UNIVERSITY OF WESTMINSTER

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Informatics Institute of Technology

Software Development Group Project

Individual Report

5COSC021C

Module Leader – Mr. Banuka Athuraliya

"**SaveNest**"

SE- 41

I. Declaration

I confirm that this project report and all related materials are my original work. It has not been previously submitted, nor is it currently being presented for any degree program.

Full Name of the Student: H.H. Welgama

UoW ID : w1998723

IIT ID : 20221109

II. Abstract

In today’s world, inflation is a major problem that affects people all over the world. This scenario is frequently caused by irresponsible financial behaviors, in which individuals indulge in excessive and wasteful spending. Such purchasing habits are typically sparked by appealing offers or suggestions from acquaintances. As a result, many find themselves spending their hard-earned money on frivolous products, straining their finances until the next paycheck arrives.

A careful examination of the market indicates that identical items have varied pricing ranges. Unfortunately, many people fail to consider these distinctions and instead choose the first option that appears. This rash decision-making results in an expenditure that surpasses the product's true value. In response to this prevalent problem, this research recommends the creation of a budget planning application. The major goal of this application is to enable users to manage difficulties while also providing additional benefits such as personalized budget plans, priority alerts, notifications for price reductions, and projections of future pricing trends.

III. Acknowledgement

Foremost, gratitude is extended to our module leader, Mr. Banu Athuraliya, and our mentor, prof. Damith Karunaratne, along with all other SDGP module lecturers for their continuous guidance and feedback throughout the project.

Appreciation is also extended to the lecturers and non-academic staff of IIT who assisted us in resolving project-related issues. Their invaluable support played a crucial role in the completion of this project.

Thanks are due to our family members and friends for their unwavering support and encouragement during challenging moments.

Finally, heartfelt thanks go to all the responders who took part in our survey, offering their support and dedicating their precious time to our research.

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Abbreviations	Explanation
SRS	System Requirements Specification
SDGP	Software Development Group Project
ML	Machine Learning
Rs.	Sri Lankan Rupees
SLEP	Social, Legal, Ethical, and Professional
HIPAA	Health Insurance Portability and Accountability Act
GDPR	General Data Protection Regulation
MFA	Multi-Factor Authentication
UI	User Interface
SDPR	Possibly a typo, corrected to GDPR
URL	Uniform Resource Locator
CCPA	California Consumer Privacy Regulation

Table 1: Abbreviations Table

Chapter 4: System Requirements Specification (SRS)

4.1. Chapter Overview

This chapter focuses on identifying the various project stakeholders, exploring the onion model, evaluating various requirement-gathering techniques, examining use case diagrams with their descriptions, and specifying both functional and non-functional requirements for the proposed system.

4.2. Stakeholder Analysis

4.2.1. Onion Model

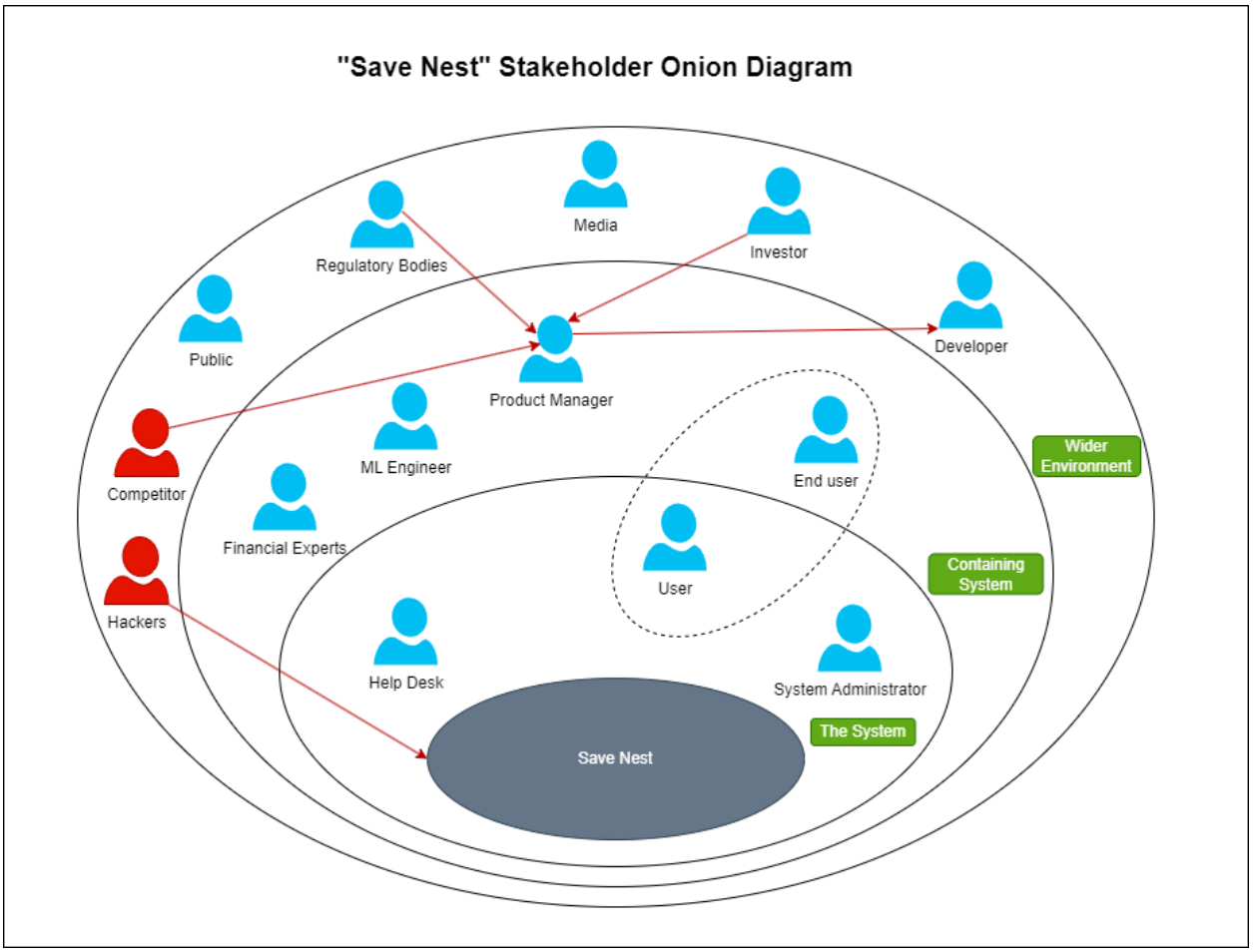


Figure 1: Stakeholder Onion Diagram

4.2.2. Stakeholder Descriptions

Stakeholder	Viewpoint
Functional beneficiary	
User	Those who profit directly from the "Save Nest" application's features. They manage their Finances and budgets using the app.
End user	
Financial beneficiary	
Investor	With the hope of earning a profit on their investment, investors contribute money to the "Save Nest" project, guaranteeing the growth and success of the program.
Social beneficiary	
Public	"Save Nest" serves the general public by lowering financial stress, making it easier for people to manage their money and enhancing their overall well - being.
Operational beneficiary	
Help Desk	The "Save Nest" help desk assists end users by quickly answering concerns and difficulties, delivering a great user experience.
Product Manager	The product manager oversees the development of "Save Nest".
Developer	Developers play an important role in the design and upkeep of "Save Nest".

System Administrator	System administrators are in charge of the technical components of "Save Nest" ensuring its smooth operation and dependability.
Negative Stakeholders	
Hackers	Individuals with malevolent intent who may represent a danger to the security of the "Save Nest" application.
Competitor	In the same market several applications compete with "Save Nest" to keep ahead of the competition, features and overall user experience must be constantly improved**.**
Regulatory	
Regulatory Bodies	Authorities from the government or business sector in charge of making sure financial rules and data protection laws are followed.
Experts	
ML Engineer	Machine learning experts who help with "Save Nest" application machine learning algorithm implementation.
Financial Expert	A financial expert who offers advice and thoughts on enhancing the app's financial functionality.
Neighboring systems	
Media	Will promote the "Save Nest" app through social media platforms.

Table 2: Stakeholder Descriptions

4.3. Selection of Requirement Elicitation Techniques/Methods

4.3.1. Techniques of requirement gathering

We explore the critical choice of requirement elicitation strategies and tactics in this part, which was essential to the project's success. We pursued this by methodically investigating several strategies to guarantee a thorough comprehension of the project specifications. Observation of previous works, conducting interviews with domain experts, conducting brainstorming sessions, using an online questionnaire, and prototyping were among the strategies used. By putting these approaches into practice, we were able to identify and completely understand the complex aspects of the project's needs.

Method 1	Observations
Understanding Save Nest application users and stakeholders requires observing user behaviors, activities, and processes. This strategy allows for the collection of significant insights into their wants and requirements, revealing patterns or trends that might not be apparent using other ways.	
Method 2	Interviews
To enhance Save Nest, conducted discussions with users, including financial experts. These sessions assisted in gathering useful input and refining features depending on user demands. While face-to-face interviews were efficient, due to budget restrictions, gathering feedback from a broader audience proved difficult. Some team members faced difficulties in formulating questions for domain experts. Despite the limitations, the interviews yielded critical insights to improve Save Nest.	
Method 3	Brainstorming
Team participation via brainstorming greatly enhances the Save Nest application. It generates creative ideas and provides insights into prospective enhancements, guaranteeing that the app's functionality and user experience are constantly improved.	
Method 4	Prototype
Creating a high-fidelity prototype for Save Nest, similar to the final application interface, has various advantages. Section 6.3.3 contains prototypes for Save Nest. This method guarantees that all team members and stakeholders have a complete virtualization of the program, allowing for successful cooperation. However, it is understood that creating such prototypes takes time. Regardless, the benefit is in the simplicity of front-end development throughout program	

installation. When transferring prototype interfaces into the actual system, difficulties may develop.	
Method 5	Distributing Online Questionnaire
Save Nest, our cutting-edge budget planning tool was meticulously designed after performing targeted online surveys. We spoke with a variety of groups, including students and young adults, to better understand their financial requirements. The polls found a market gap, indicating a potential for Save Nest to cater to customers who are not already using budget applications. Save Nest aspires to be the best choice for quick and successful budget planning, with an emphasis on user-friendly savings tools and favorable feedback on future developments.	

Table 3: Techniques of requirement gathering.

4.3.2 Questionnaire Design

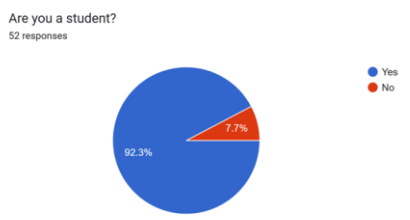
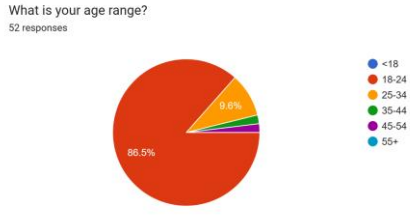
Questionnaire	Goal
1. Are you a student?	The goal is to determine if the app's users are mostly students, allowing us to adapt the program to better meet their needs.
2. What is your age range?	To gather information about the ages of possible users to better build the application for their age groupings.
3. Are you currently using a budget planning application to manage your finances?	Determine how many individuals in the desired audience are presently using budgeting apps.
4. If not**,** are you using any other method such as maintaining a book for financial management?	Find out how potential users might manage their finances in methods other than using budgeting apps.
5. What are the objectives that you wish to accomplish through a budget application?	Learn about the financial aims and expectations of budget planning application uses.
6. Evaluate the unique features of the budget planning application and assess their effectiveness in helping you achieve your objectives.	Examine how consumers view the usefulness of existing features in meeting their financial objectives.
7. How much do you spend on a daily basis?	Collect information on potential

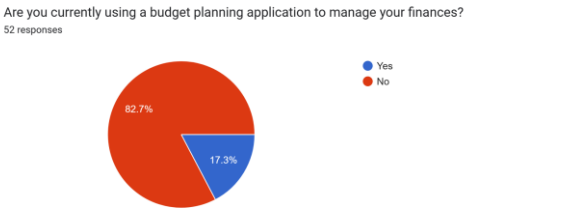
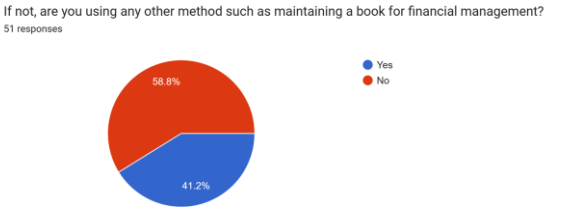
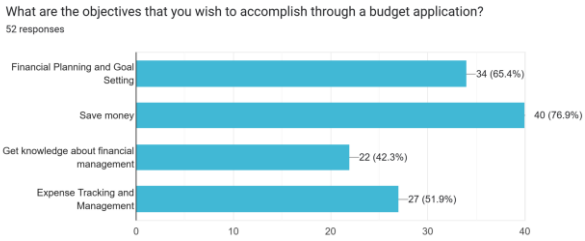
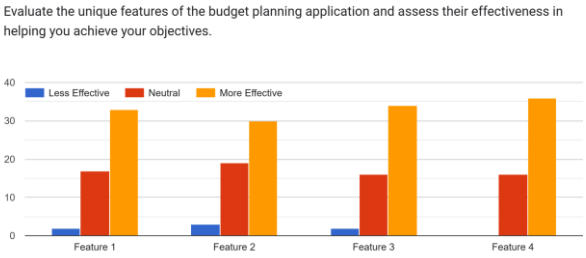
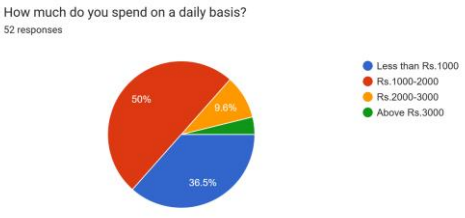
	users' everyday purchasing patterns.
8. Can you manage your expenses through your current financial management method?	Determine the effectiveness of users' existing money management approaches.
9. Will you think this application will successfully overcome existing challenges that your current financial management method have?	Examine user expectations about the application's potential to meet their present money management difficulties.
10. According to your view, what features should we add to this application other than the ones mentioned above.	Capture user suggestions for new features in order to improve the app's features and user happiness.

Table 4: Questionnaire Design

4.4. Discussion/ Analysis of Results

4.4.1. Analysis Of Budget Plan Questionnaire

Questionnaire Result	Analysis
	The outcomes of the survey show that 92.3% of the 52 respondents identified themselves as students. As a result, the project's primary focus was on catering to the demands and preferences of students, rather than presenting the perspective of working professionals.
	With 86.5% of responses indicating an age range of 18 to 24, It is clear that a substantial majority of the audience and potential users fall into the younger group. As a result, it is critical to design app features with a great emphasis on young people's financial habits and trends, taking into consideration their preferences and demands.

	A significant 82.7% of participants do not use any budgeting app. This indicates a possible market gap or unmet user demands. The project should perform more research to identify obstacles impeding the adoption of existing budgeting apps and the related negative consequences.
	58.8% of respondents report a lack of budgeting techniques. This demonstrates that the majority of end users do not adopt a formal budgeting technique. It provides an excellent chance to encourage them to utilize the program by providing a user- friendly platform for successful budget management.
	The goal for 76.9% of respondents is to save money using the “Save Nest” budget planning application. As a result, the project should prioritize including features and capabilities that directly contribute to the end user’s savings goals.
	The majority of respondents believe that the proposed features of the budget planning application (Save Nest) will help them reach their goals. As a result, the project may securely go forward with its development and specific emphasis.
	With 50% of respondents standing daily expenditure between Rs. 1000 and Rs. 2000, this budgetary range gives excellent information into the target audience’s financial habits. As a result, the project should prioritize budgeting tools and features that correspond to expenditure patterns ranging from Rs.1000 to Rs 2000.

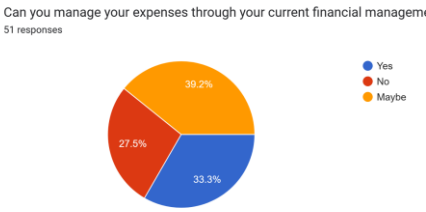
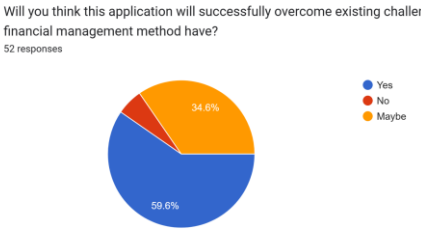
	A significant 39.2% of respondents said "maybe" showing a degree of doubt. This shows that present procedures may cause hesitancy or difficulty. As a result, the project should focus on identifying the variables that contribute to these "maybe" replies and identifying the unique challenges that end users have with their present financial management system.
	With 59.6% of respondents saying "yes," it shows that this application has the ability to successfully handle the issues associated with their existing financial management practices. As a result, it is prudent to preserve the present project trajectory and continue confidently towards its objectives.

Table 5: Analysis of Budget plan Questionnaire

4.5. Use Case Diagram

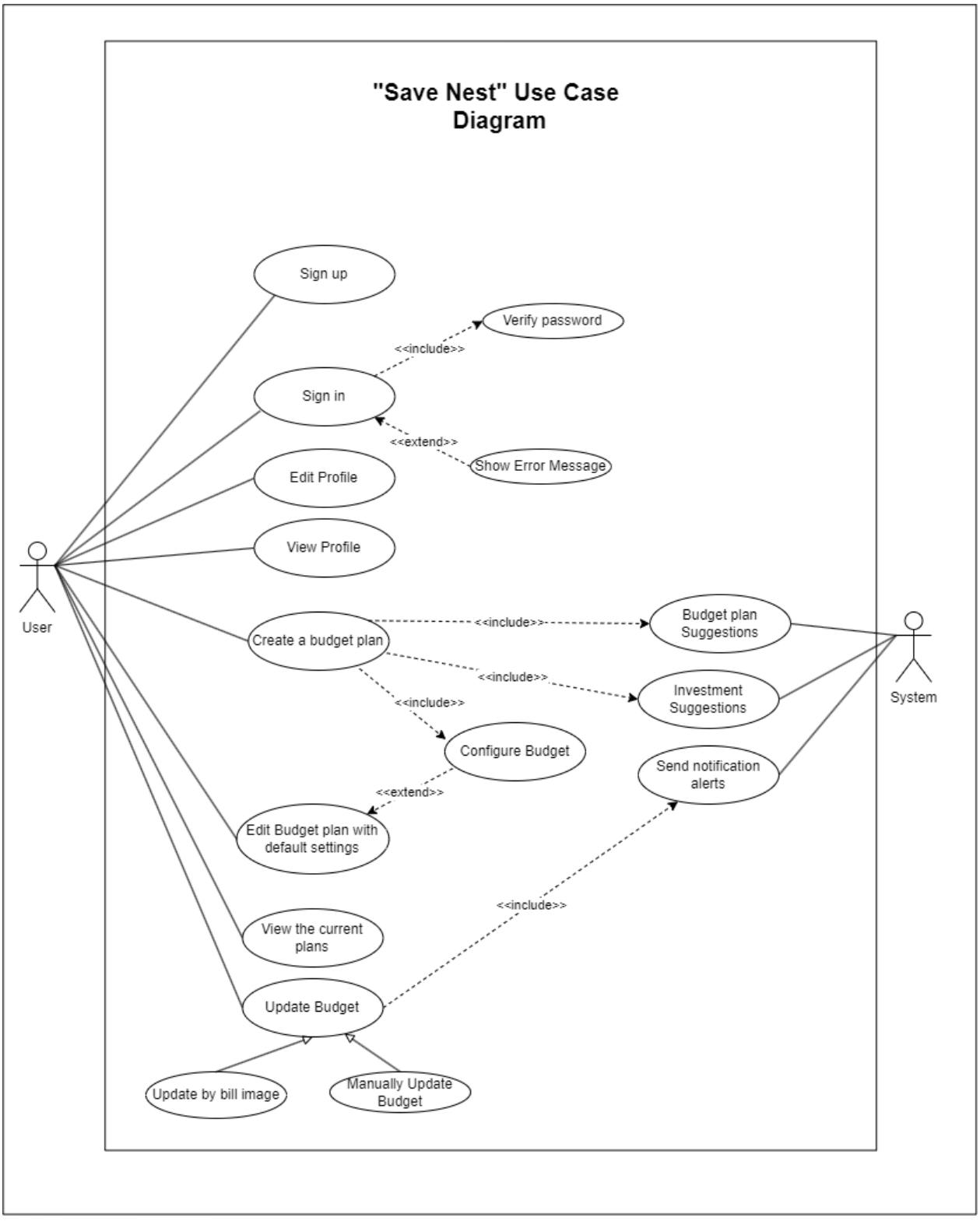


Figure 2:"Save Nest" Use Case Diagram

4.6. Use Case Descriptions

Use Case Name	**Sign-up**	
Use Case ID	**UC-001**	
Description	• Describes the processes needed to create a new user account in the SaveNest program.	
Priority	• Sign-up use case is a use case with a high priority level.	
Primary Actor	User	
Supporting Actors	System	
Pre-Conditions	• To use the application, users must download and install it on their device from an app store or the official website.	
Trigger	• The user is prompted to create a new account on the screen after choosing the sign-up option.	
Main flow	**Actors**	**System**
	1. User: Enter full name, Mobile number, Email address and create a password for their account. **3. User:** Reviewers confirm the information they have provided. **5. User:** Select the Sign-up option.	**2. System:** Validates entered email and mobile number **4. System:** The system allows access to the “sign up” option.

		6. System: The system will send a verification code to the provided email address. **7. System:** SaveNest system creates a new user account and sends a welcome message.
Exception flow	**Actors**	**System**
	1. User: If the user enters an invalid email address or an invalid mobile number.	**2. System:** Display an error message and ask them to try again. **3. System:** The system identifies any required fields left blank during sign-up. **4. System:** Highlights the blank fields with visual cues (e.g., red borders). **5. System:** Display error messages indicating necessary fields must be filled in. **6. System:** Prevents the user from proceeding until all required fields are completed.
Alternate flow	**Actors**	**System**
	1. User: select a social login button (e.g., Facebook, Google)**.**	**2. System:** Redirects the user to the login page specific to the social networking platform

		3. System: User authenticates their social media account. **4. System:** Social media platform sends authentication information back to SaveNest**.** **5. System:** SaveNest creates or logs in the user based on the social media information.
Exclusions	-	
Post Conditions	• The user now has a SaveNest account and may use the app's capabilities.	

Table 6: Sign-up use case

Use Case Name	**Sign-in**
Use Case ID	**UC-002**
Description	• Describes the process of a user logging into their existing SaveNest account.
Priority	• Sign-in use case is a use case with a high priority level.
Primary Actor	User
Supporting Actors	System

<table>
<tr><td>Pre-Conditions</td><td colspan="2">The user has a valid SaveNest account.
The user has access to the SaveNest app or website.</td></tr>
<tr><td>Trigger</td><td colspan="2">The login procedure is started by the user inputting their email address or username and password.</td></tr>
<tr><td rowspan="2">Main flow</td><td>Actors</td><td>System</td></tr>
<tr><td>1. User: On the login screen, the user enters their email address or username and password in the appropriate areas.
2. User: User clicks the "Sign In" button.</td><td>3. System: The SaveNest system compares the entered credentials to the user's account information in the database.

4. System: If the credentials are correct:
System authenticates the user.
The system returns the user to their SaveNest dashboard or home page.
5. System: If the credentials are incorrect:
The system produces an error message stating that the credentials are wrong.
The system prompts the user to re-enter their information or to utilize the "Forgot Password?" function.</td></tr>
</table>

Exception flow: **Forgot Password**	**Actors**	**System**
	1. User: User clicks the "Forgot Password" option. **4. User:** clicks on the link to reset their password.	**2. System:** The system asks the user for their email address. **3. System:** A password reset link is sent to the user's email address.
Alternate flow	**Actors**	**System**
	-	-
Exclusions	• This use case does not address specific security methods like two-factor authentication.	
Post Conditions	• The user is logged in to their SaveNest account and can start using the app's features**.**	

Table 7: Sign-in use case

Use Case Name	**Edit Profile**
Use Case ID	**UC-003**
Description	• Describes the process of a user updating their personal information within the SaveNest app.
Priority	• Edit Profile use case is a use case with a medium priority level.
Primary Actor	User

Supporting Actors	System	
Pre-Conditions	• The user has a valid SaveNest account. • The user has access to the SaveNest app or website. • User is logged in to their SaveNest account. • Within the app, the user has access to the "Edit Profile" feature.	
Trigger	• Within the SaveNest app, the user selects the "Edit Profile" button or menu item.	
Main flow	**Actors**	**System**
	2. User: Edits the details on their desired profile. **3. User:** Confirm the updated information.	**1.System:** The current profile information of the user is displayed on the screen. **4. System:** Validate the updated information for any errors or inconsistencies. **5. System:** The changed information is saved to the user's profile database.
Exception flow: Network Error:	**Actors**	**System**
		If the system finds a network problem when editing a profile, an error notice will be displayed, and the user will be prompted to retry.

Alternate flow:	**Actors**	**System**
Social Media Integration	**User:** Select the "link with the social media button."	**System:** If the app supports social media account connection, users may be able to edit their profile picture or basic information straight from the connected social media sites.
Exclusions	-.	
Post Conditions	• The SaveNest mechanism updates the user's profile information to reflect the modifications they made.	

Table 8: Edit profile use case.

Use Case Name	**View Profile**
Use Case ID	**UC-004**
Description	• Describes the process of a user viewing their profile information in the SaveNest app.
Priority	• View Profile use case is a use case with a medium priority level.
Primary Actor	User
Supporting Actors	System
Pre-Conditions	• The user has a valid SaveNest account. • The user has access to the SaveNest app or website.

	• User is logged in to their SaveNest account.	
Trigger	Within the SaveNest app, the user selects the "View Profile" button or menu item.	
Main flow	**Actors**	**System**
	1. User clicks the "View Profile" button.	**2. System:** Displays on the screen the user's profile information, which may include: • Personal Information: Full name, date of birth, email address, phone number (optional). • Account Information: Username, account creation date, etc. • Budget Information: Overview of current budget plan, target amounts, and progress towards goals.
Exception flow: Network Error:	**Actors**	**System**
		If the system finds a network problem when viewing the profile, an error notice will be displayed, and the user will be prompted to retry.
Alternate flow	**Actors**	**System**

	-	-
Exclusions:	-	
Post Conditions	• The user has successfully examined their profile information and obtained knowledge about their financial situation and budget progress.	

Table 9: View profile use case.

Use Case Name	**Create a Budget Plan**
Use Case ID	**UC-005**
Description	• Describes the process of a user creating a new budget plan within the SaveNest app to manage their budget plans effectively.
Priority	• Create a Budget Plan use case is a use case with a medium priority level.
Primary Actor	User
Supporting Actors	System
Pre-Conditions	• User is logged in to their SaveNest account. • Within the app, the user may access the "Create a Budget Plan" feature.
Trigger	• The user selects the "Create a new budget plan" menu item or button.

Main flow	**Actors**	**System**
	1. User: Clicks the "Create a Budget Plan" button.	**2. System:** Displays a budget creation screen with a notepad. **3. System:** Validates entered details. **4. System:** Creates the budget plan and stores it in the database. **5. System:** Displays the Configure Budget screen when it is created.
Exception flow: If during budget creation, the system hits a technical problem:	**Actors**	**System**
		System: displays an error message, logs the issue, and prompts to try again later.
Alternate flow	**Actors**	**System**
	-	-
Exclusions	-	
Post Conditions	• In the user's SaveNest account, a new budget plan is created and stored.	

Table 10: Create a budget plan use case.

Use Case Name	**Edit budget plan with default settings**	
Use Case ID	**UC-006**	
Description	• Describes the process of a user easily updating their budget plan within the SaveNest app by using a set of default settings.	
Priority	• Edit budget plan with default settings use case is a use case with a medium priority level.	
Primary Actor	User	
Supporting Actors	System	
Pre-Conditions	• The user has an existing budget plan created in the SaveNest app. • The system offers a selection of configuration sections or default budget settings.	
Trigger	• Within the budget editing screen, the user picks the "Edit with Default Settings" option.	
Main flow	**Actors**	**System**
	1. User: Chooses to apply default settings to their budget plan. **3. User:** The user chooses a preferred default option. **4. User:** reviews the preview and confirms the changes.	**2. System:** Displays a list of available default settings. (e.g., "Balanced," "Savings-focused")

		5. System: Saves the updated budget plan with the applied default settings.
Exception flow If during budget creation, the system hits a technical problem:	**Actors**	**System**
	1. User: When the user clicks the "Edit budget plan with default settings" button.	**System:** displays an error message, logs the issue, and prompts to try again later.
Alternate flow	**Actors**	**System**
	-	-
Exclusions	-	
Post Conditions	• The budget plan has been successfully changed, and it now reflects the changes made, including the option to revert to default settings. The system updates the budget plan on the SaveNest app.	

Table 11: Edit budget plan with default settings use case.

Use Case Name	**View the Current Plans**
Cc	**UC-007**
Description	• Describes the process of a user viewing their current budget plans and performance within the SaveNest app.
Priority	• View the Current Plans use case is a use case with a medium priority level.

Primary Actor	User	
Supporting Actors	System	
Pre-Conditions	• User is logged in to their SaveNest account. • The user has established at least one investment plan in the SaveNest app.	
Trigger	• The user selects the "View the Current Plans" button or menu option.	
Main flow	**Actors**	**System**
	1. User: clicks the "View the Current Plans" button.	**2. System:** retrieves the user's active budget plans from the database.
Exception flow Network Error:	**Actors**	**System**
		If the system finds a network problem when retrieving the current budget plans, an error notice will be displayed, and the user will be prompted to retry.
Alternate flow	**Actors**	**System**
	1. User: The user may access historical performance data for a plan over time.	**2. System:** Generates charts and graphs that depict long-term patterns.
Exclusions	-	

Post Conditions	• The User has viewed their current budget plans and their performance within the SaveNest app.

Table 12: View the current plans use case.

Use Case Name	**Update Budget**	
Use Case ID	**UC-008**	
Description	• Describes the process of a user modifying an existing budget plan within the SaveNest app, either by manually entering changes or by uploading bill images for automated data extraction.	
Priority	Update Budget use case is a use case with a high priority level.	
Primary Actor	User	
Supporting Actors	System	
Pre-Conditions	• The user has a valid SaveNest account.	
Trigger	• The user selects the "Update Budget" button or menu option.	
Main flow	**Actors**	**System**
	1. User: clicks the "Update Budget" button.	**2. System:** Prompts the user to select a method for updating. Bill Image Update or Manual Update.

	3. User: The user Selects the update method and confirms the changes.	**4.** The system displays the new budget plan, which reflects the adjustments made.
Exception flow When the image cannot be recognized:	**Actors**	**System**
	1. User: When the user entered an unclear bill image.	**2. System:** Fails to extract data accurately from a bill image. The system prompts the user to manually enter the data or try a different image.
Alternate flow	**Actors**	**System**
	-	-
Exclusions	-	
Post Conditions	• The implemented modifications are updated in the user's budget plan, which now reflects their goals and present financial status. • With the updated budget data at its disposal, the system can offer insights and suggestions.	

Table 13: Update budget use case.

Use Case Name	**Send Notification Alerts**
Use Case ID	**UC-009**

Description	• Analyzing income, spending, and balance data and informing the user of any changes to these data.	
Priority	• Send Notification Alerts use case is a use case with a high priority level.	
Primary Actor	System	
Supporting Actors	User	
Pre-Conditions	• The user has a valid SaveNest account. • The user has logged in to the SaveNest app. • The user has enabled notification preferences within the SaveNest app.	
Trigger	• The system detects significant changes in the user's existing budget plans and updated bills	
Main flow	**Actors**	**System**
	1. User: When the user updates the budget manually or updates by bill image.	**2. System:** Detects significant changes in the user's existing budget plans and updated bills. **3. System:** evaluates data on balance, spending, and income, and alerts the user to any changes.
Exception flow	**Actors**	**System**
	-	-
Alternate flow	**Actors**	**System**
	-	-

Exclusions	-
Post Conditions	The user is informed that these changes should be made.

Table 14: Send notification alerts use case.

Use Case Name	**Budget Plans Suggestions**	
Use Case ID	**UC-010**	
Description	• The budget plans of those who plan their budget well by using the app well will be suggested to the user.	
Priority	• Budget Plans Suggestions use case is a use case with a medium priority level.	
Primary Actor	System	
Supporting Actors	User	
Pre-Conditions	• The user has a valid SaveNest account. • The user has logged into the SaveNest application. • The user has created a budget plan.	
Trigger	• When the user creates a budget plan.	
Main flow	**Actors**	**System**
	1. User: Clicks the "Create a Budget Plan" button.	**2. System:** Displays a budget creation screen with a notepad. **3. System:** Validates entered details.

		4. System: Creates the budget plan and stores it in the database. **5. System:** Displays the Configure Budget screen when it is created. **6. System:** suggests budget plans.
Exception flow	**Actors**	**System**
	-	-
Alternate flow	**Actors**	**System**
	-	-
Exclusions	-	
Post Conditions	• Budget plans of those who manage the app well, are recommended for other users.	

Table 15: Budget plans suggestions use case.

Use Case Name	**Investment Suggestions**
Use Case ID	**UC-011**
Description	• By providing investing plans, the app assists users in managing their money.
Priority	• Investment Suggestions use case is a use case with a medium priority level.
Primary Actor	System

Supporting Actors	User	
Pre-Conditions	• The user has a valid SaveNest account. • The user has logged in to the SaveNest app. • The user has enabled Investment Suggestions preferences within the SaveNest app.	
Trigger	-	
Main flow	**Actors**	**System**
		1. System: The AI system will choose the best investment for the user. Will use the app to reserve investment plans from the system.
Exception flow	**Actors**	**System**
	-	-
Alternate flow	**Actors**	**System**
	-	-
Exclusions	-	
Post Conditions	• The app helps users find specific ideal investments and makes it simple for them to book selected plans through the app.	

Table 16: Investment suggestions use case.

4.7. Functional Requirements (with prioritization)

Requirements list		**Priority Level**	**Description**
FR1	User Authentication	Critical	Secure password storage should be enabled for added security and user authentication.
FR2	Dashboard	Critical	The dashboard should contain essential information.
FR3	Budget Creation	Critical	Users ought to be able to create personalized budget plans using the application.
FR4	Edit Budget	Critical	Users ought to be able to edit existing budget plans using the application.
FR5	Notification Alerts	Desirable	The application should analyze income, spending, and balance data and inform the user of any changes to these data.
FR6	Investment Suggestions	Luxury	The application should suggest investment plans to the user to invest money properly.

FR7	Generating Reports and Graphs	Luxury	The app should analyze the user's income and expenses and show them in reports and graphs in a way that is easy for them to understand.
FR8	Budget plan suggestions	Luxury	The application should suggest budget plans so that the user can plan the budget in a useful way.

Table 17: Functional Requirements

4.8. Non-Functional Requirements

Requirements list		**Priority Level**	**Description**
NFR1	Privacy	Critical	Application should ensure that it has robust practices in place to protect user information.
NFR2	Security	Critical	The application should be able to secure user data and credentials in "Save Nest" through robust security measures.
NFR3	Usability	Desirable	The application should be able to make sure Save Nest's interface is easy to use, offering a simple and intuitive experience for users.

NFR4	Compatibility	Desirable	System should be compatible with all mobile devices.
NFR5	Accuracy	Critical	Output of the system should be accurate.

Table 18: Non-Functional Requirements

4.9. Chapter Summary

This chapter digs into identifying key stakeholders and providing insights into their viewpoints on our project. It goes on to look at various requirement elicitation methodologies, giving you a thorough grasp of both functional and non-functional needs. These needs prioritization also covers the display of use case diagrams and extensive use case descriptions to improve understanding of the project's functionality.

Chapter 5: Social, Legal, Ethical and Professional Issues

5.1. Chapter Overview

This chapter will focus on the social, legal, ethical, and professional challenges related to this undertaking. The solutions and preventative steps adopted to reduce or minimize these difficulties will be highlighted.

5.2. Dataset Ethical Clearance

To ensure the ethical usage of the dataset for the Save Nest financial planning tool utilizes a painstakingly curated dataset titled "Analyzing Customer Spending Habits," which is available on Kaggle and was created by Vineet Bahi. According to the authors, the dataset is intended to aid in the investigation of numerous research objectives connected to client spending patterns.

- The product categories with the greatest average income per sale might be used to prioritize resources for those specific items or services.
- Tracking and analyzing changes in client spending habits across many product categories over time.

To protect user privacy, direct identifiers such as names and addresses are not included in the dataset. Ethical clearance procedures include the removal of sensitive material and the implementation of encryption. Compliance with data protection legislation like GDPR, CCPA, and HIPAA is essential to our strategy.

Vineet Bahl's dataset is shared with transparency, including facts such as the dataset's name, source link, and license information. Vineet Bahl expressly permits sharing and adaptation under the original license with proper attribution. This commitment, together with ethical measures, guarantees that the dataset is used responsibly and with privacy in mind while designing the Save Nest financial planning tool.

Name of the dataset: Analyzing Customer Spending Habits to Improve Sales Performance

Author of the dataset: Vineet Bahl

Link to the dataset: **https://www.kaggle.com/datasets/thedevastator/analyzing-customer-spending-habits-to-improve-sa**

License of dataset: **https://creativecommons.org/licenses/by/4.0/legalcode.en**

5.3. SLEP Issues and Mitigation

In the development of a budget planning application such as Save Nest, consideration must be given to societal, legal, ethical, and personal considerations. Adherence to the BCS principles is not just an issue of ethics, but also a fundamental part of the growth process.

5.3.1. Social issues

Problems

1. **Privacy concerns:** Addressing privacy concerns is critical in the field of budget planning apps, especially given the necessity for access to sensitive financial information. According to the BCS code, developers must prioritize the confidentiality of customer data. To achieve this obligation, clear and comprehensive privacy policies must be established. Furthermore, adding strong security measures, such as encryption, is critical for properly safeguarding user information.

2. **Data Accuracy and Representation:** Financial data accuracy is critical for efficient budgeting. Problems may develop if users are unable to correctly input or retrieve data, resulting in inaccurate budget assessments. The app's utility must ensure that financial data is representative.

Mitigations

1. **Privacy concerns**

- End-to-end encryption should be used to protect financial data throughout transmission and storage.
- Implement multi-factor authentication (MFA) to add another degree of protection by forcing users to give several forms of identity before accessing sensitive data.
- If the app interfaces with third-party services, be certain that these services follow stringent security requirements.

2. **Data Accuracy and Representation**

- Can provide simple and user-friendly data entry interfaces to reduce mistakes throughout the entering process.
- Use verification measures like confirmation prompts or two-factor authentication to guarantee that users enter data correctly.
- Use feedback from customers to continuously enhance the app's data accuracy features.

5.3.2. Legal Issues

Problems

1. **Compliance with Data Protection Laws:** Noncompliance with data protection rules, such as GDPR or HIPAA, may result in legal ramifications.

2. **Security Breach Response Plan:** Failure to establish a competent security breach response strategy may result in legal liability.

Mitigations

1. **Compliance with Data Protection Laws**

- Ensure that data protection rules, such as SDPR or HIPAA, are strictly followed by embedding their principles into the application's design and operation.
- Implement explicit and transparent processes for acquiring user consent for data collection, processing, and storage that are lawful in nature.
- Use strong encryption techniques to secure sensitive user information, preventing unauthorized access and guaranteeing data protection compliance.

2. **Security Breach Response Plan**

- Conduct security audits and vulnerability assessments regularly to detect and resolve any flaws.
- To minimize unauthorized access, enforce strong access controls and follow the concept of least privilege.
- To minimize data loss in the case of a breach, use frequent data backup practices.

5.3.3. Ethical Issues

Problems

1. **Transparency:** The BCS code encourages professionalism in the creation of budget planning applications by promoting openness. This requires communicating a clear knowledge of the app's functions, the sort of data gathered, and how it is used.

2. **Avoiding Bias:** When implementing algorithmic decision making into the program, it is critical to actively reduce biases, as recommended by the BCS code. Developers should

carefully evaluate any ethical consequences, especially when the app has the ability to impact financial decisions.

Mitigations

1. **Transparency**

- Notify users of an in-app notice of any major changes to the terms of service or privacy policies.
- Provide a forum or email help for people who have inquiries concerning ethical problems.

2. **Avoiding Bias**

- Include a range of perspectives on the development team to reduce the likelihood of inadvertent biases.
- Examine the app's algorithms for biases on a regular basis, then take steps to address and fix any that are discovered.

5.3.4. Professional Issues

Problems

1. **Professional development:** According to the BCS code, developers and IT professionals must be committed to continuing professional growth. This dedication guarantees that they are up to date on changing security processes. Emerging technology, and ethical problems. This, in turn, helps to construct a dependable and high-quality budget.

2. **Cost-effectiveness:** Achieving equilibrium between the features and functions of the application and the related expenses of development and upkeep is crucial. Encouraging a cost-effective and sustainable approach to the development and maintenance of the application entails making sure that the advantages it offers outweigh the financial and resource expenditures made in it.

Mitigations

1. **Professional development**

- Continuous professional growth should be promoted for developers and IT workers.
- Make time and resources available for training programs and certifications.

- Make appropriate training, workshops, and certifications available to keep them up to speed with industry best practices.

2. Cost-effectiveness

- Prioritize development efforts on additions that provide considerable value to users and contribute to the core functionality of the program.
- Anticipate future demands and build the application architecture to enable scalability and shifting requirements.
- Create contingency plans and resources to deal with any unforeseen challenges that may develop throughout the project.

5.4. Chapter Summary

This chapter covers numerous facets of the study effort, including social, legal, ethical, and professional issues, as well as mitigating methods.

Chapter 6: System Architecture & Design

6.1. Chapter Overview

This chapter will look at the prototype's design and architecture goals. To offer a thorough understanding of the proposed system, will show a relevant tiered system architecture diagram, class diagram, activity diagram, sequence diagram, and UI design.

6.2. System Architecture Design

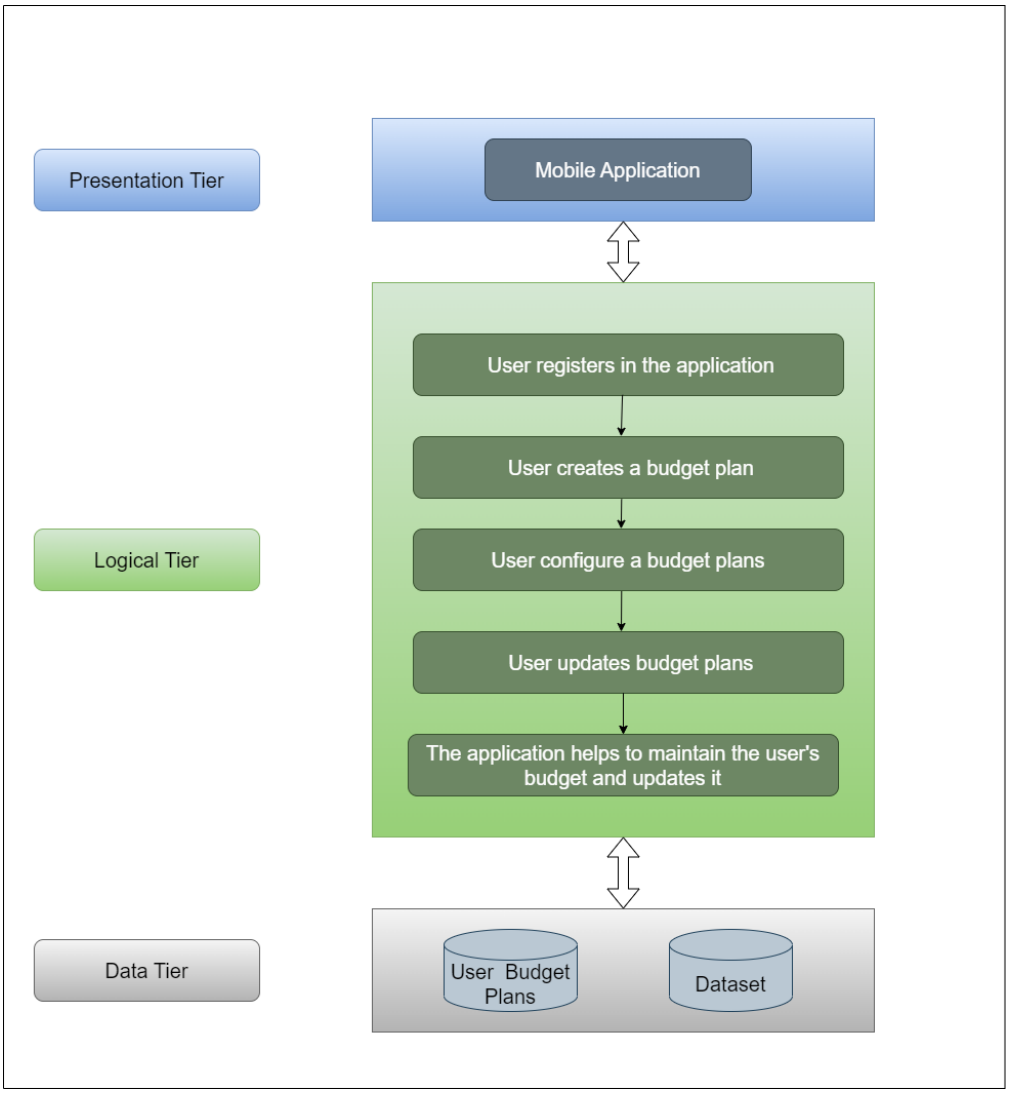


Figure 3: "Save Nest" System Architecture Design

A three-tier design for a mobile budgeting application is depicted. The presentation layer is where the user interacts with the system, where they may register, create, and configure budget plans, edit them as required, and update the budget. This information is subsequently processed by the logical tier, which utilizes it to manage and update the user's budget. Finally, the data layer holds all of the user's budget data, including plans and datasets. This design contributes to the application's security, scalability, and usability.

6.3. System Design

6.3.1. Class Diagram

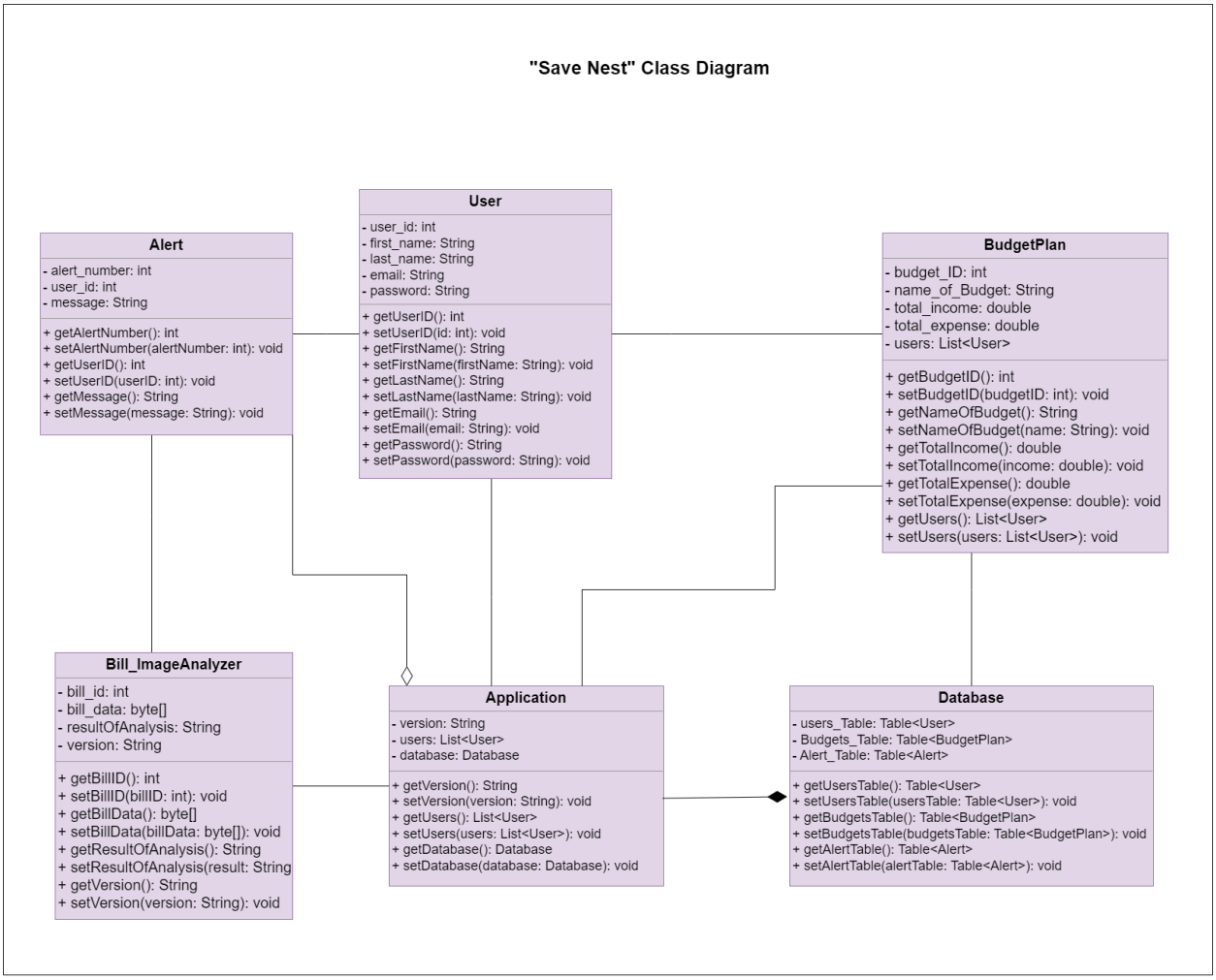


Figure 4: Save Nest" Class Diagram

6.3.2. Sequence Diagram

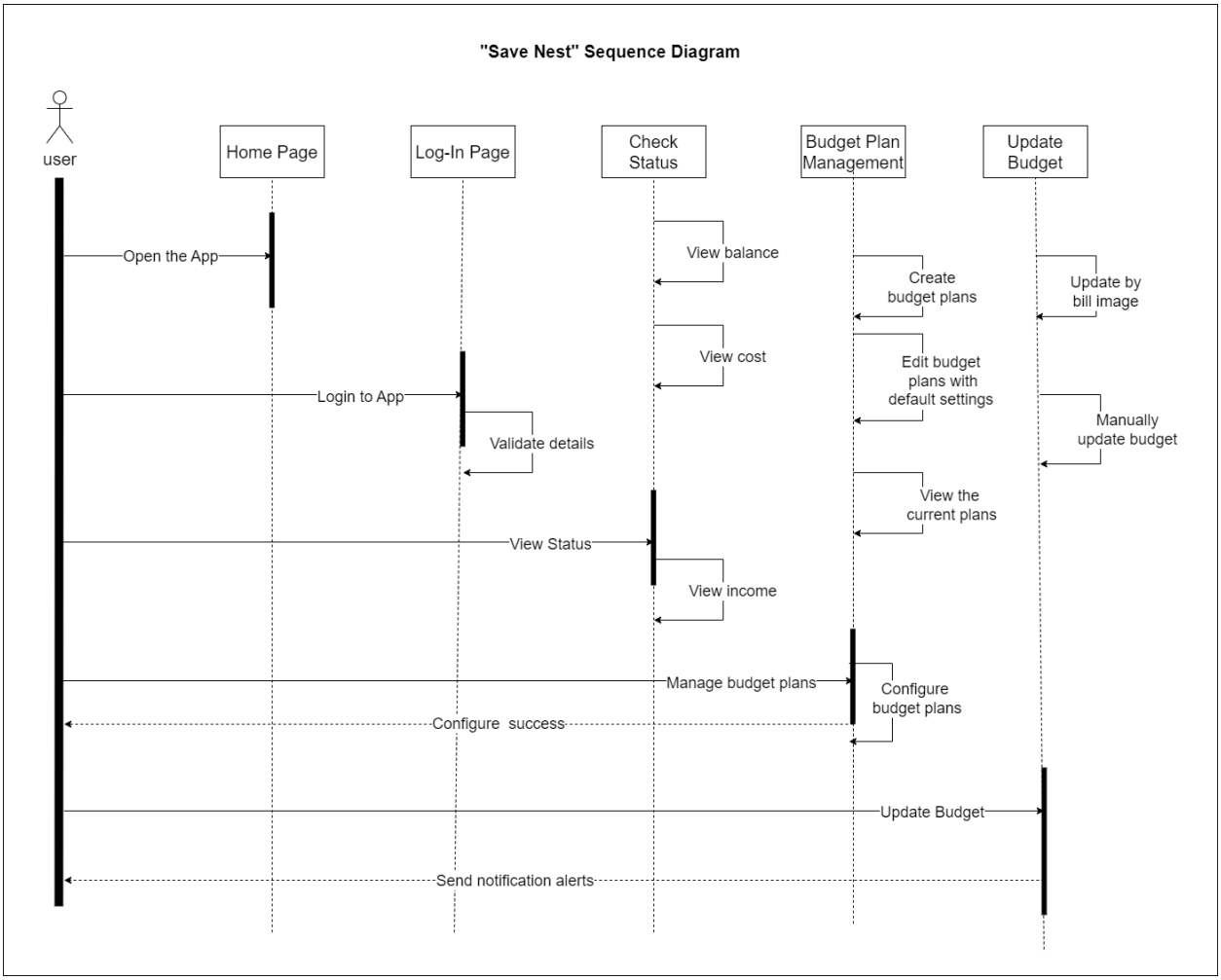


Figure 5: "Save Nest" Sequence Diagram

6.3.3. UI Design and mockups – des/high fidelity prototype

Refer Appendix C.1 for the High-fidelity prototype figures.

6.3.4. Activity Diagram

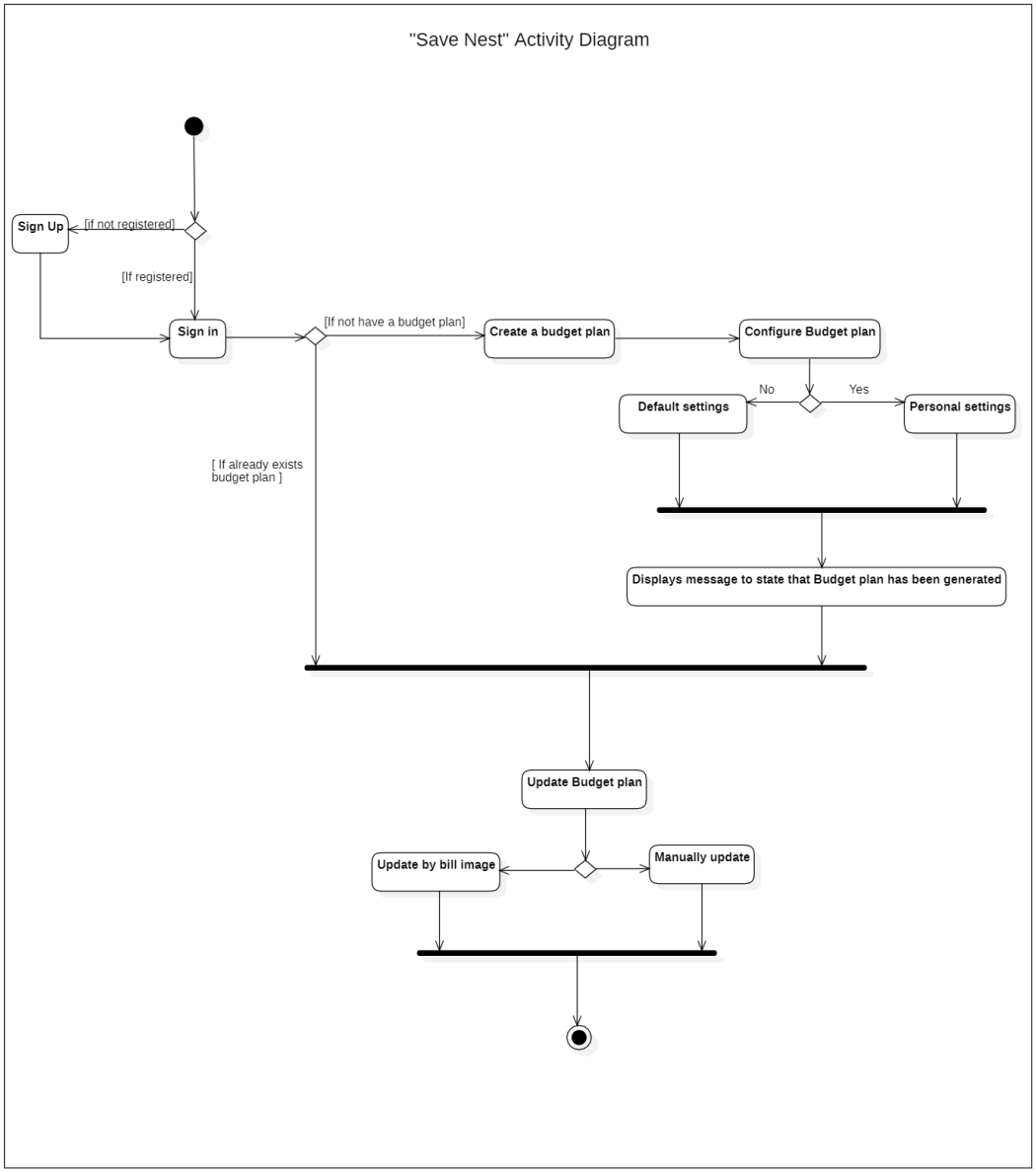


Figure 6: "Save Nest" Activity Diagram

6.4. Chapter Summary

The design features of the summarizer were reviewed in this chapter, which included the system architecture diagram, class diagram, sequence diagram, UI design, and activity diagram.

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Appendix

Appendix C.1.high fidelity prototype Figures.

Appendix C.1.1 Account login interface

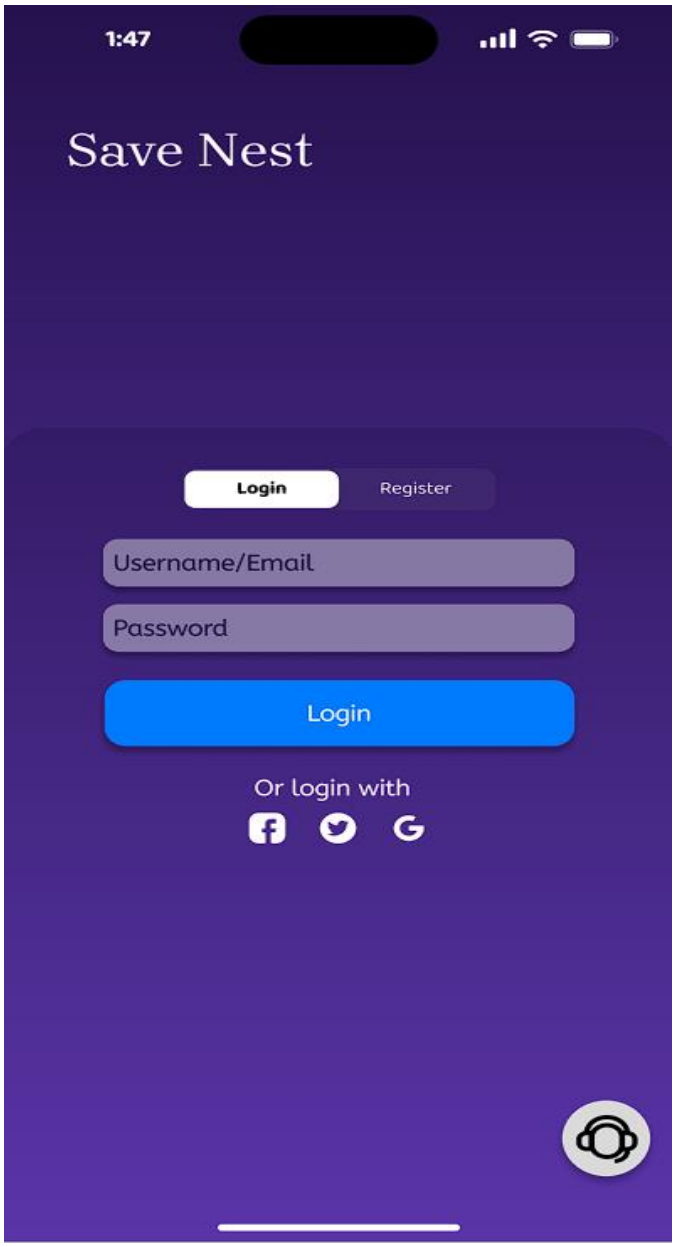


Figure 7: Account login interface

Appendix C.1.2 Account registration interface

Figure 8: Account registration interface

Appendix C.1.3 User profile interface

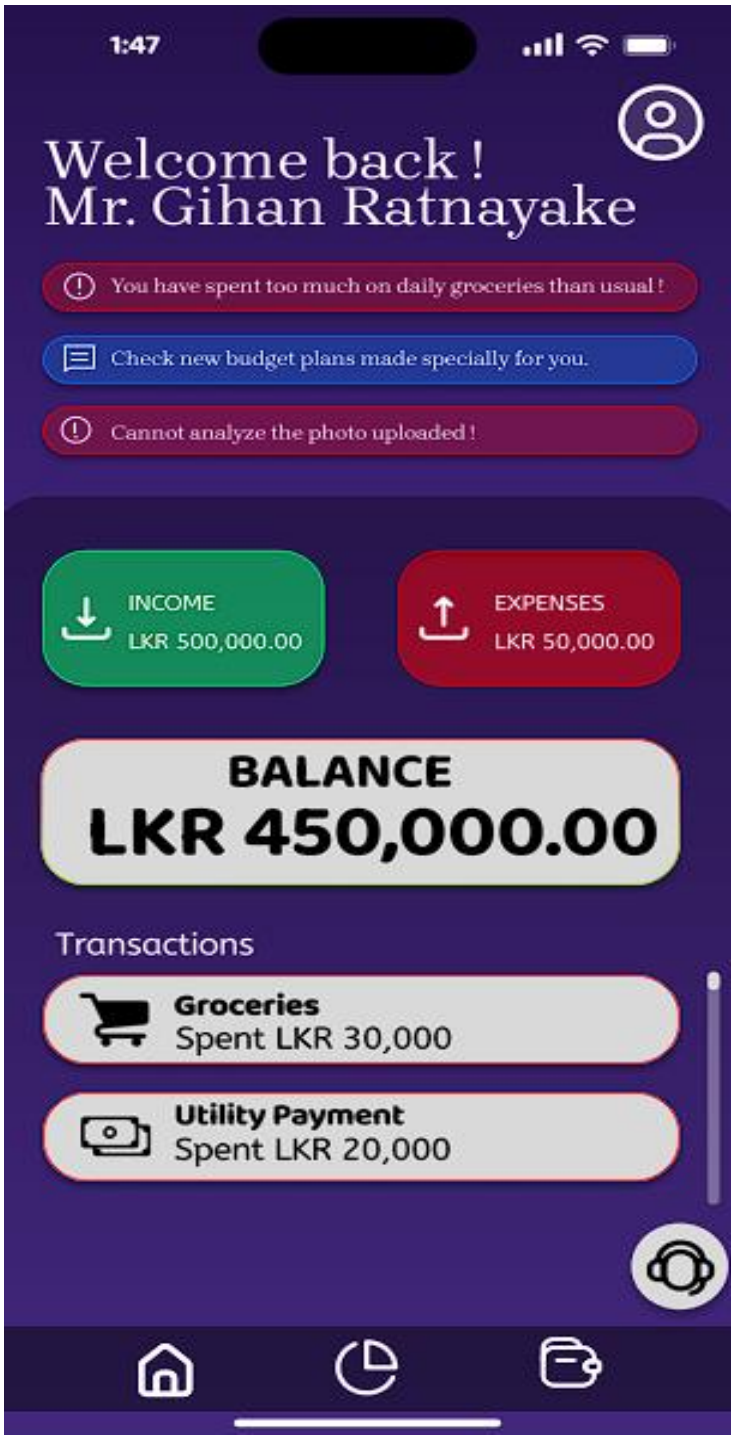


Figure 9: User profile interface

Appendix C.1.4 Budget Configuration Section

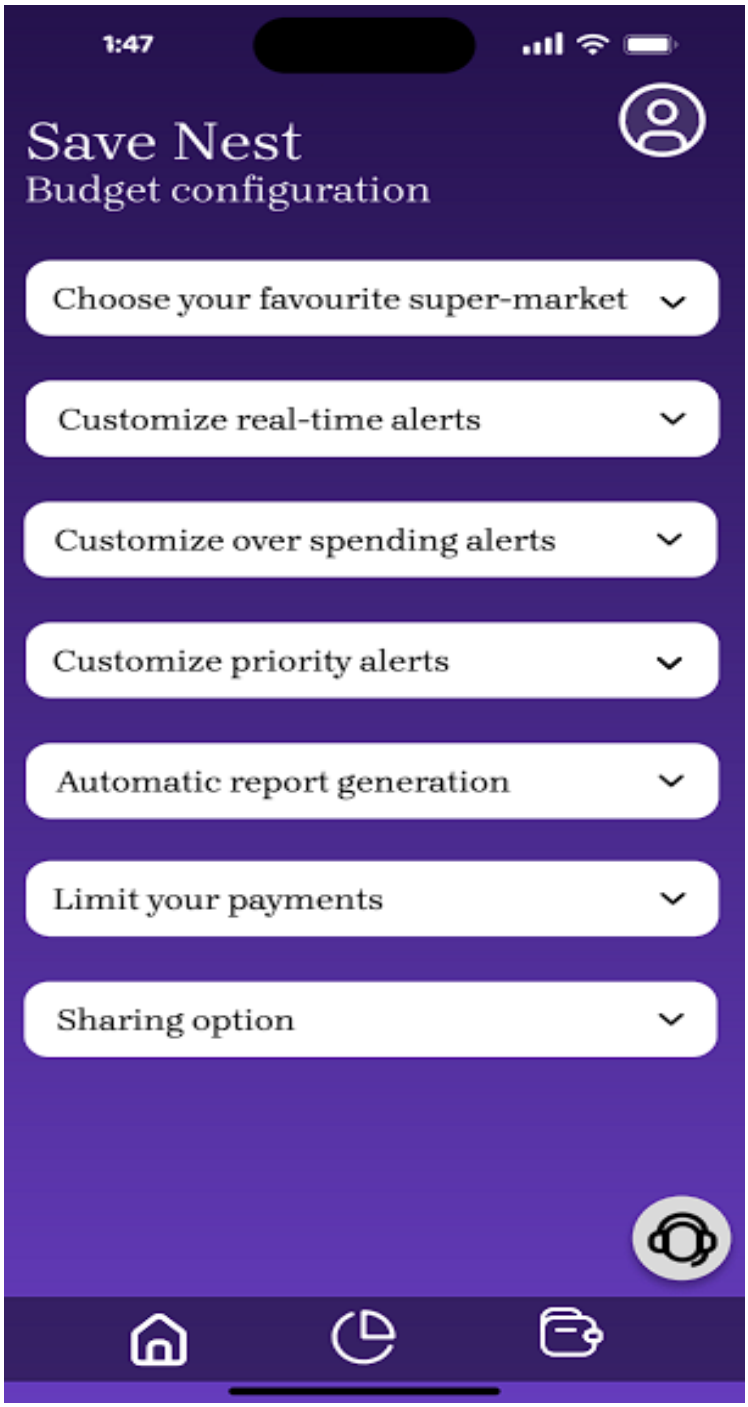
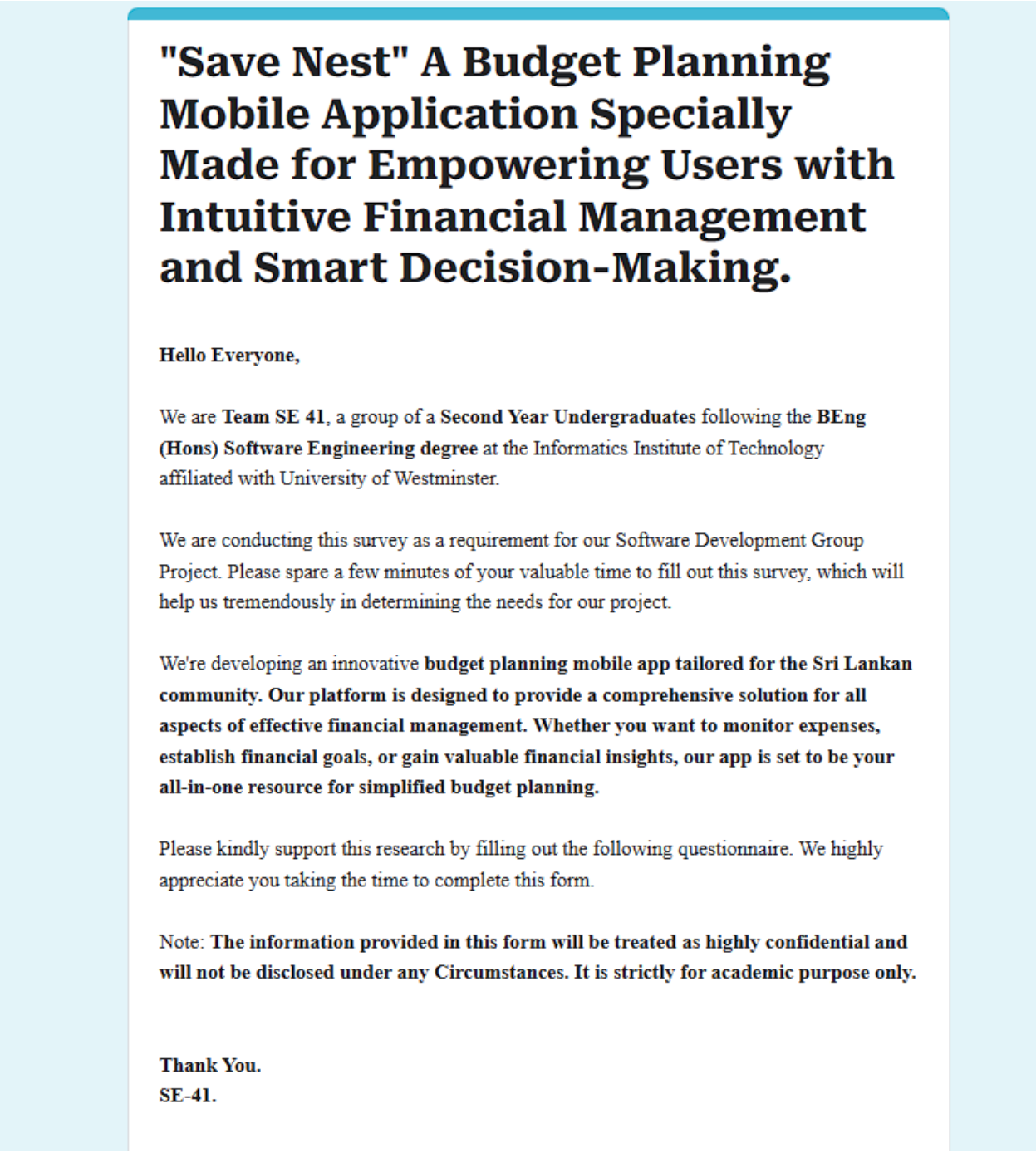


Figure 10: Budget Configuration Section

Appendix D.1. Screenshots of “Save Nest” Survey



"Save Nest" A Budget Planning Mobile Application Specially Made for Empowering Users with Intuitive Financial Management and Smart Decision-Making.

Hello Everyone,

We are **Team SE 41**, a group of a **Second Year Undergraduates** following the **BEng (Hons) Software Engineering degree** at the Informatics Institute of Technology affiliated with University of Westminster.

We are conducting this survey as a requirement for our Software Development Group Project. Please spare a few minutes of your valuable time to fill out this survey, which will help us tremendously in determining the needs for our project.

We're developing an innovative **budget planning mobile app tailored for the Sri Lankan community. Our platform is designed to provide a comprehensive solution for all aspects of effective financial management. Whether you want to monitor expenses, establish financial goals, or gain valuable financial insights, our app is set to be your all-in-one resource for simplified budget planning.**

Please kindly support this research by filling out the following questionnaire. We highly appreciate you taking the time to complete this form.

Note: **The information provided in this form will be treated as highly confidential and will not be disclosed under any Circumstances. It is strictly for academic purpose only.**

Thank You.
SE-41.

Are you a student? *

- (●) Yes
- ( ) No

What is your age range? *

- ( ) <18
- (●) 18-24
- ( ) 25-34
- ( ) 35-44
- ( ) 45-54
- ( ) 55+

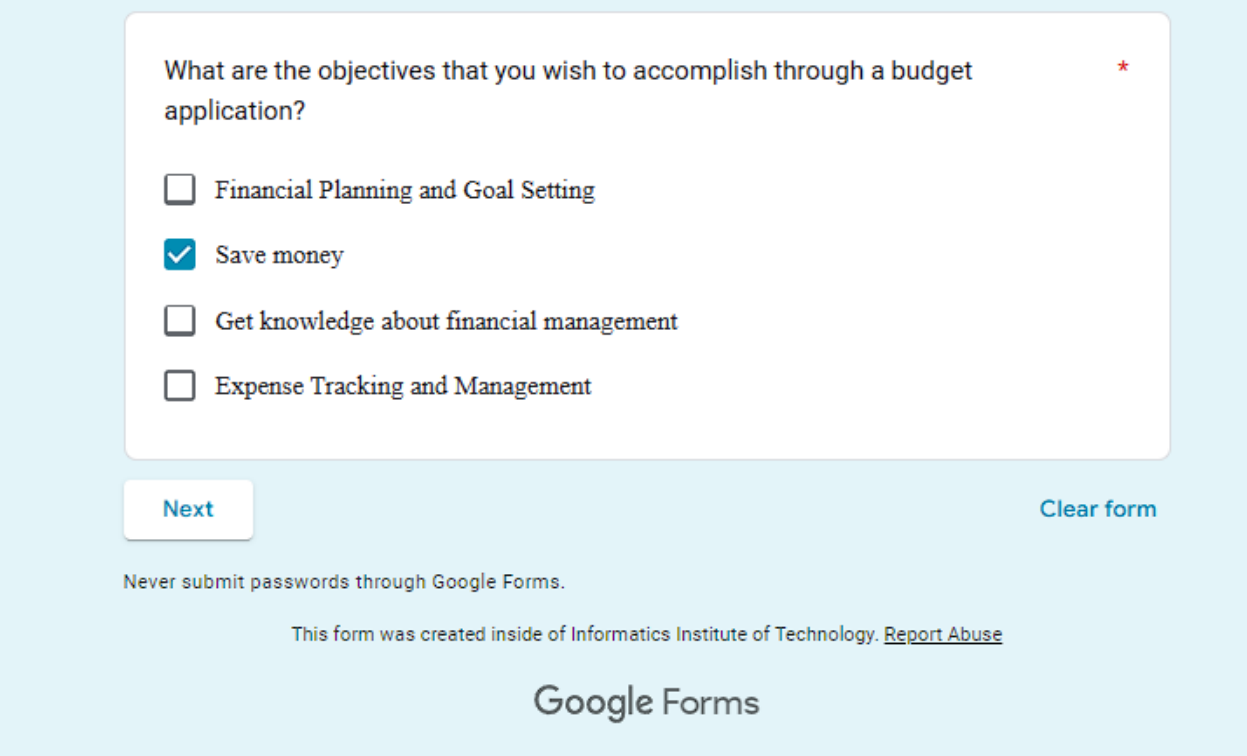
Are you currently using a budget planning application to manage your finances? *

- ( ) Yes
- (●) No

If not, are you using any other method such as maintaining a book for financial management?

- (●) Yes
- ( ) No

Clear selection


What are the objectives that you wish to accomplish through a budget application? *
Financial Planning and Goal Setting
Save money
Get knowledge about financial management
Expense Tracking and Management
Next
Clear form
Never submit passwords through Google Forms.
This form was created inside of Informatics Institute of Technology. Report Abuse
Google Forms

We will look at our app unique features.

Real-time price alerts using web-scraping (Feature 1).

Our application empowers users to select a merchant with an active online store where they regularly purchase goods. When the price of an item changes on that merchant's website, our application promptly sends a notification to the user, alerting them of the increase and suggesting that they adjust their budget plans, accordingly, taking into account the fluctuating economic landscape of the country.

Updating the spending by just getting a photo (Feature 2).

Many people find it tedious and time-consuming to manually update their budget plans with their spending. However, our application "Save Nest" simplifies this process by using machine learning algorithms to automatically update spending from photos of bills.

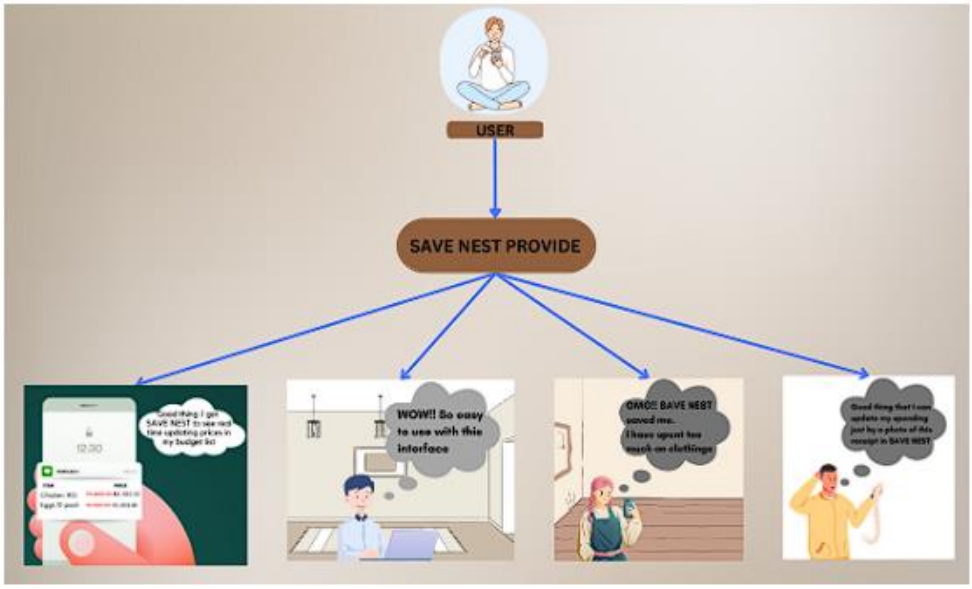
Priority alerts (Feature 3).

Our application requires users to define their spending priorities when creating a budget plan. For example, if a user lists education as their top priority, followed by clothing, the application will send an alert if the user exceeds their usual spending limit on clothing. This alert will remind the user of their more important financial obligations in the education category and include a motivational quote to encourage them to avoid overspending on lower priority items.

Future price predictions (Feature 4).

Our application conducts a thorough examination of the historical pricing data associated with user-selected items. Using advanced algorithms and data modeling techniques, the application generates predictive insights, offering users informed estimations of future price predictions for their chosen items.

Key features



Evaluate the unique features of the budget planning application and assess their effectiveness in helping you achieve your objectives. *

	Less Effective	Neutral	More Effective
Feature 1	◯	◯	◯
Feature 2	◯	◯	◯
Feature 3	◯	◯	◯
Feature 4	◯	◯	◯

How much do you spend on a daily basis? *

- ◯ Less than Rs.1000
- ◯ Rs.1000-2000
- ◯ Rs.2000-3000
- ◯ Above Rs.3000

Can you manage your expenses through your current financial management method?

- ◯ Yes
- ◯ No
- ◯ Maybe

Will you think this application will successfully overcome existing challenges that your current financial management method have? *

- ◯ Yes
- ◯ No
- ◯ Maybe

According to your view what features should we add to this application other than the ones mentioned above.

Your answer

Back Submit Clear form

Never submit passwords through Google Forms.