner / User
Description	Users can make changes to app appearance like switching to dark mode. Users will also be able to make changes to his/her profile.
Trigger	
Preconditions	Users must be on the Settings Screen.
Post Conditions	User can successfully change the application appearance, his profile picture,

	username and can go to change password screen.
Normal Flow	1. User clicks on the menu icon. 2. Navigation menu pops up. 3. User clicks on the setting. 4. Users will be taken to the Setting Screen. 5. User changes the application's appearance to dark/light mode. 6. User clicks the edit icon next to the profile picture. 7. User selects a picture from the gallery. 8. Profile picture is updated. 9. User Clicks on the edit icon next to username. 10. User enters a new username. 11. Username is updated. 12. User clicks on the change password. 13. User is taken to change the password screen.
Variations: [Alternative Flow 1 – Not in Network]	1. User clicks on his / her profile picture on the home screen. 2. User is taken to the Settings page.
Exceptions	1. If the user fails to log in the system.

Table 28 UC-10

Use Case ID	**UC-10**
Use Case Name	**Change Password**
Actors	Business Owner / User
Description	User can change his/her password.
Trigger	
Preconditions	Users must click on the change password button.
Post Conditions	User successfully changed his password.
Normal Flow	1. User clicks on the change password button in the settings. 2. Users will be taken to change the password screen. 3. User enters an old password, a new password and confirms the password. 4. Application will match the old password to the user's current password in the database. 5. Application matches new password and confirms password. 6. User clicks on the change password. 7. Password Updated. 8. Users will be taken back to the settings screen.
Variations: [Alternative Flow 1 – Not in Network]	

Exceptions	1. If the user enters the wrong old password, “Invalid Password” message will be shown. 2. If the new password and confirm password do not match, “Passwords Do not match” message will be shown.

Table 29 UC-11

Use Case ID	**UC-11**
Use Case Name	**Navigation / Menu**
Actors	Business Owner / User
Description	Users can navigate through the application easily.
Trigger	
Preconditions	Users must be logged in.
Post Conditions	User successfully navigated inside the application.
Normal Flow	1. User clicks on the menu icon. 2. Navigation menu pops up. 3. User clicks on the Home / Analytics / Billing / Inventory / Settings. 4. Users will be taken to the respective screen.
Variations: [Alternative Flow 1 – Not in Network]	
Exceptions	1. The user fails to log in the system.

2.6 Use case design

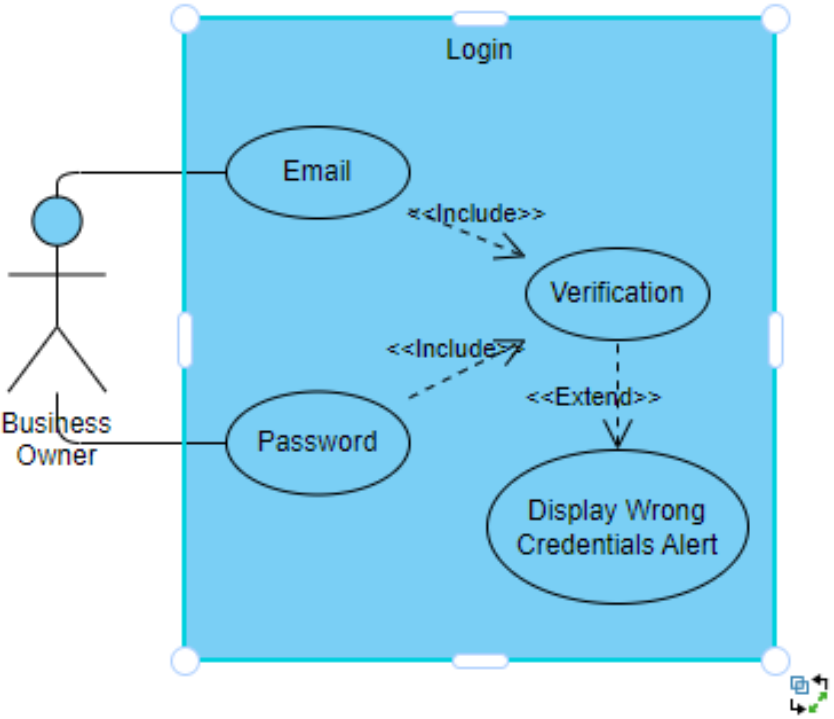

Figure 1 Login UCD01

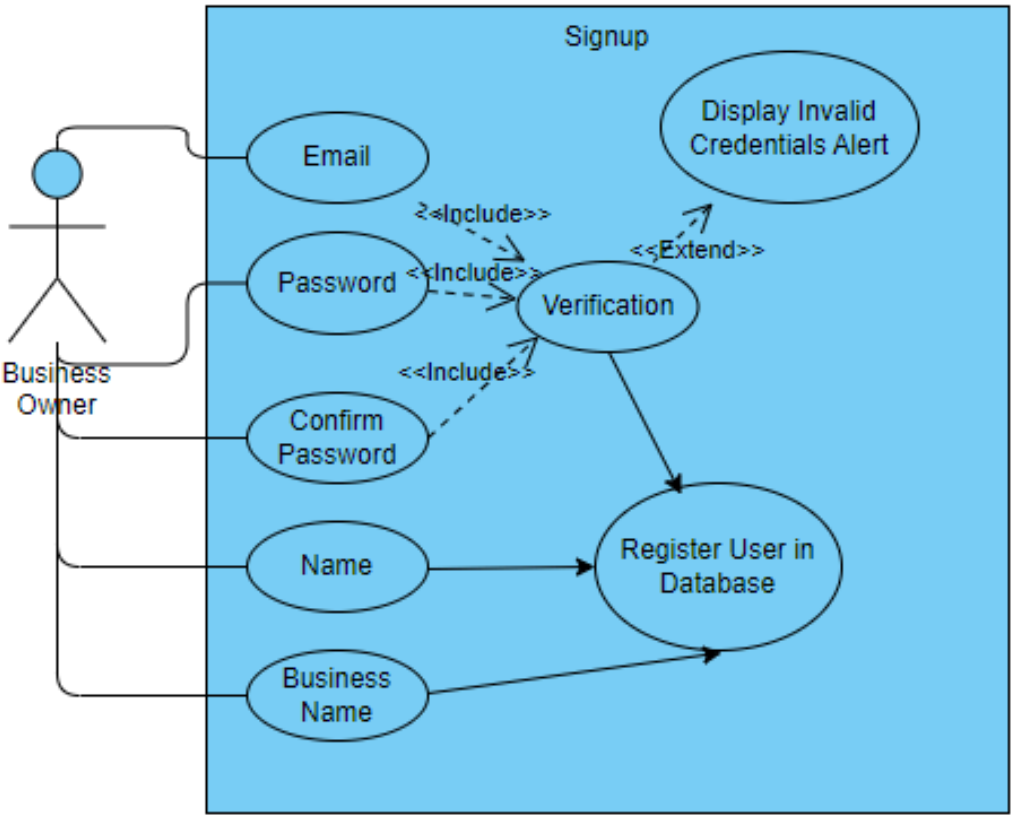

Figure 2 Signup UCD02

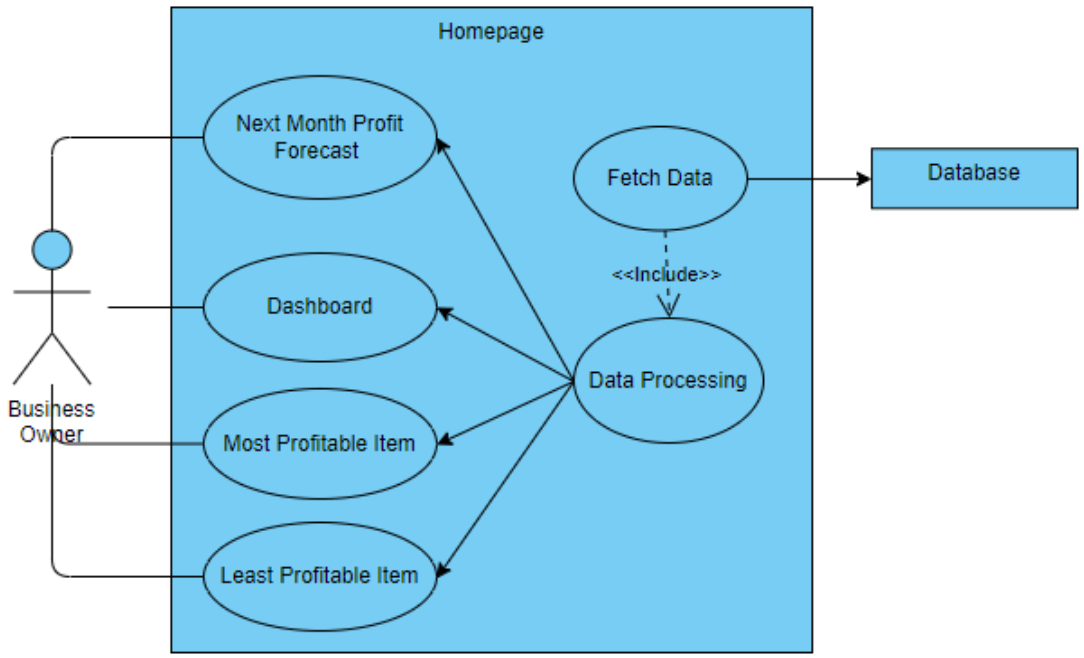

Figure 3 Homepage UCD03

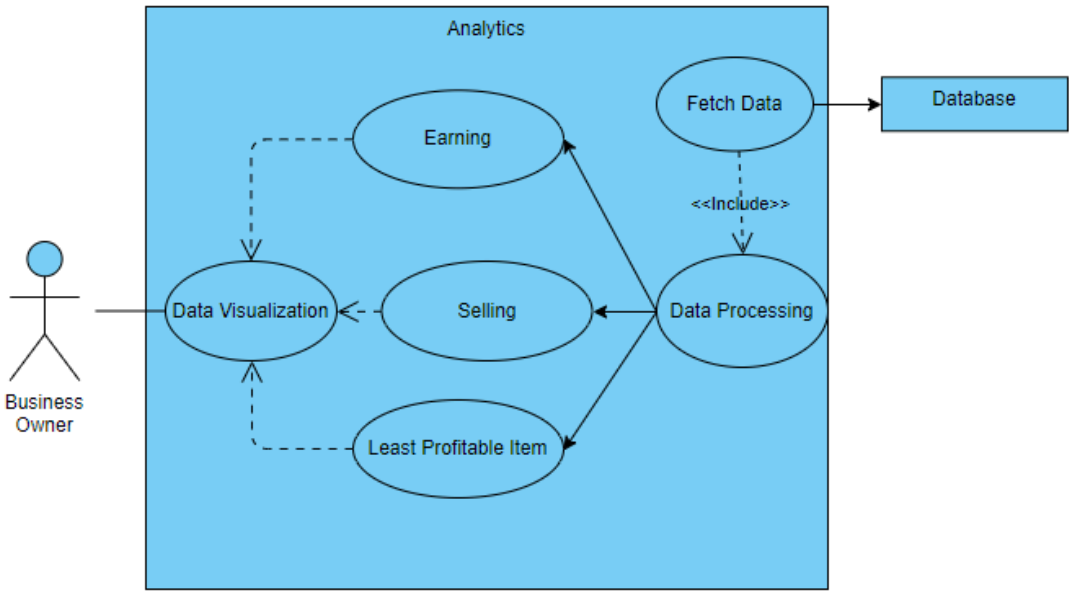

Figure 4 Analytics UCD04

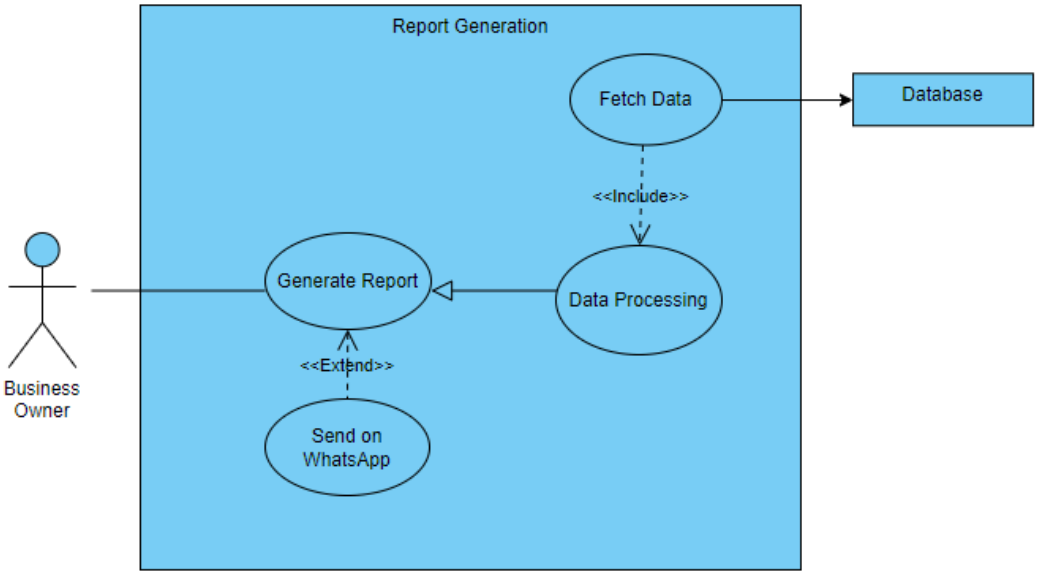

Figure 5 Report Generation UCD05

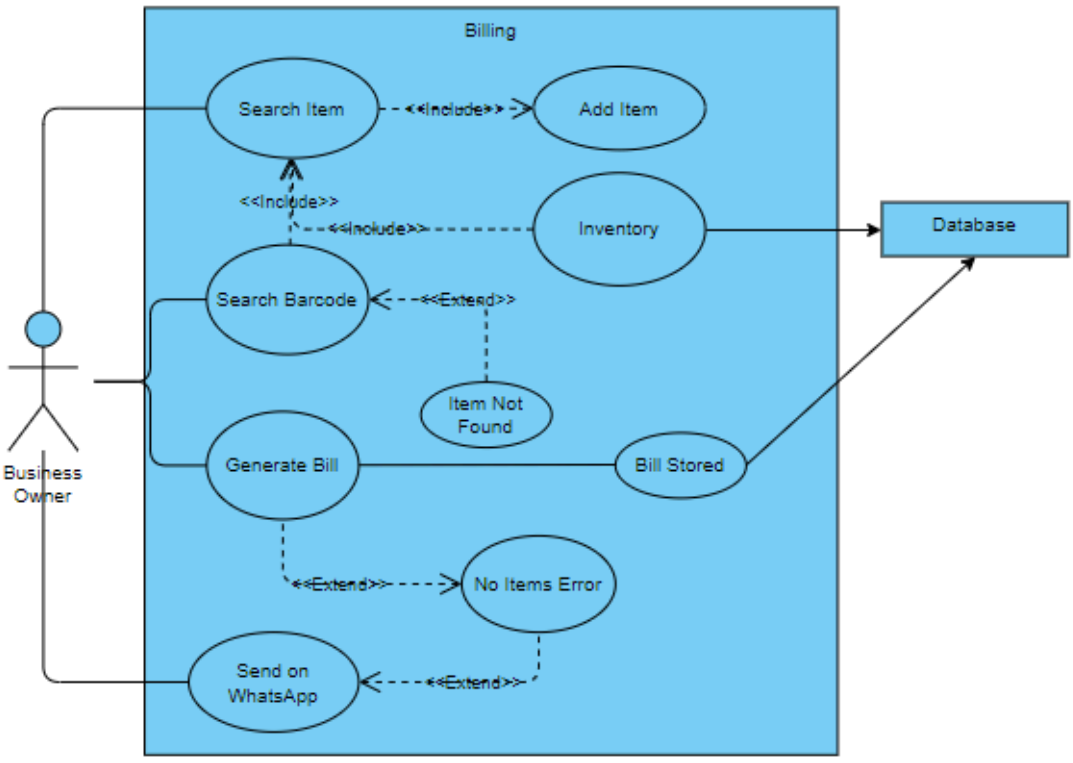

Figure 6 Billing UCD06

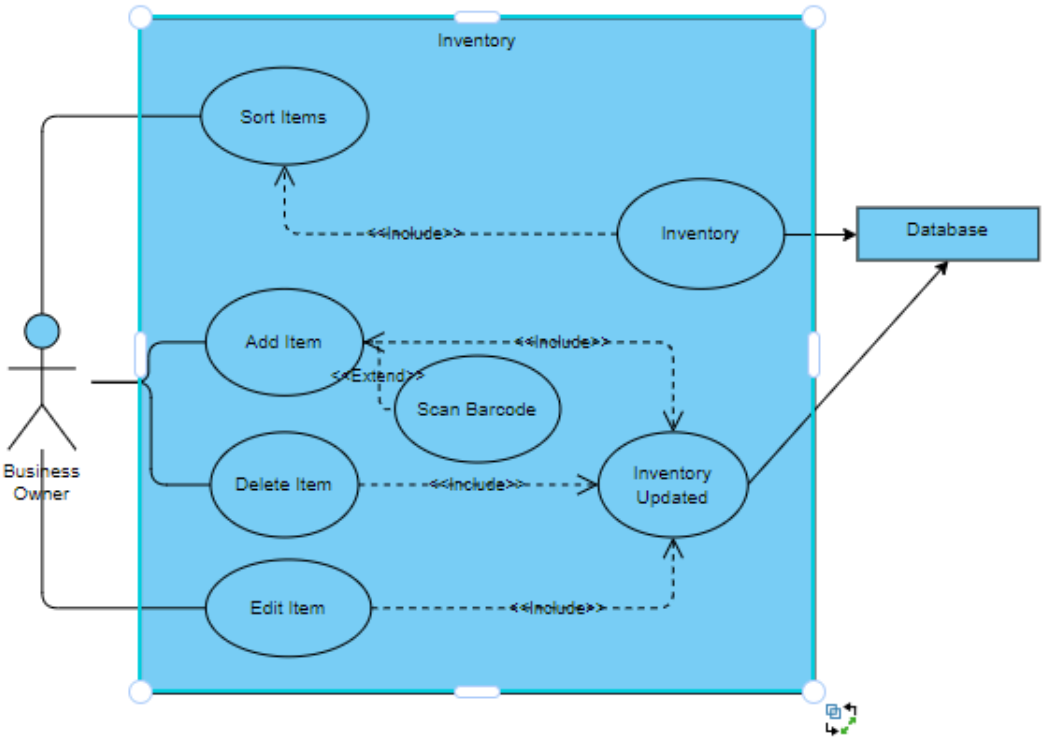

Figure 7 Inventory UCD08

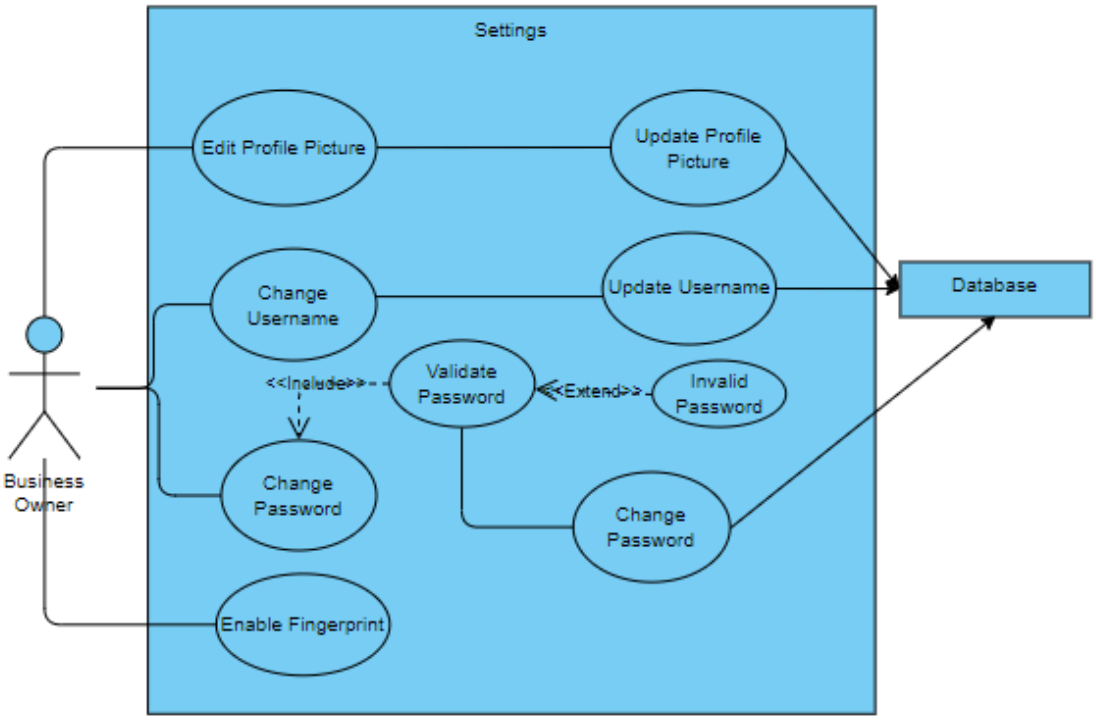

Figure 8 Settings UCD09

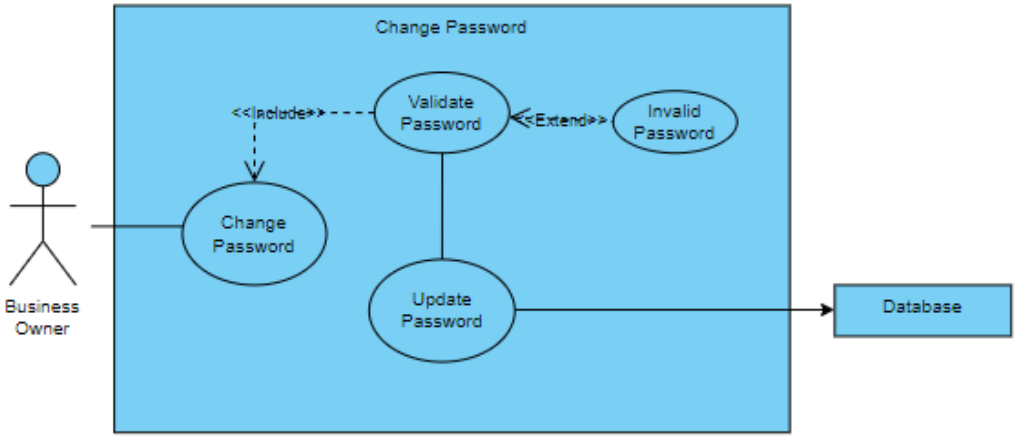

Figure 9 Change Password UCD10

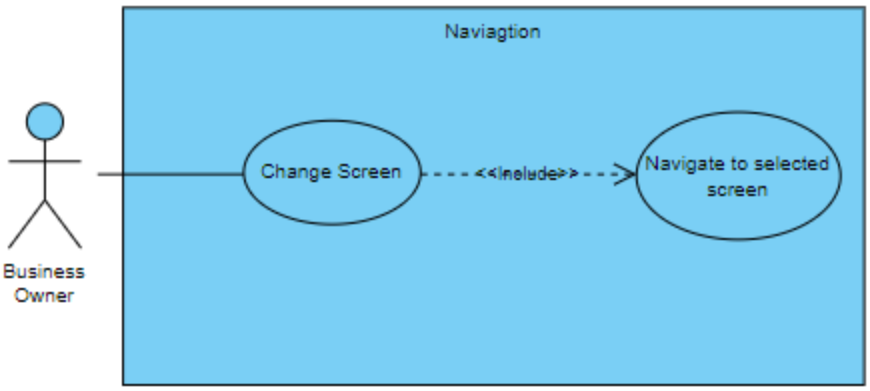

Figure 10 Navigation UCD11

2.7 Software development life cycle model

Agile is a technique for software development and an iterative process in which, through coordination with the project stakeholders, the project specifications and solutions evolve. It is one of the most disciplined processes for project management that facilitates regular review and adaptation. The product is reviewed for each iteration in the agile model. These short releases allow developers to consider the application in a broader way and encourage the process of debugging. For instance, instead of spending hours or days creating a comprehensive project plan that may or may not fit the execution of the project, an Agile team will start with a small portion of work, review progress, and proceed down the path until enough input has been obtained to suggest that they are on the right path.

2.7.1 Advantages of Agile model:

- Flexibility
- Better development of projects because of less workload.
- Finding errors is easy.
- Client satisfaction for development of each module.

2.7.2 Why not any other model?

- First, the other models promote completion and then testing.
- In other models, short releases of apps are not supported.
- In other models, the Iterative Process is not recognized.

- Errors can be easily handled and removed because of iterative process.
- Agile is the most advanced version of other models.
- Each iteration ensures that there is room to add or remove something.

3 Chapter 3: System Design

3.1 Work breakdown structure (WBS)

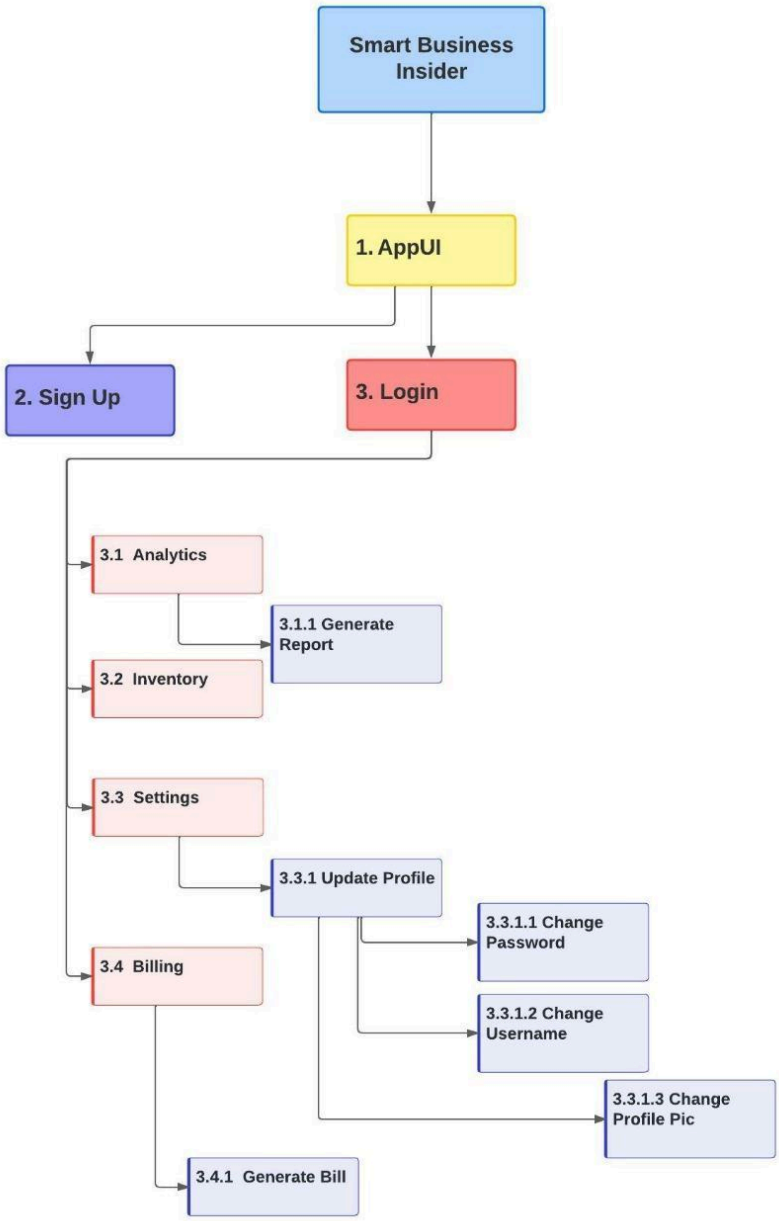

Figure 11 Work Breakdown Structure

3.2 Activity diagram

3.2.1 AD01 Sign Up

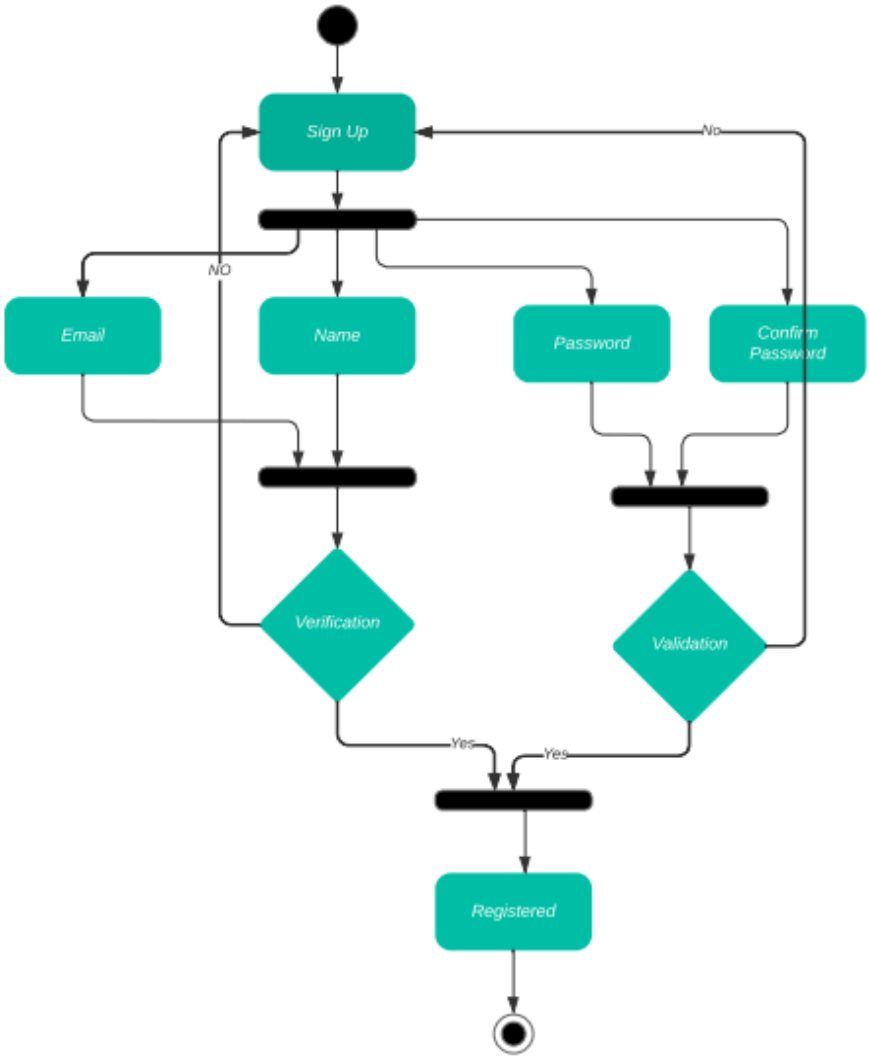

Figure 12 AD01

3.2.2 AD02 Login

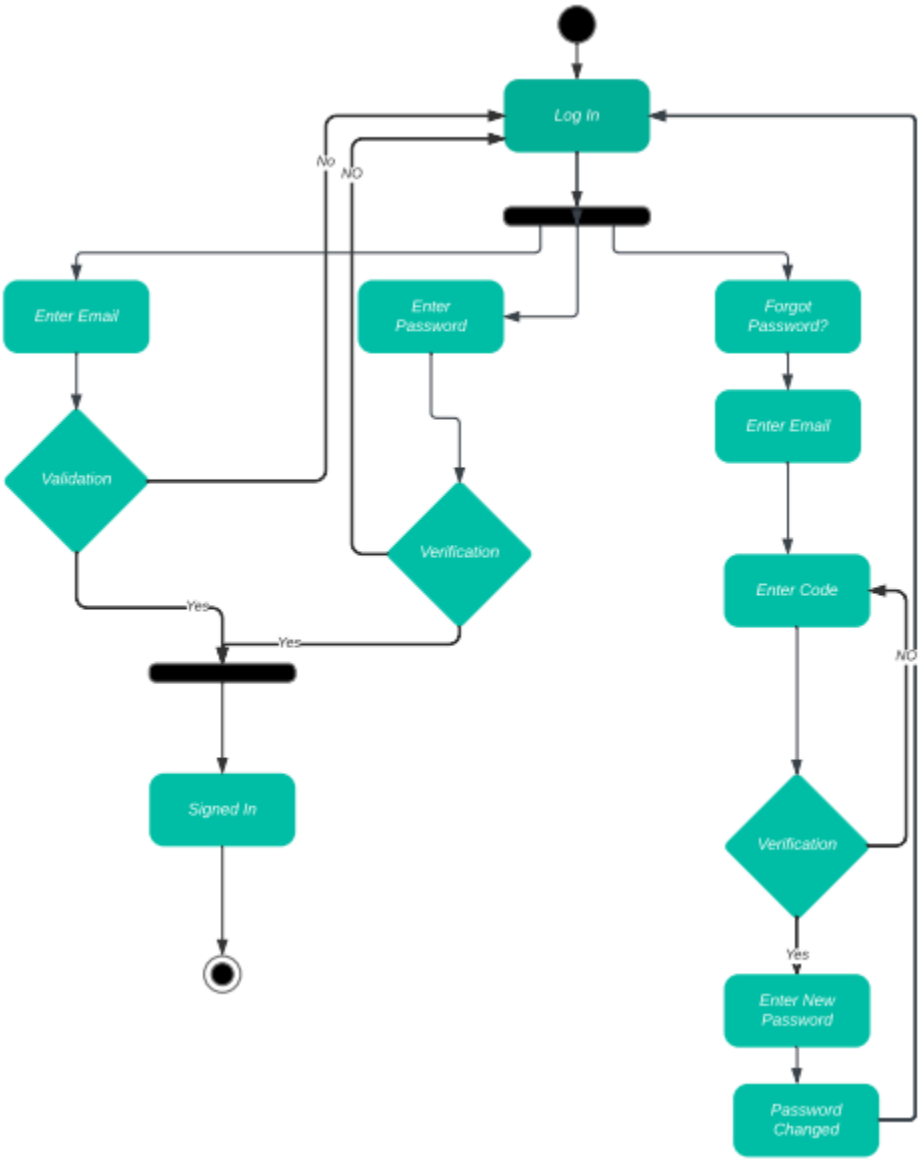

Figure 13 AD02

3.2.3 AD03 Dashboard

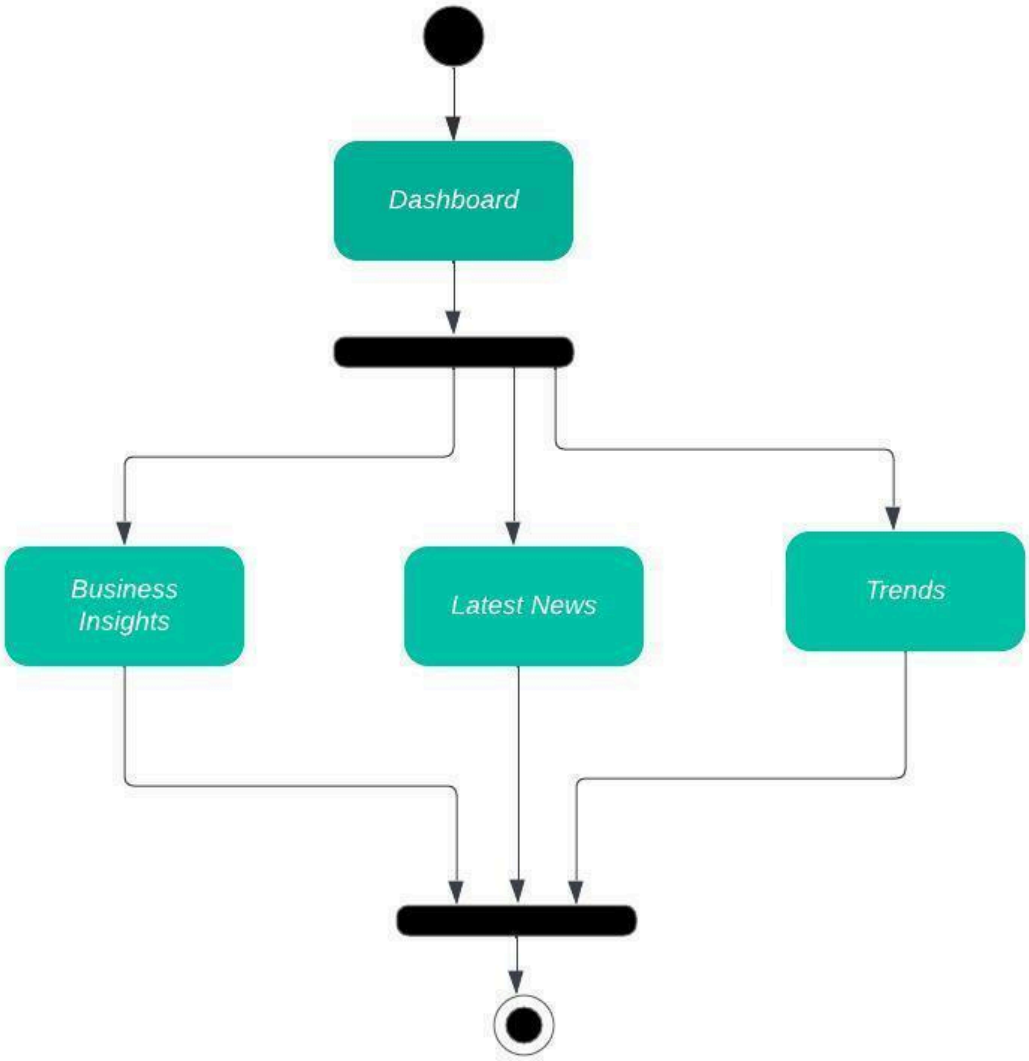

Figure 14 AD03

3.2.4 AD04 Analytics

Figure 15 AD04

3.2.5 AD05 Generate Report

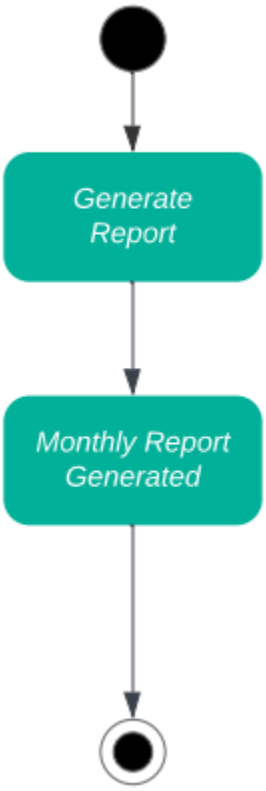

Figure 16 AD05

3.2.6 AD06 Billing

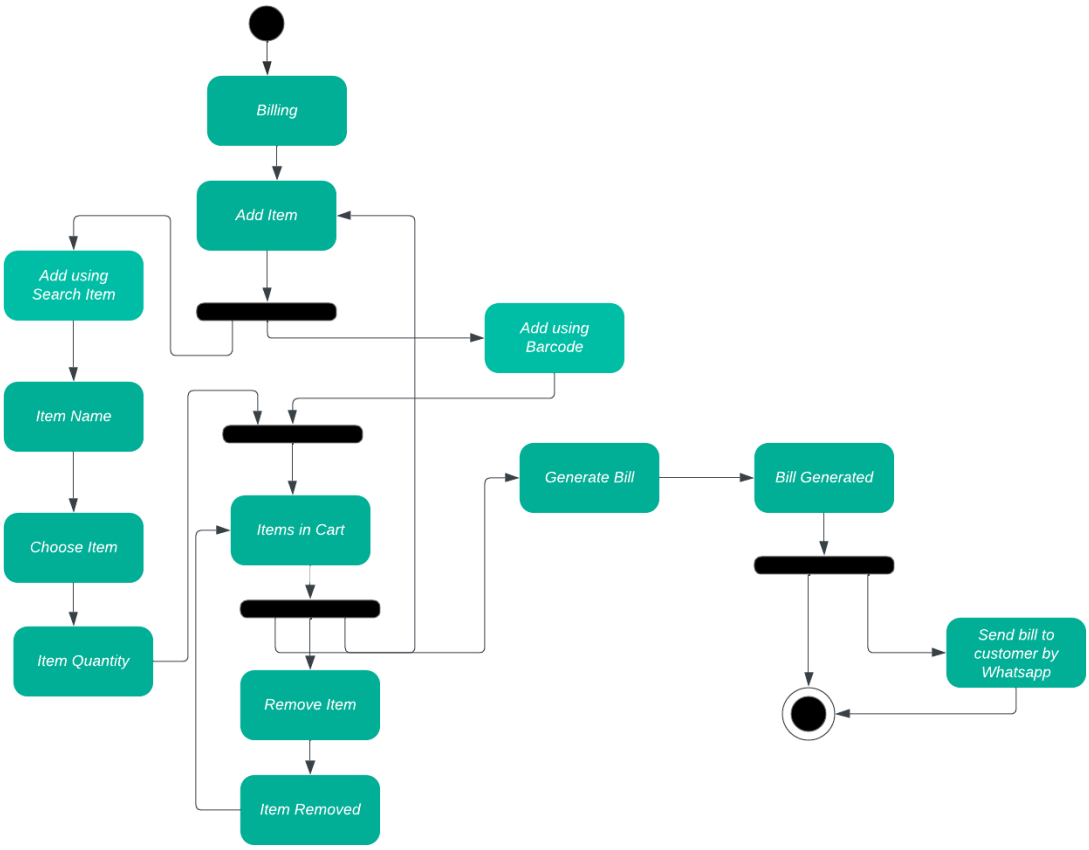

Figure 17 AD06

3.2.7 AD07 Generate Bill

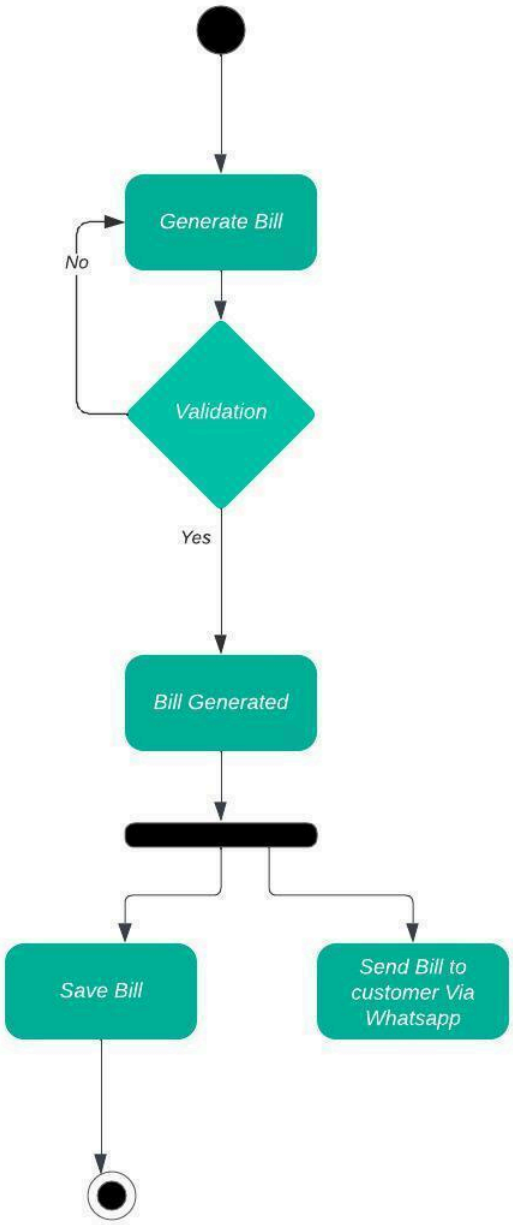

Figure 18 AD07

3.2.8 AD08 Inventory Management

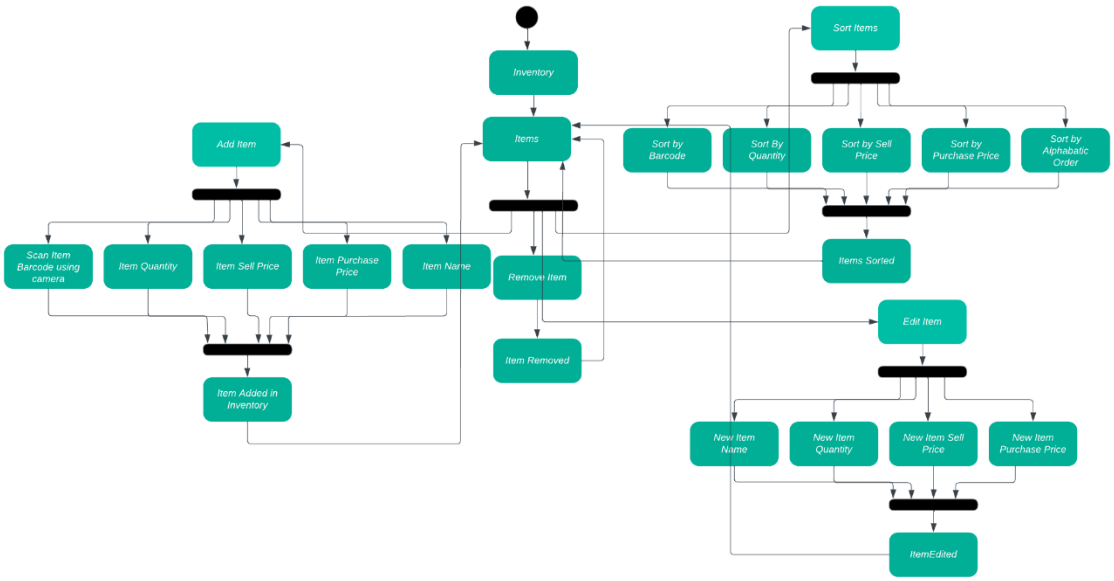

Figure 19 AD08

3.2.9 AD09 Settings

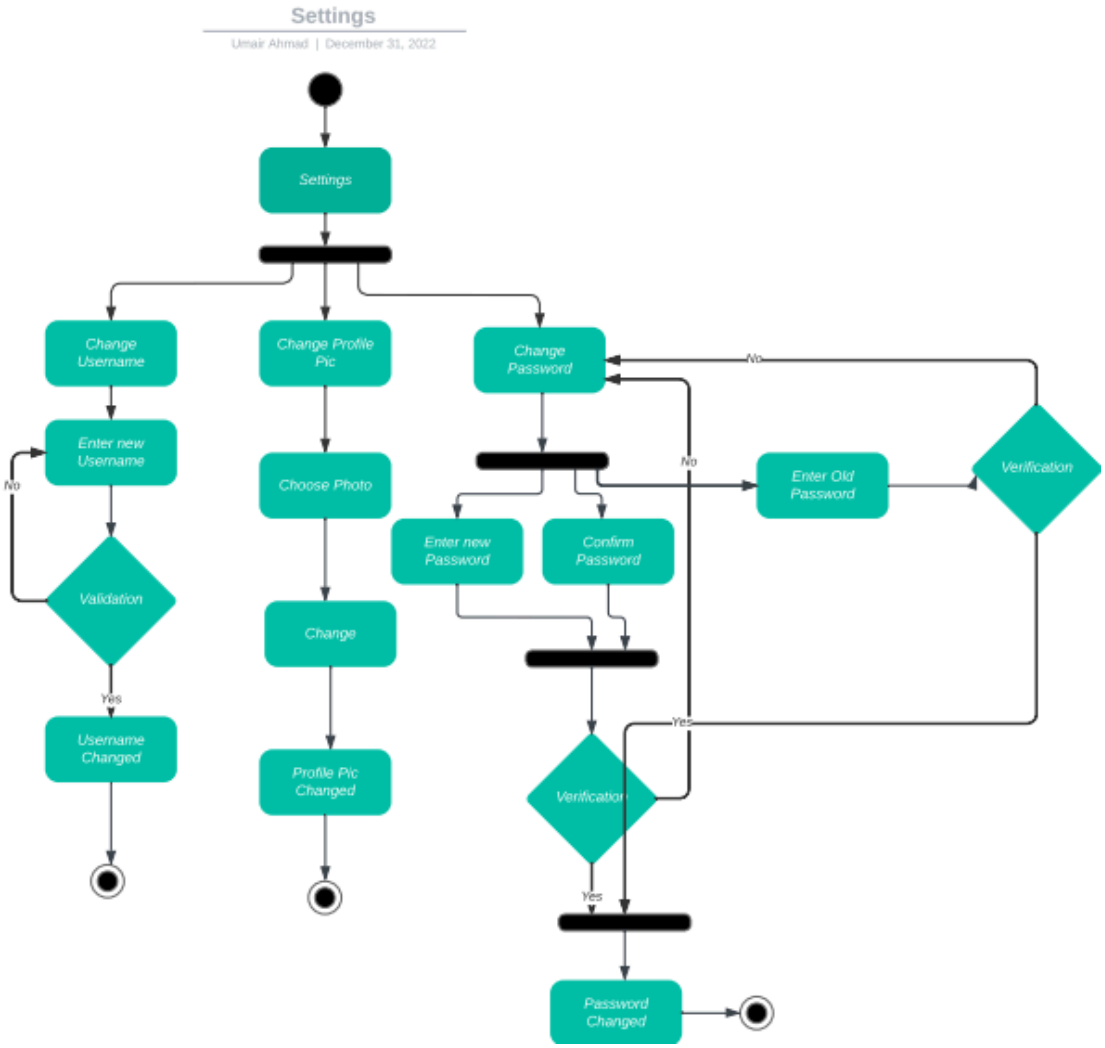

Figure 20 AD09

3.2.10 AD10 Change Password

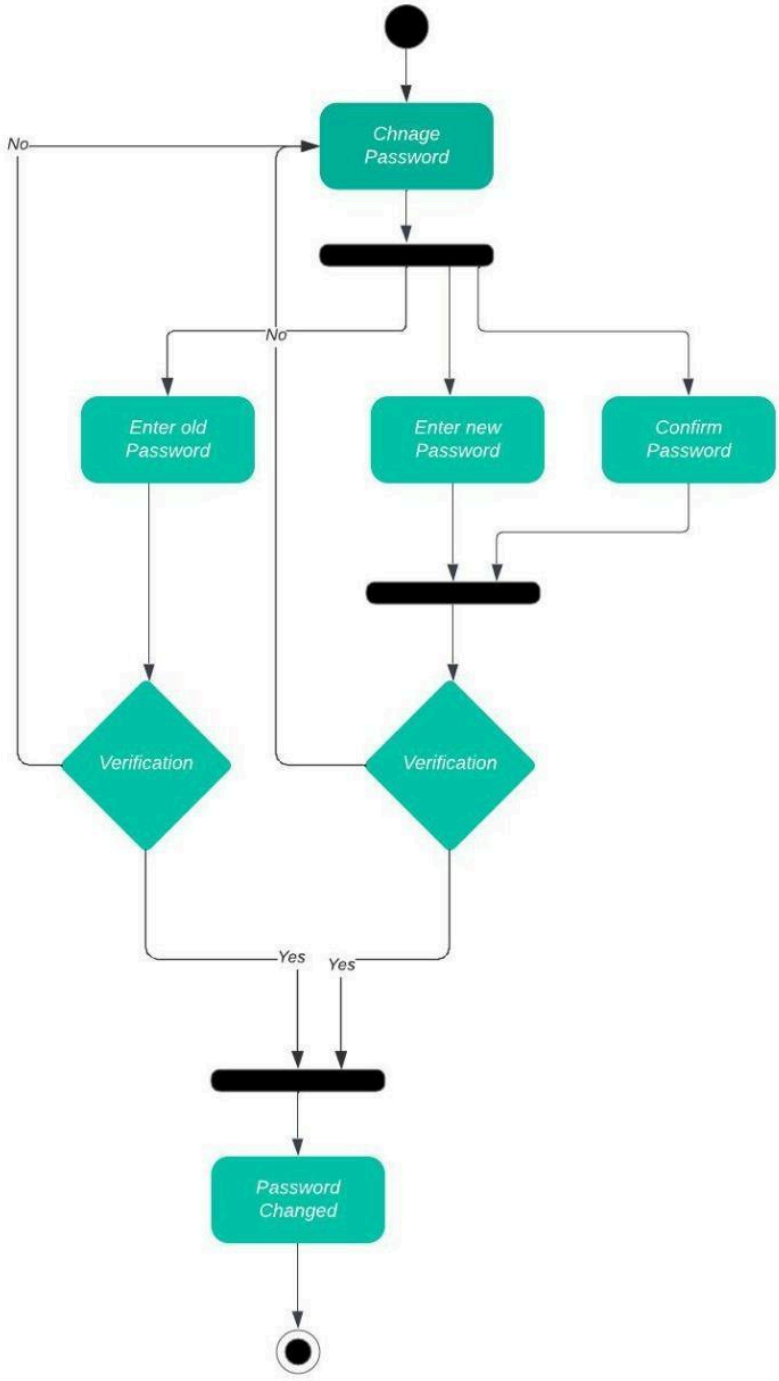

Figure 21 AD10

3.2.11 AC11 Navigation / Menu

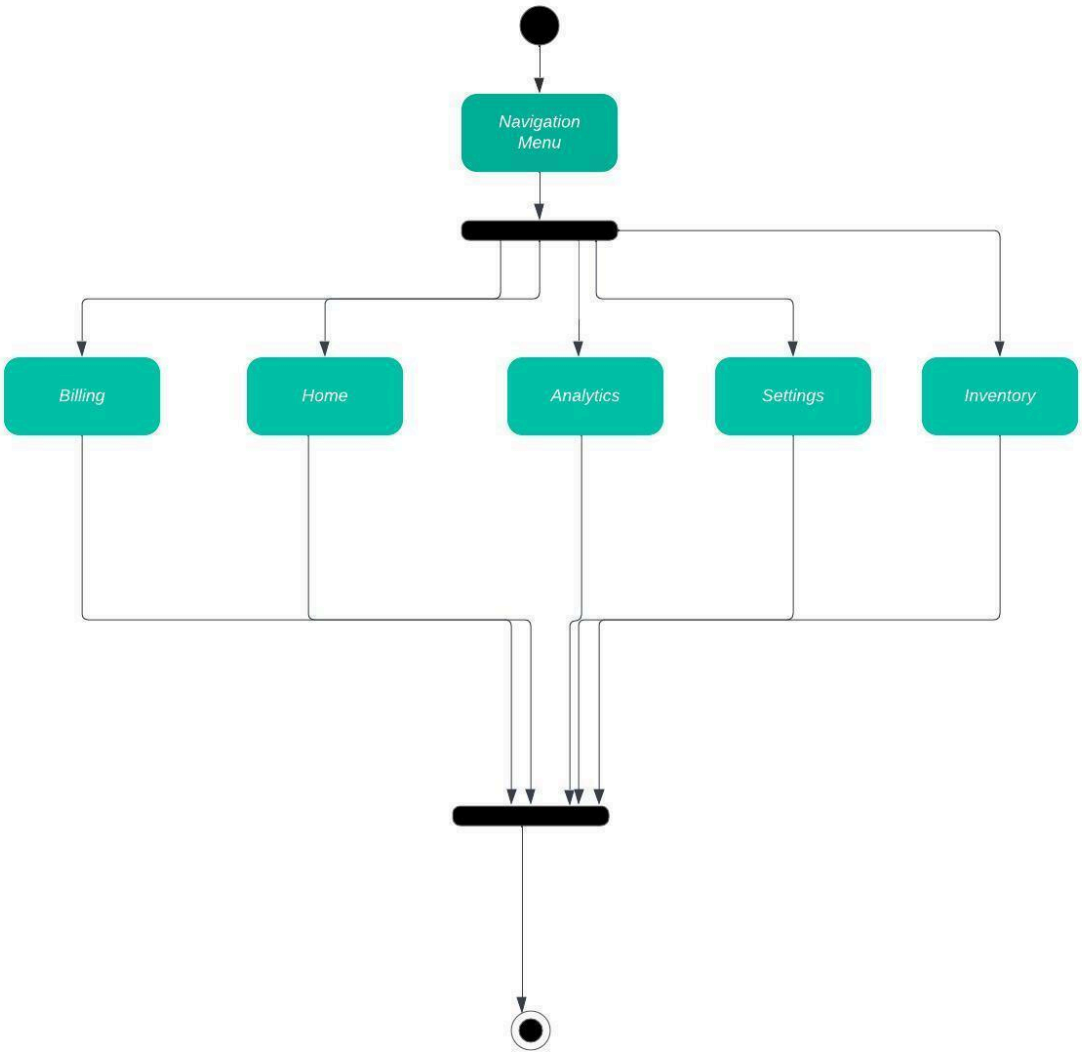

Figure 22 AD11

3.3 Sequence diagram

3.3.1 SD01 Sign Up

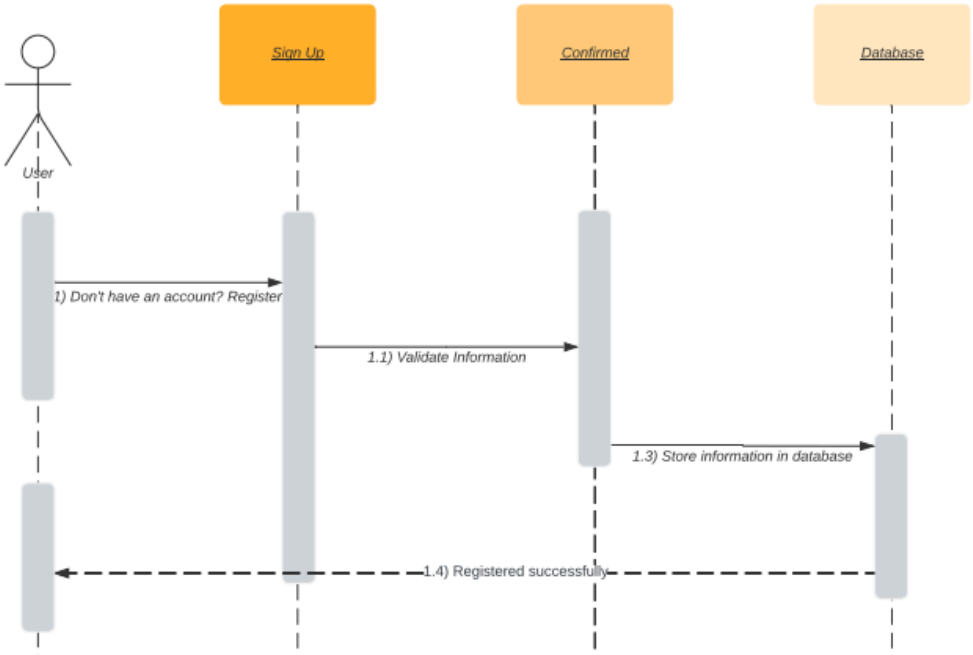

Figure 24 SD01

3.3.2 SD02 Login

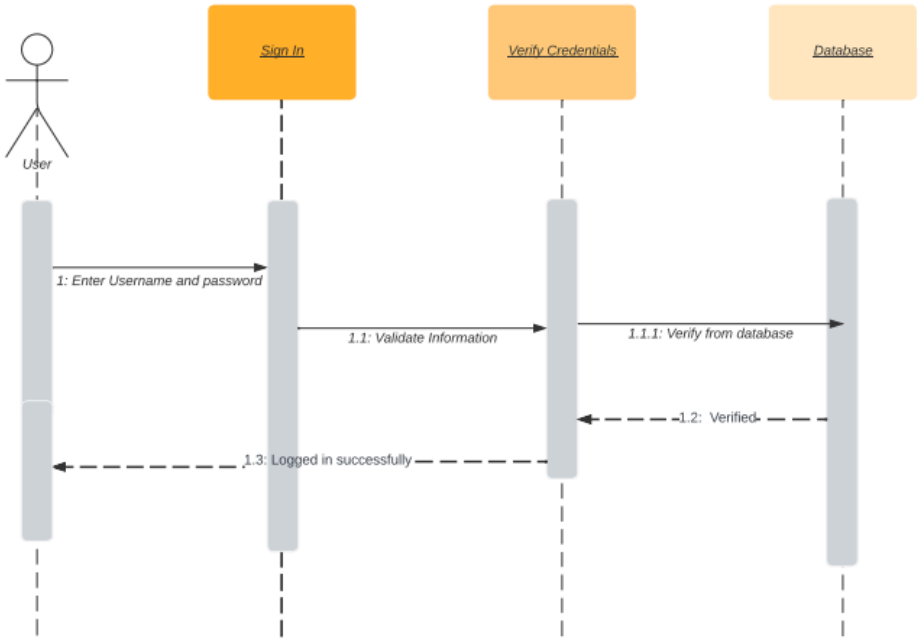

Figure 25 SD02

3.3.3 SD03 Overview / Dashboard

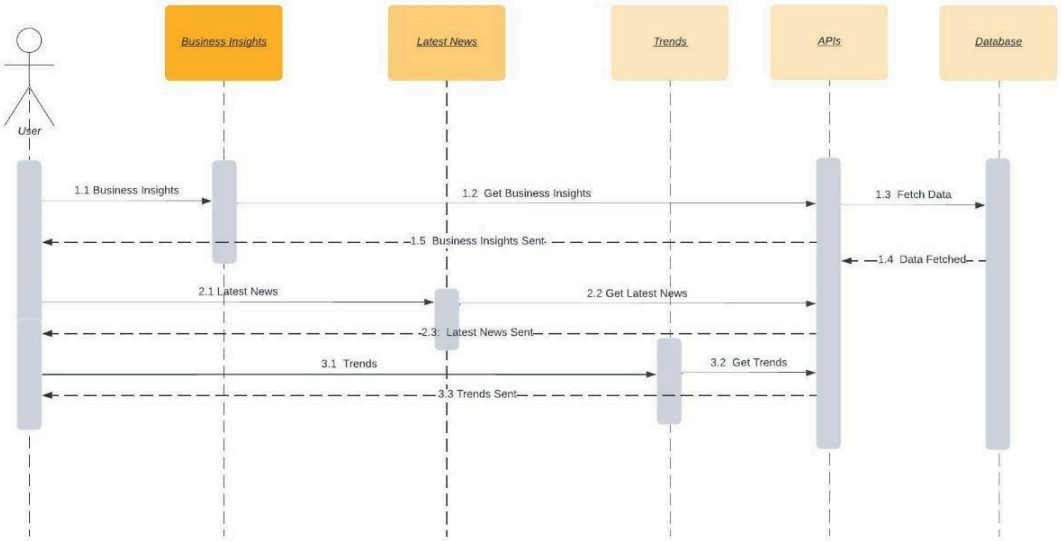

Figure 26 SD03

3.3.4 SD04 Analytics

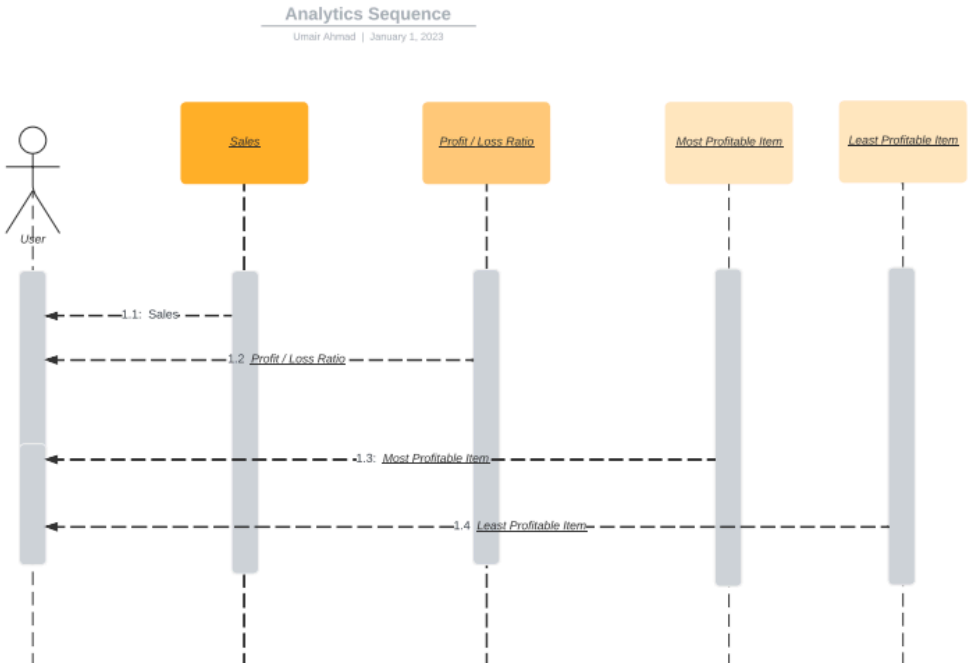

Figure 27 SD04

3.3.5 SD05 Generate Report

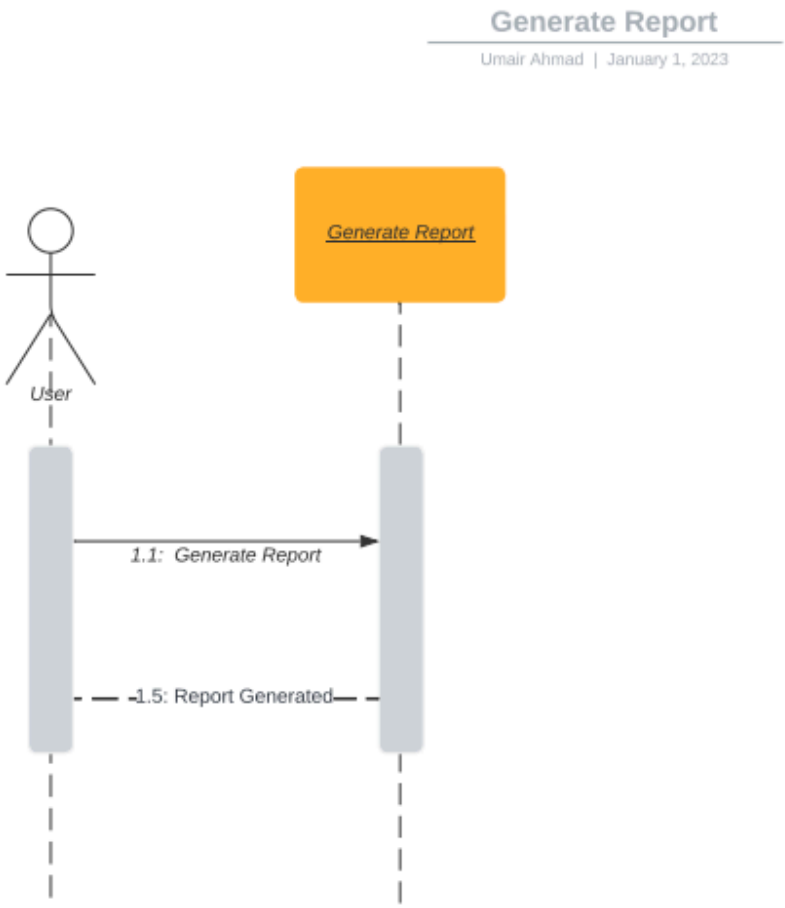

Figure 28 SD05

3.3.6 SD06 Billing

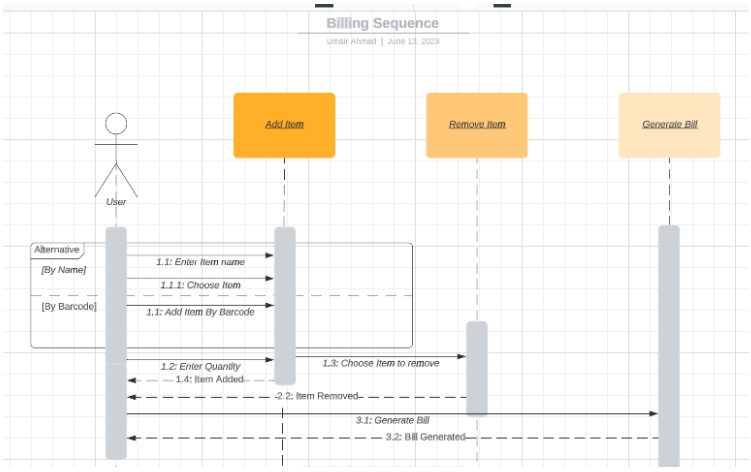

Figure 29 SD06

3.3.7 SD08 Inventory Management

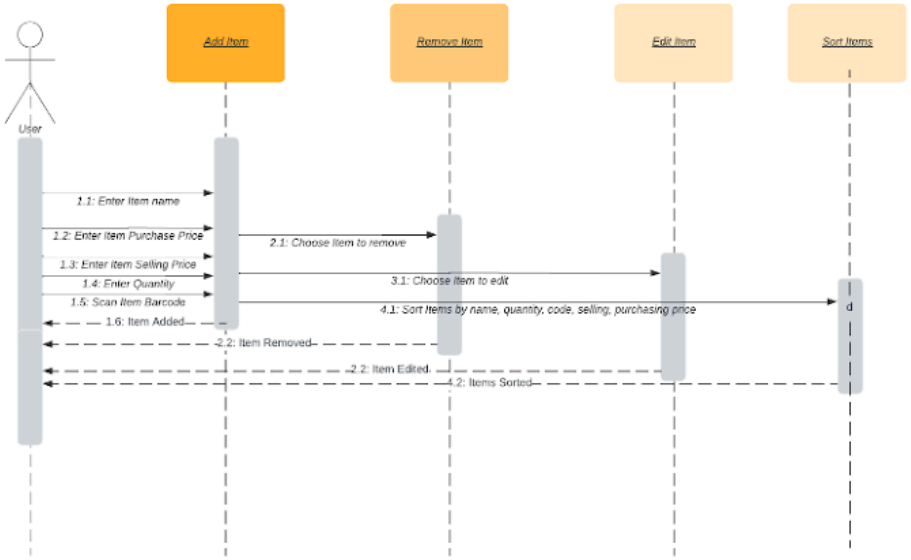

Figure 30 SD08

3.3.8 SD09 Settings

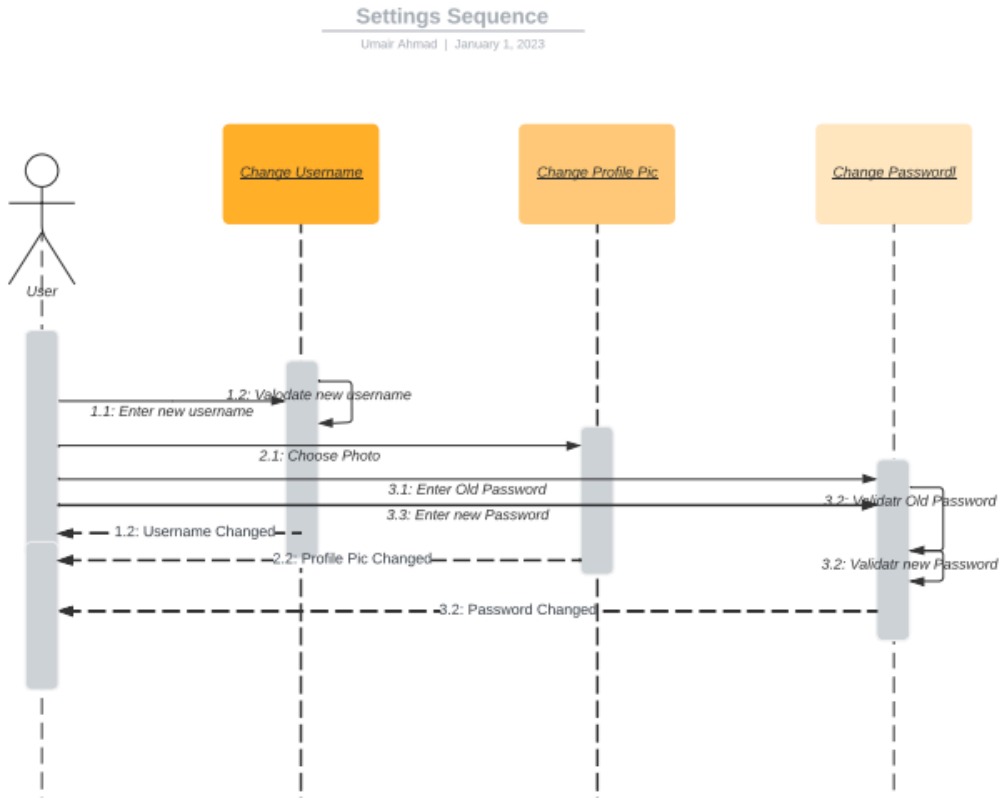

Figure 31 SD09

3.3.9 SD10 Change Password

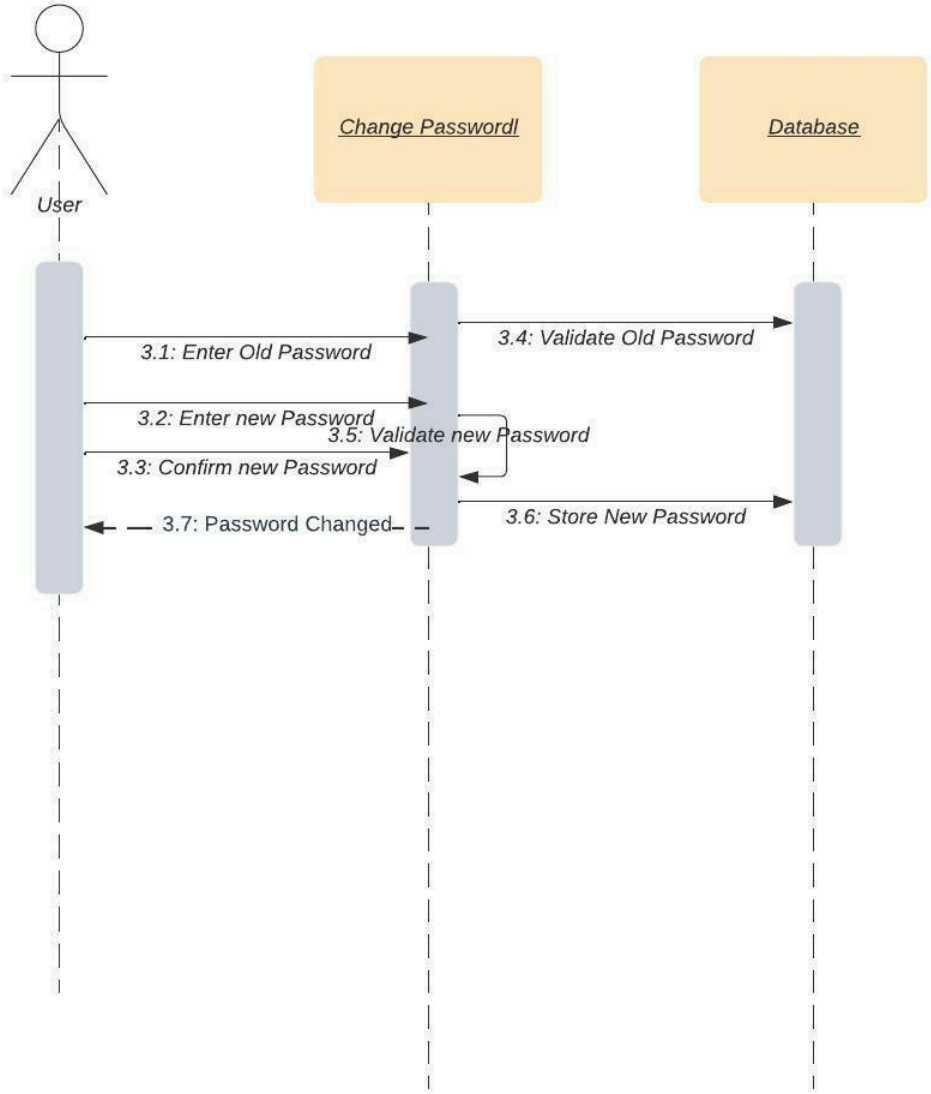

Figure 32 SD10

3.4 Software architecture

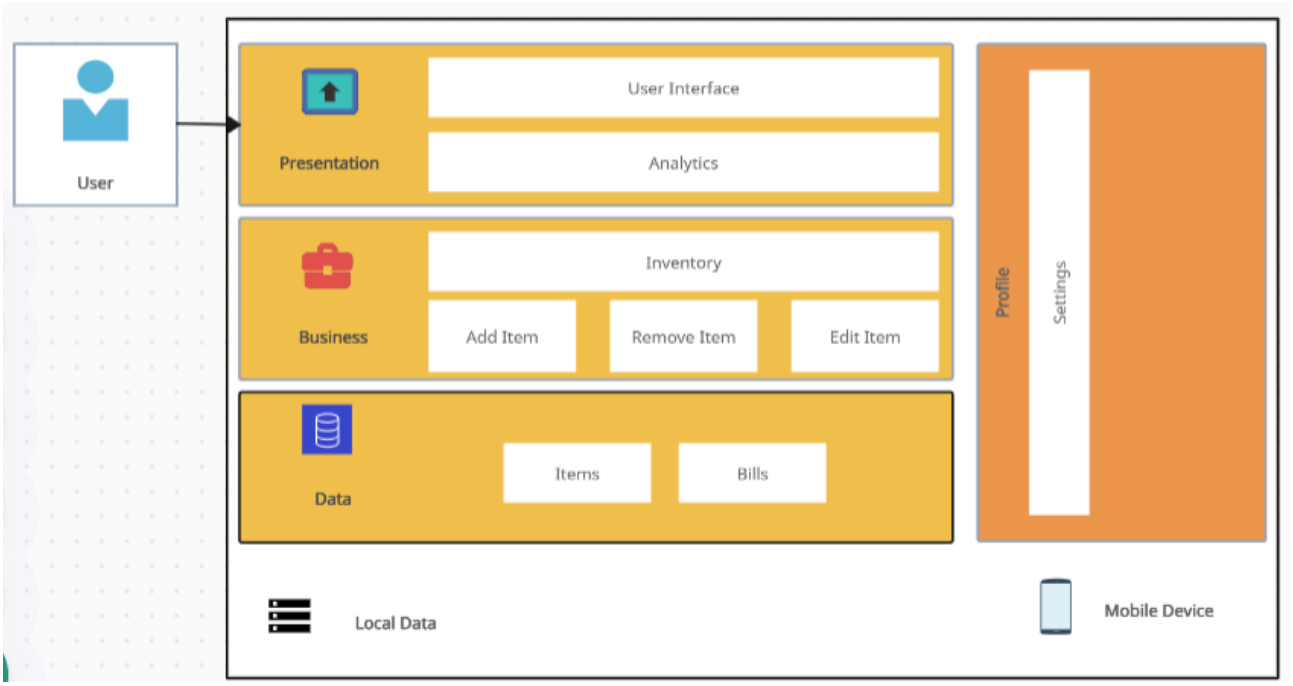

Figure 34 Software Architecture

3.5 Class diagram

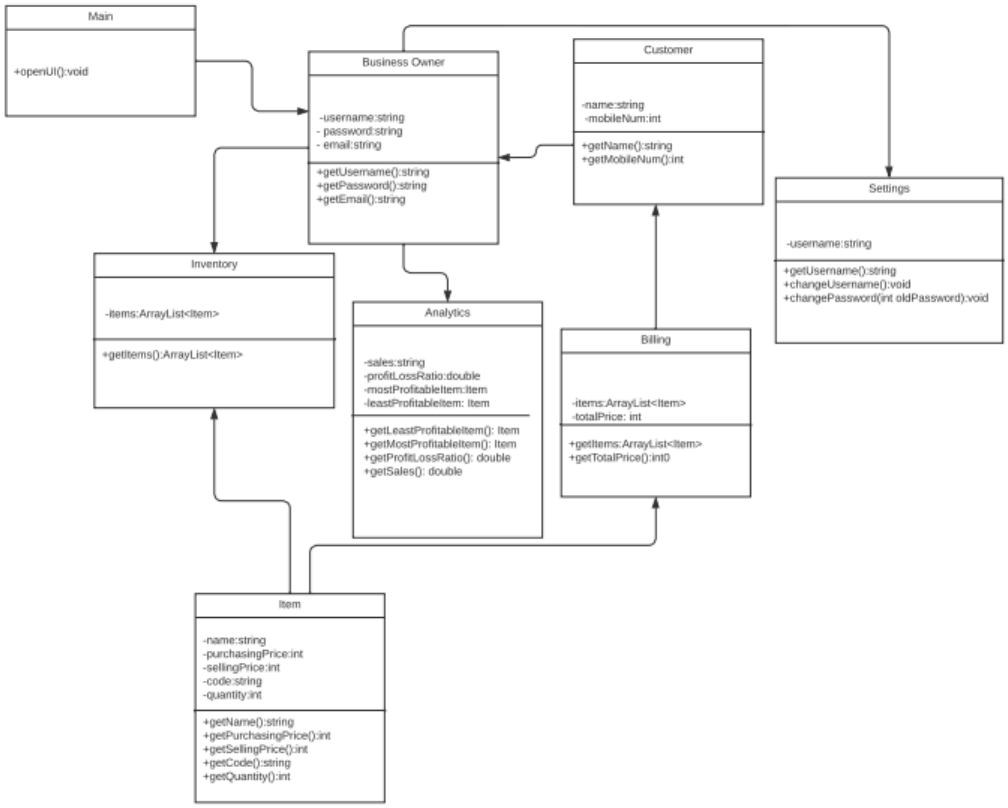

Figure 35 Class Diagram

3.6 Database diagram

-

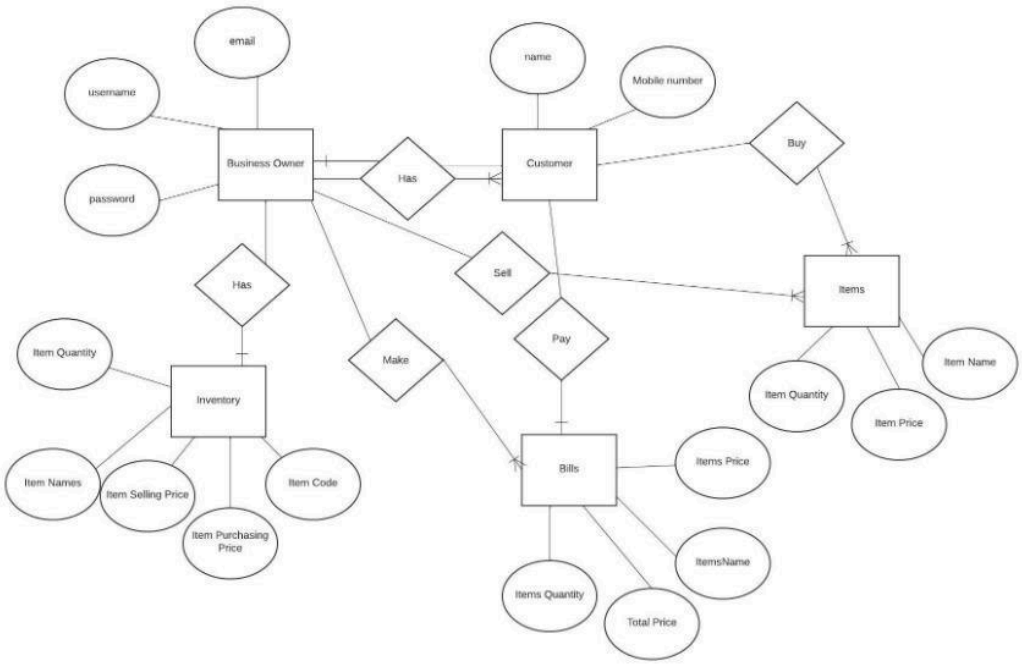

Figure 36 ERD

3.7 Network diagram (Gantt chart)

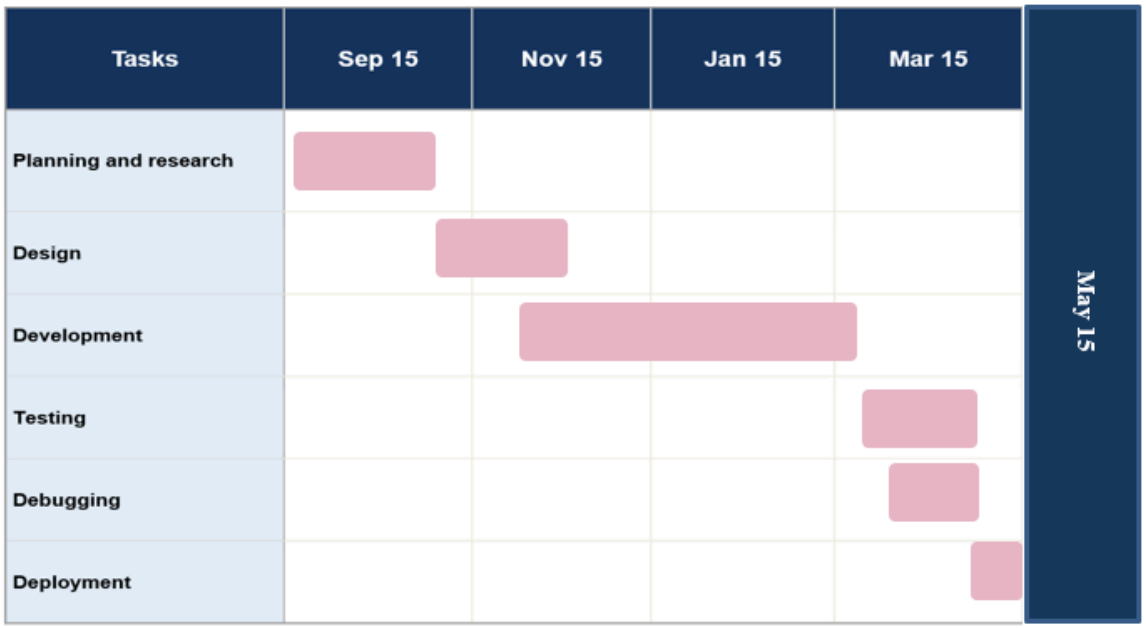

Figure 37 Gantt Chart

3.8 Collaboration diagram

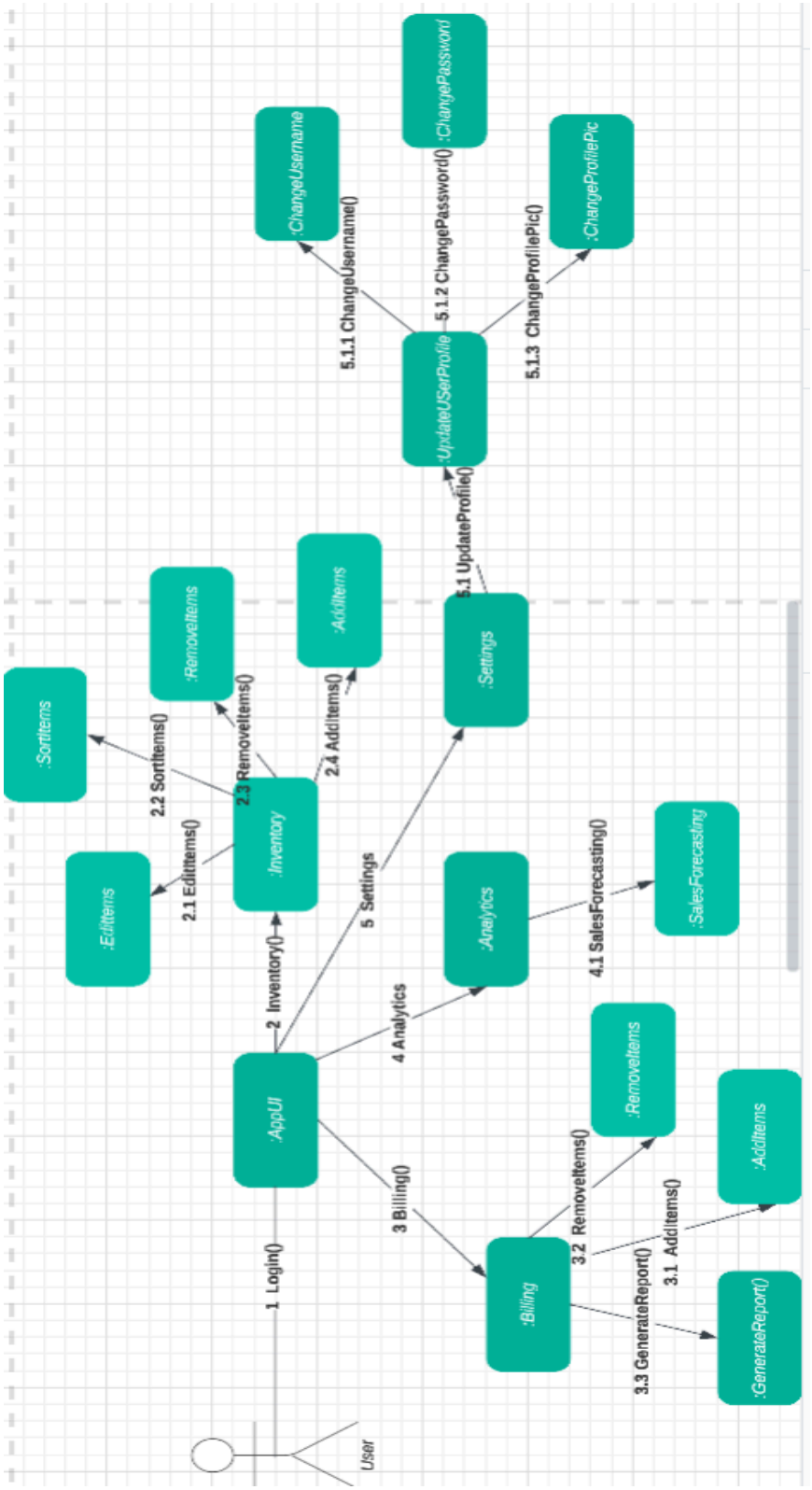

Figure 28 Collaboration Diagram

4 System Testing

4.1 Test Cases

4.1.1 Test Case 01 Sign Up

Test Case 1: Valid Sign Up

Test Case ID: TC-01

Test case#1	**Test Case Name**: Valid Sign Up
System: Smart Business Insider	**Subsystem:** Smart Business Insider.
Designed By: Ahmed Raza Warraich	**Design date**:30/12/2022
Short description: User should enter valid credentials for signup.	**Execution date:**31/12/2022
Executed By: Muhammad Waqar	

Pre-Condition:

- Open the application.

Step	Action	Expected system response	Pass/Fail	Comment
1.	Enter a valid email address and name.	System accepts the email and name and saves it in the database.	Pass	
2.	Enter a valid password and confirm the password.	Password saved in database.	Pass	

Step	Action	Expected system response	Pass/Fail	Comment
3.	Click on the Sign-Up button.	System redirect to login page.	Pass	Successfully new user signed up.
1.	Enter an invalid email address.	Generate error messages.	Pass	
2.	Enter a valid password and confirm the password.	Password saved in database.	Pass	
Post condition: The user can successfully register.				
3.	Click on the Sign-Up button.	System shows an error message.	Pass	Successfully generates an error message.
Post condition: Error pops up successfully.				

Test Case 2: Invalid Email Address

Test Case ID: TC-02

Test case#2	**Test Case Name**: Invalid Email
System: Smart Business Insider	**Subsystem:** Smart Business Insider.
Designed By: Ahmed Raza Warraich	**Design date**:31/12/2022
Short description: User enter invalid credentials for signup.	
Executed By: Muhammad Waqar	**Execution date:**01/01/2023

Pre-Condition:

- Open the application.

Step	Action	Expected system response	Pass/Fail	Comment
1.	Enter an existing email address.	Check in the database for checking existence.	Pass	
2.	Enter a valid password and confirm the password.	Password saved in database.	Pass	
3.	Click on the Sign-Up button.	System shows an error message.	Pass	Successfully generates alert messages.
Post condition: If the email address is already associated with an existing account, the application displays an alert message indicating that the user already has an account.				

Test Case 3: Existing Account

Test Case ID: TC-03

Test case#3	**Test Case Name**: Existing Account
System: Smart Business Insider	**Subsystem:** Smart Business Insider.
Designed By: Ahmed Raza Warraich	**Design date**:05/01/2023
Short description: User enter existing credentials for signup. **Executed By**: Muhammad Waqar	**Execution date:**06/01/2023

Pre-Condition:

- Open the application.

Test Case 4: Password Mismatch

Test Case ID: TC-04

Step	Action	Expected system response	Pass/Fail	Comment
1.	Enter an existing email address.	Check in the database for checking existence.	Pass	
2.	Enter a password and confirm the password both must be different.	System checks for both passwords.	Pass	
3.	Click on the Sign-Up button.	System shows an error message.	Pass	Successfully generates an error message for the password mismatch.
Post condition: The application displays an error message indicating that the password and confirm password do not match.				

Test case#4 **Test Case Name**: Password Mismatch

System: Smart Business Insider **Subsystem:** Smart Business Insider.

Designed By: Ahmed Raza Warraich **Design date**:05/01/2023

Short description: User enter wrong password in confirm password. **Executed By**: Muhammad Waqar **Execution date:**06/01/2023

Pre-Condition:

- Open the application.

4.1.2 Test Case 02 Login

Test Case Name: Login with Valid Credentials

Test Case ID: TC-05

Test case#5 **Test Case Name**: Login

System: Smart Business Insider **Subsystem:** Smart Business Insider.

Designed By: Ahmed Raza Warraich **Design date**:05/01/2023

Short description: User enter correct credentials for login. **Executed By**: Muhammad Waqar **Execution date:**06/01/2023

Pre-Condition:

- Open the application.
- User must be Signed up.

Step	Action	Expected system response	Pass/Fail	Comment
1.	Enter a valid email address.	Check in the database for validity.	Pass	
2.	Enter a password.	System matches the password.	Pass	
3.	Click on the Log-in button.	System shows the homepage.	Pass	Successfully logged in.

Post condition:
The user is redirected to the application's main page.
The user is successfully logged into the application.

Test Case Name: Login with Invalid Password

Test Case ID: TC-06

Test case#6 **System**: Smart Business Insider **Designed By**: Ahmed Raza Warraich **Short description:** User enter correct credentials for login. **Executed By**: Muhammad Waqar	**Test Case Name**: Login with invalid data. **Subsystem:** Smart Business Insider. **Design date**:05/01/2023 **Execution date:**06/01/2023

Pre-Condition:

- Open the application.
- User must be Signed up.

Step	Action	Expected system response	Pass/Fail	Comment
1.	Enter a valid email address.	Check in the database for validity.	Pass	
2.	Enter an invalid password.	System matches the password.	Pass	
3.	Click on the Log-in button.	System shows the error message.	Pass	Successfully generates the error message
Post condition: An alert message should be displayed indicating an invalid password.				

4.1.3 Test Case 03 Home Screen

Test Case Name: Accessing home page through the menu.

Test Case ID: TC-07

Test case#7 **System**: Smart Business Insider **Designed By**: Ahmed Raza Warraich **Short description:** Accessing home page through the menu. **Executed By**: Muhammad Waqar	**Test Case Name**: Accessing the homepage through menu. **Subsystem:** Smart Business Insider. **Design date**:05/01/2023 **Execution date:**06/01/2023

Pre-Condition:

- Open the application.
- User must be Logged in.

Step	Action	Expected system response	Pass/Fail	Comment
1.	Click on the menu icon.	It will popup the navigation bar.	Pass	
2.	Click on the "Home Screen" option in the menu.	System will again redirect to the homepage.	Pass	
3.	Each data visualisation on the homepage must be correct and showing properly.	Data visualization.	Pass	Successfully displayed the homepage correctly.

Post condition:
The user can access the home page by clicking on the menu icon and selecting the home screen option.

4.1.4 Test Case 4 Analytics

Test Case Description: Verify that the user can successfully view detailed insights of their business with data visualization.

Test Case ID: TC-11

Pre-Condition:

- Open the application.
- User must be Logged in.
- Navigation must be working properly.

4.1.5 Test Case 5 Generate Report

Test Case Description: This test case verifies the successful generation of a monthly business report in PDF format.

Test Case ID: TC-12

Test case#9	**Test Case Name**: Generate Report.
System: Smart Business Insider	**Subsystem:** Smart Business Insider.
Designed By: Ahmed Raza Warraich	**Design date**:05/01/2023
Short description: Successful generation of a monthly business report in PDF format.	**Executed By**: Muhammad Waqar **Execution date:**06/01/2023

Pre-Condition:

- Open the application.
- User must be Logged in.
- Navigation must be working properly.

Step	Action	Expected system response	Pass/Fail	Comment
1.	User clicks on the "Generate Report" button.	System will convert all analytics into a pdf report.	Pass	

Post condition:

1. The report is generated successfully.
2. The report is in PDF format.
3. The report includes the required analytics and insights.
4. The user can view and access the generated report.

4.1.6 Test Case 6 Billing

Description: Testing Billing page functionality.

Test Case ID: TC- 13

Test case#10

Test Case Name: Billing Functionality.

System: Smart Business Insider

Subsystem: Smart Business Insider.

Designed By: Ahmed Raza Warraich

Design date:05/01/2023

Short description: Testing Billing page functionality.

Executed By: Muhammad Waqar

Execution date:06/01/2023

Pre-Condition:

- Open the application.
- User must be Logged in.
- Navigation must be working properly.

Step	Action	Expected system response	Pass/Fail	Comment
1.	Click on the "Search Bar" button.	It will display a dropdown menu.	Pass	
2.	Click on the "Use Barcode" button.	This will open the barcode screen with a camera scanner.	Pass	
3.	Repeat steps 4-9 for multiple items.	This will add more items and calculate the total bill.	Pass	Successfully calculated the total bill.

Post condition:

1. The user should be able to log in successfully.
2. The Billing Screen should be displayed without any errors.
3. The "Add Item" button should be clickable and functional.
4. The user should be able to enter a valid item code or item name.
5. The system should provide a list of available items matching the entered code or name.
6. The user should be able to select an item from the list.
7. The selected item should be added to the bill without any errors.
8. Multiple items should be added correctly without any conflicts.
9. All items should be added and removed from the bill as expected.

4.1.7 Test Case 7 Generate Bill

Description: Testing Billing page functionality.

Test Case ID: TC- 14

Test case#11	**Test Case Name**: Generate Bill.
System: Smart Business Insider	**Subsystem:** Smart Business Insider.
Designed By: Ahmed Raza Warraich	**Design date**:05/01/2023
Short description: Testing Generate Bill **Executed By**: Muhammad Waqar	**Execution date:**06/01/2023

Pre-Condition:

- Open the application
- User must be Logged in.

Navigation must be working properly and there are some items in bill.

Step	Action	Expected system response	Pass/Fail	Comment
1.	User clicks on the "Generate Bill" button.	System will convert all added items into pdf report and generates bill.	Pass	Bill is generated and saved in the database successfully.
2.	User clicks on the "Send on WhatsApp" button.	Whole bill will be sent to the customer number as a text message.	Pass	Message sent successfully.

Post Condition

1. The "Generate Bill" button should be clickable and functional.

2. The "Send to WhatsApp" button should be clickable and functional.
3. The bill details should be saved in the database accurately.

4.1.8 Test Case 9 Inventory

Description: Testing Inventory Page functionality.

Test Case ID: TC- 15

Test case#12 **System**: Smart Business Insider **Designed By**: Ahmed Raza Warraich **Short description:** Testing Inventory functionality. **Executed By**: Muhammad Waqar	**Test Case Name**: Testing Page Functionality. **Subsystem:** Smart Business Insider. **Design date**:05/01/2023 **Execution date:**06/01/2023

Pre-Condition:

- Open the application.
- User must be Logged in.
- Navigation must be working properly and there are some items in bill.

Step	Action	Expected system response	Pass/Fail	Comment
1.	User clicks on the "Add Items" button.	System will popup the add item screen.	Pass	Item added in the database and shown in inventory
2.	Users edit and delete the existing item by swiping left and right on the item card.	This will edit or delete existing items in the database.	Pass	Item modified in database and shown in the inventory.
Post Condition				

1. The pop-up appears asking for item details.
2. The item details are entered correctly.
3. The unique code is assigned to the item.
4. The item is added to the inventory in the database.
5. The item appears in the inventory list on the screen.

4.1.9 Test Case 10 Settings

Test Case Name: Change User Profile

Test Case ID: TC- 18

Test case#13	**Test Case Name**: Change User profile
System: Smart Business Insider	**Subsystem:** Smart Business Insider.
Designed By: Ahmed Raza Warraich	**Design date**:05/01/2023
Short description: Change User Profile like username.	
Executed By: Muhammad Waqar	**Execution date:**06/01/2023

Pre-Condition:

- Open the application.
- User must be Logged in.

Step	Action	Expected system response	Pass/Fail	Comment
1.	User clicks on the "Change" button.	System will open a gallery for selecting photos.	Pass	
2.	User clicks on the "Profile" button.	This will pop up the username screen.	Pass	Item modified in database and shown in the inventory.

Post Condition

1. The navigation menu should pop up.
2. The user should be taken to the Setting Screen.
3. The profile picture should be updated with the selected picture.

4. The username should be updated with the new value.

4.1.10 Test Case 11 Change Password

Test Case: Change Password

Test Case ID: TC- 19

Test case#14	**Test Case Name**: Change Password
System: Smart Business Insider	**Subsystem:** Smart Business Insider.
Designed By: Ahmed Raza Warraich	**Design date**:05/01/2023
Short description: Change Password. **Executed By**: Muhammad Waqar	**Execution date:**06/01/2023

Pre-Condition:

- Open the application.
- User must be Logged in.
- User must be on Settings screen.

Test Steps:

Step	Action	Expected system response	Pass/Fail	Comment
1.	User clicks on the "Change Password" button.	This will open the change password screen.	Pass	Item modified in database.

Post Condition

1. The password should be updated successfully, and the application should provide confirmation.
2. The application should display an "Invalid Password" message.
3. The user should be able to log in successfully using the new password.

4.1.11 Test Case 12 Navigation Button

Test Case: Navigation / Menu

Test Case ID: TC- 20

Test case#15	**Test Case Name**: Navigation
System: Smart Business Insider	**Subsystem:** Smart Business Insider.
Designed By: Ahmed Raza Warraich	**Design date**:05/01/2023
Short description: Test the Navigation. **Executed By**: Muhammad Waqar	**Execution date:**06/01/2023

Pre-Condition:

- Open the application.
- User must be Logged in.

Step	Action	Expected system response	Pass/Fail	Comment
1.	User clicks on every button in the menu.	Users navigate to each screen whose button will be pressed.	Pass	Successfully navigate over all the screens.

Post condition:

1. The navigation menu should appear after clicking the menu icon.
2. Clicking on each menu option should take the user to the respective screens.

5 Conclusion

In conclusion, Smart Business Insider is a revolutionary mobile application designed to address the needs of small store owners who aspire to digitize their bookkeeping and streamline their operations. This application serves as a comprehensive tool that enables store owners to efficiently manage their inventory, generate online bills, and maintain accurate records of sales and purchases. By leveraging advanced Business Intelligence features, such as sales forecasting and stock reminders, Smart Business Insider empowers store owners with valuable insights to make informed business decisions and optimize their profitability.

One of the key advantages of Smart Business Insider is its accessibility through smartphones, which is particularly beneficial for small store owners who may not have access to desktop computers. This mobile-first approach ensures that even those with limited resources can benefit from the advantages of digital management and online operations. By bridging the gap between small and big stores, Smart Business Insider democratizes the use of advanced management tools, ultimately helping small store owners compete more effectively in today's digital landscape.

Furthermore, Smart Business Insider goes beyond basic bookkeeping functionalities by offering additional features and business techniques that aid in achieving success. The application serves as a platform where store owners can learn about proven strategies and implement them in their own businesses. This invaluable knowledge and guidance empower small store owners to enhance their operations, attract more customers, and drive growth.

Another notable aspect of Smart Business Insider is its commitment to sustainability. By enabling the generation and sending of bills through WhatsApp, the application significantly reduces paper usage, contributing to environmental conservation. This eco-friendly approach aligns with the growing global emphasis on sustainable practices and showcases the application's commitment to making a positive impact.

Overall, Smart Business Insider is a game-changer for small store owners, offering them the convenience, efficiency, and intelligence needed to succeed in the modern business landscape. With its focus on digitization, accessibility, business techniques, and sustainability, this mobile application has the potential to transform the way small stores manage their operations and thrive in an increasingly competitive market. By empowering small store owners with powerful tools and insights, Smart Business Insider paves the way for their continued growth and prosperity.

5.1 Problems faced and Lessons Learned

Completing the project was not easy as we faced a lot of challenges. Our target is to make a full-fledged application for our users so that they won’t have to face any difficulty while using the app. The diagrams added in the report represent the processing of the application. Following all the functional and non-functional requirements it was not easy to decide the functionalities of the application, but we still made the effort to complete the report until further proceeding.

5.2 Project Summary

Smart Business Insider is an application to keep track of store’s inventory and generate online bills with the proper record of date, time etc. It has Business Intelligence like forecasting the

sales, reminders when the stock of items is about to run out. Artificially calculate all the profit and loss ratio to keep updating the user. It enables apps to send bills on WhatsApp which reduces paper use. As many of the small store owners do not have the access to desktop computers but most of them have access to smartphones. So the main motive of this mobile application is to give the same facility to small stores which all the big stores have of online or digital management. One can use a great management app just free of cost.

5.3 Future Work

We are aiming to make our application available for commercial use. But before that we will be running it as a beta version for some specific users. It will be available on IOS, and android and one can easily get the access in a simple smartphone.

6 References

[1] “Tech Jockey,” 15 July 2022. [Online]. Available: https://www.techjockey.com/blog/best-mobile-bookkeeping-apps#quickbooks_online. [Accessed 22 December 2022].

Appendix A

Turnitin Originality Report

Processed on: 14-Jun-2023 12:25 PKT
ID: 2115800313
Word Count: 7161
Submitted: 1

Smart Business Insider By Haroon Riaz

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