PES UNIVERSITY, Bengaluru
Department of Computer Science and Engineering
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UE21CS341A – Software Engineering

PROJECT REPORT
on

FOOD ALLERGY DETECTION APP

Submitted by : Team T12

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1. Project Proposal/Synopsis

Proposed Project Description

The proposed project, "Food Allergy detection App," introduces a creative mobile application designed to transform the way consumers make informed dietary choices daily . With a focus on enhancing personal health and nutrition awareness, Food Allergy detection App combines barcode scanning technology, ingredient analysis, and personalized dietary recommendations into a single with a vast database of dietary products and user-friendly platform . Food Allergy detection App is a mobile app that empowers users to make healthier food choices by providing real-time analysis of the ingredients in products they scan. This project aims to address the increasing demand for transparent and accessible nutritional information in a world where dietary preferences, allergies, and restrictions are diverse and complex.

Key Features:

1. Barcode Scanning: Users can simply scan the barcode of a food or beverage product using their smartphone's camera. Food Allergy detection App quickly identifies the product and retrieves its ingredient
information.

2. Ingredient Analysis: The app's robust database contains detailed information on ingredients, including nutritional content, allergens, additives, and more. Food Allergy detection App processes this data to
offer a comprehensive analysis of the scanned product.

3. Nutritional Insights: Users receive instant access to crucial nutritional information such as calories, macronutrients (carbohydrates, proteins, fats), vitamins, and minerals.

4. Personalized Recommendations: Food Allergy detection App goes a step further by considering each user's
dietary preferences, restrictions, and health goals. It provides personalized recommendations, suggesting alternative products that better align with the user's needs.

5. User Profiles: To enhance the user experience, the app offers user registration and login

features. This allows users to save their dietary profiles and preferences for future reference.

6. Intuitive User Interface: Food Allergy detection App boasts an intuitive and visually appealing user interface that
ensures a seamless experience for users of all backgrounds and technological expertise.

Plan of Work and Product Ownership

To accomplish the project goals, we will divide the work into several key areas, each with a designated team member responsible for its execution:

User Interface and Experience (UI/UX):

- Responsible Team Member: Dilip, Digvijay
- Tasks:
    - Design the user interface for the mobile application.
    - Create user-friendly and intuitive screens for scanning, profile management, and alerts.
    - Identify and report bugs and issues for resolution.

Backend Development:

- Responsible Team Member: Ramesh, Danish
- Tasks:
    - Design the database schema for storing allergen information and user data.
    - Implement the image recognition and natural language processing algorithms.
    - Implement data encryption and security measures.

2. Software Requirements Specification [SRS] with RTM

1. Introduction

1.1 Purpose

The purpose of this document is to provide a comprehensive overview of the food allergy detection app, its functionalities, external interfaces, non functional requirements, and other relevant information. It serves as a reference for the development team, stakeholders, and users, helping them understand the app's objectives and capabilities.

1.2 Intended Audience

Intended Audience: This document is intended for the development team, project managers, quality assurance professionals, and other stakeholders involved in the food allergy detection app project. It is also relevant to potential users and individuals interested in understanding the app's features and functionalities.

1.3 Product Scope

The food allergy detection app is designed to assist users with food allergies in making informed decisions about the safety of food products. It includes features for barcode scanning, product information retrieval, allergen detection, user profiles, and safety alerts. However, it does not provide medical advice or replace professional medical consultation. The app is available for iOS and Android platforms and requires an internet connection for certain functionalities

1.4 References

1. Android Application for Food Allergy Detection using Machine Learning Technique https://www.ijcrt.org/papers/IJCRT2008177.pdf
2. Product information, safe restaurants, and other helpful information at the ready https://www.verywellhealth.com/food-allergy-apps-to-help-keep-you-safe1324320

2. Overall Description

2.1 Product Perspective

The food allergy detection app is a standalone mobile application that utilizes barcode scanning and a database of product information to provide users with allergy-related information. In society most people are insecure about the food items they consume, they are concerned about the amount of fat, carbohydrates, sugar content etc they consume, which we try to resolve on the basis of the lifestyle of user and product ingredients.

2.2 Product Functions

• Barcode scanning to identify products.
• simple to use UI and free service.
• Retrieving product information from a database.
• Analyzing ingredients to check for allergens.
• Providing a safety recommendation (safe to use or not)

2.3 User Classes and Characteristics

• Users with food allergies.
• Individuals looking to make informed food choices.

2.4 Operating Environment

• Mobile devices (iOS and Android) with camera capabilities for barcode scanning.
• Internet connection for accessing the product database.

2.5 Design and Implementation Constraints

• Platform-specific limitations , as we are using flutter the minimum sdk version should be 7 .
• Database constraints: recently released products on the market might not be available on the user database .

2.6 Assumptions and Dependencies

• The availability of a reliable barcode scanner in order for checking into the database.
• The accuracy of product information in the database.
• User willingness to follow app recommendations.

3. External Interface Requirements

3.1 User Interfaces

• The main user interface for scanning barcodes and viewing results.
• Menu navigation and buttons for specific actions.
• Input forms for user preferences or settings.
• Notifications or alerts for allergy warnings.

3.2 Software Interfaces

• The smartphone camera application for barcode scanning.
• The database or server where product information is stored.
• API services used for retrieving data or updating the app.
• Integration with third-party software or libraries for barcode recognition and data processing

3.3 Communications Interfaces

• Internet communication protocols (e.g., HTTP, HTTPS) for accessing online databases or APIs.
• Data transfer formats (e.g., JSON, XML) used for exchanging information with external services.

3.4 Hardware Interfaces

• The smartphone camera for barcode scanning.
• Any external accessories (e.g., barcode scanners) if the app supports them.

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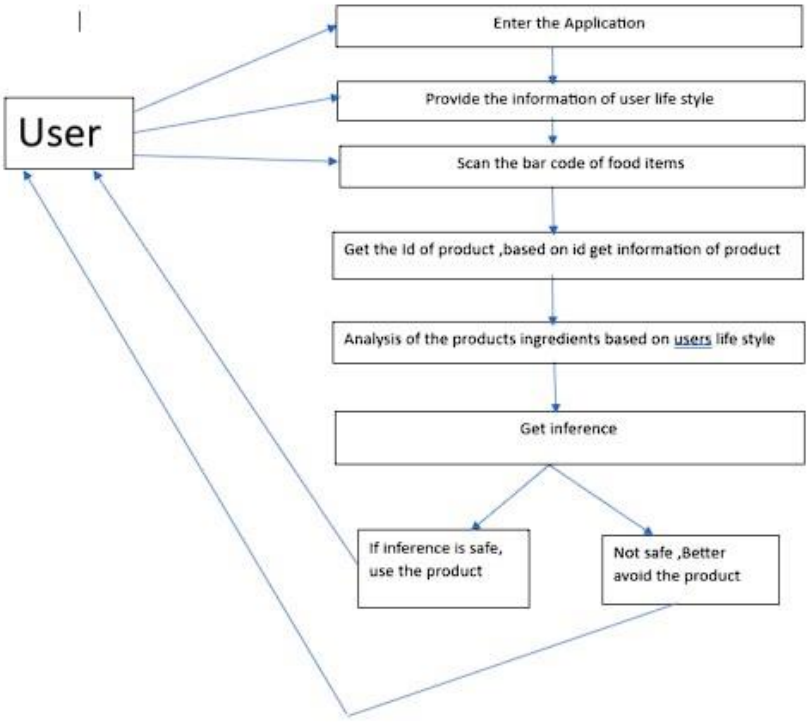
4. Analysis Models

Use Case diagram:



5. System Features

Barcode Scanning

5.1.1 Description and Priority

The app allows users to scan the barcode of a food product using their device's camera.

5.1.2 Stimulus/Response Sequences

As the user scans the barcode he shall see a box containing information that the product's barcode has been scanned

5.1.3 Functional Requirements

REQ-1: Capture barcode information.

REQ-2:Initiate product data retrieval.

REQ-3:Display product information on the screen

Product Information Retrieval

5.1.1 Description and Priority

The app retrieves detailed information about the scanned product from an external database.

5.1.2 Stimulus/Response Sequences

After the above scanning process, the user shall press on check for allergy button and get the final result from the database.

5.1.3 Functional Requirements

REQ-1: well defined and robust database

REQ-2:managing multiple requests and displaying accurate results like names

Allergen Detection

5.1.1 Description and Priority

The app analyses the product's ingredients to check for potential allergens.

5.1.2 Stimulus/Response Sequences

The user shall either be informed to use or discard the product based on the results of our analysis.

5.1.3 Functional Requirements

REQ-1: running the accurate calculations based on the specific user information

REQ-2:Generate a safety recommendation based on allergen detection

6. Other Nonfunctional Requirements

6.1 Performance Requirements

• The system shall respond to user requests within 2 seconds on average.

• It should support a concurrent user load of at least 1000 users without significant performance degradation.

• The system should be capable of handling a large database of food products and allergen information efficiently.

6.2 Safety Requirements

• The application must provide clear and accurate allergen information to prevent allergic reactions.
• It should include a safety feature to contact emergency services in case of a severe allergic reaction alert.
• The system should adhere to all relevant safety standards and regulations for food allergen information disclosure.

6.3 Security Requirements

• User data, including allergen profiles and scanning history, must be encrypted and securely stored.
• The application should implement secure authentication and authorization mechanisms.
• Regular security audits and penetration testing should be conducted to identify and address vulnerabilities.

6.4 Software Quality Attributes

• The software must maintain a high level of accuracy in allergen detection, with a minimum 95% success rate.
• The application should provide a seamless and intuitive user experience to ensure user satisfaction.
• It should be designed with modularity and extensibility in mind to facilitate future updates and enhancements.

6.5 Business Rules

- The product must be free fro all the users who just need to know about allergies
- We can have a premium tier for people who want to manage the allergies for their families

7. Other Requirements:

6.1 Regulatory Compliance:

- The system must comply with all relevant data privacy regulations, such as GDPR or HIPAA.
- It should adhere to food labelling regulations and standards established by relevant authorities.

6.2 Localization and Language Support:

- The application should support multiple languages to cater to a diverse user base.
- It must provide accurate allergen information for food products from different regions.

6.3 Data Backup and Recovery:

- Regular automated backups of user data and product information should be performed.
- The system should have a robust data recovery plan in case of data loss or system failure.

6.4 Scalability:

- The architecture should be designed to allow for easy scalability to accommodate a growing user base and expanding allergen databases.

6.5 User Training and Support:

- Provide user training materials and online support resources to help users effectively use the application.
- Establish a customer support system for addressing user inquiries and issues promptly

Appendix A: Glossary

Food Allergy Detection App:

- Definition: A mobile application designed to assist users with food allergies in making informed decisions about the safety of food products.

Barcode Scanning:

● Definition: The process of using a device's camera to capture the barcode information on a food product for further analysis.
Product Information Retrieval:
● Definition: The action of obtaining detailed information about a scanned food product from an external database.
Allergen Detection:
● Definition: The process of analyzing a product's ingredients to identify and check for potential allergens that may be harmful to users with food allergies.
Stakeholders:
● Definition: Individuals or groups, such as the development team, project managers, quality assurance professionals, and users, who have an interest in the food allergy detection app project.
User Interface (UI):
● Definition: The visual elements and interactions through which users interact with the food allergy detection app.
Functional Requirements:
● Definition: Specifications that describe the functions and features the food allergy detection app must have to meet its objectives.
Non-functional Requirements:
● Definition: Specifications that describe how well the system performs its functions, including performance, safety, security, and other quality attributes.
API (Application Programming Interface):
● Definition: A set of rules and tools that allows different software applications to communicate with each other.
SDK (Software Development Kit):
● Definition: A set of tools and libraries that developers use to create applications for specific software platforms.
Database:
● Definition: A structured collection of data that can be easily accessed, managed, and updated.
Assumptions:
● Definition: Statements that are considered true without direct evidence, forming the basis for the development and use of the food allergy detection app.
Dependencies:
● Definition: Factors or elements that the food allergy detection app relies on for its proper functioning.

Concurrent User Load:
● Definition: The number of users the system can handle simultaneously without significant performance degradation.
GDPR (General Data Protection Regulation):
● Definition: A regulation in EU law on data protection and privacy for all individuals within the European Union and the European Economic Area.
HIPAA (Health Insurance Portability and Accountability Act):
● Definition: A U.S. law that provides data privacy and security provisions for safeguarding medical information.
Localization:
● Definition: Adapting the food allergy detection app to meet the language and cultural requirements of a specific region or audience.
Scalability:
● Definition: The ability of the system to handle a growing amount of work or its potential to be enlarged to accommodate that growth.
User Training and Support:
● Definition: Providing resources and assistance to users to help them effectively use the food allergy detection app.
Data Backup and Recovery:
● Definition: The process of regularly saving copies of data to prevent loss and having a plan in place to restore data in case of loss or system failure.

Appendix B: Field Layouts

Field	Description	Type	Validation	Required
Barcode	Unique identifier on the product	Alphanumeric	Valid barcode format	Yes
Product Name	Name of the food product	Text	Length <= 255	Yes
Ingredients	List of ingredients in the product	Text	Length <= 1000	Yes
Allergen Information	Detected allergens in the product	Text	N/A	Yes
Safety Recommendation	App's recommendation for usage	Text	N/A	Yes
User Profile	Information about the app user	User Object	N/A	Yes
User Preferences	Custom settings chosen by the	Text or Boolean	N/A	No

REPORT REQUIREMENTS:

Report	Description	Data Source	Filters	Format	Delivery Method
Allergen Detection Report	Details of allergens detected	App Database	User, Product	PDF	In-App Notification
User Activity Report	User's scanning and usage history	App Logs	Date Range	Excel	Email Attachment

Requirement ID	Field/Functionality/Attribute	Design Element	Test Case	Remarks
REQ-1	Barcode Scanning	UI Component	TC-001	
REQ-2	Product Information Retrieval	Database Query	TC-002	
REQ-3	Allergen Detection	Algorithm	TC-003	
REQ-4	User Interface	UI Design	TC-004	
REQ-5	Internet Connection	Networking	TC-005	
REQ-6	Performance Response Time	Performance	TC-006	
REQ-7	Safety Feature	Emergency Call	TC-007	
REQ-8	Data Encryption	Security	TC-008	
REQ-9	Language Support	Localization	TC-009	
REQ-10	Data Backup and Recovery	Backup System	TC-010	
REQ-11	Scalability	System Architecture	TC-011	
REQ-12	User Training and Support	Help Resources	TC-012	
REQ-13	Regulatory Compliance	Compliance Checks	TC-013	
REQ-14	Premium Tier	Subscription System	TC-014	

3. Project Plan with Gantt Chart (Baseline)

Life-cycle followed

Agile Development

Justification:

Iterative Development: Agile allows for iterative development, enabling us to do changes in requirements,

Iterative Development: Agile lets us build the app step by step, so if we need to change something, it's

Easier

Collaboration and Communication: Agile is like having a conversation with our customers throughout the project. We talk frequently in short bursts, making sure we're on the right track. It's like a continuous chat, ensuring we're building exactly what they want.

Risk Management: With Agile, we tackle problems early. It's like fixing a leak in a boat right away instead of waiting for it to sink. By dealing with issues as they come, we ensure a smoother journey to the final destination.

Continuous Improvement: Agile is all about getting better as we go. It's like fine-tuning a recipe each time we cook. We look back regularly, see what worked well, and make small adjustments for an even tastier result.

Tools Used for this Project

Agile Project Management: Jira for sprint planning, backlog management, and task tracking.

Design Tools: figma for collaborative UI/UX design.

Version Control: Git for source code versioning and collaboration.

Development Tools: Visual Studio Code for coding and flutter for app development.

Bug Tracking: Jira for tracking and managing bugs.

Testing Tools: flutter driver

Deliverables classified as reuse/build components

Reusable Components: Barcode Scanner Widget to detect the products , Optical Character Recognition (OCR) to upload Ingredients to defined Database

Authentication Module: A secure and reusable module for user authentication.

Database Integration Module: A flexible module for integrating with different databases.

Build Components:

UI Components: Project-specific UI components designed for the food allergy scanner app.

Allergy Detection Algorithm: Custom-built algorithm for scanning and identifying allergens (Ingredients), tailored

to the app's needs.

(Feedback Module: App-specific module for user feedback and issue reporting.)// if we are taking feed back

Justification:

Reusable components provide a foundation for future projects, enhancing efficiency.

Build components are project-specific and form the unique functionalities of the food allergy scanner app.

Work Breakdown Structure

Sprint 1: Project Setup and Planning (2 weeks)

- Set up project environment and tools
- Define user stories and create the product backlog
- Sprint planning for the first iteration

Sprint 2-4: Core Functionality (6 weeks)

- Implement user authentication and database integration
- Develop the core algorithm for allergy detection
- Conduct regular sprint reviews and retrospective

Sprint 5-7: User Interface (UI) Development (6 weeks)

- Create and implement project-specific UI components
- User testing on UI components
- Iterate based on feedback from each sprint

Sprint 8-9: Feedback and Bug Tracking (4 weeks)

- Develop the user feedback module
- Integrate bug tracking tools for efficient issue resolution

Sprint 10-12: Integration and Testing (6 weeks)

- Integrate all developed modules and functionalities
- Conduct comprehensive testing, including unit, integration, and system testing

Sprint 13-14: Documentation and Deployment (4 weeks)

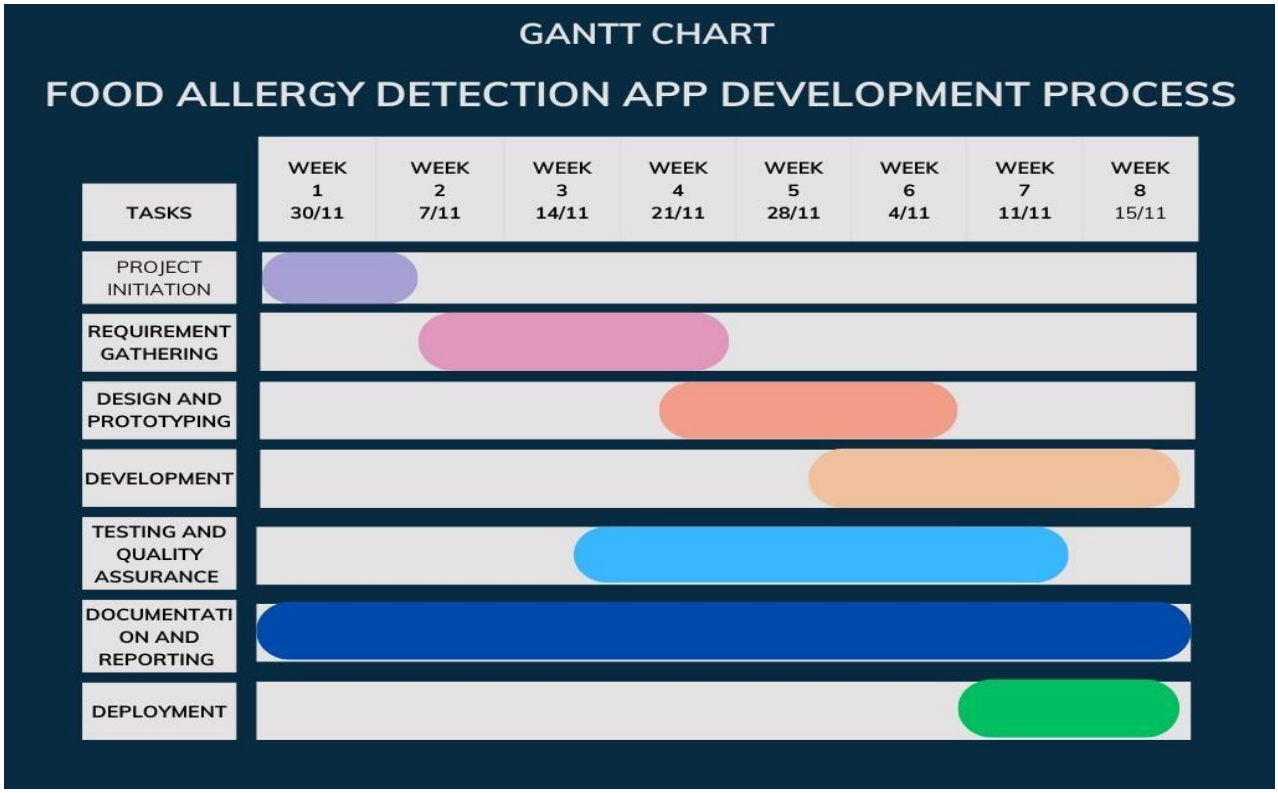
- Document code and system functionalities
- Deploy the app to app store

Effort Estimation (in person-months)

Project Setup and Planning	2	0.646
Core Functionality	6	1.938
UI Development	6	1.938
Task	**Estimated Duration (weeks)**	**Estimated Effort (person-months)**
Feedback and Bug Tracking	4	1.292
Integration and Testing	6	1.938
Documentation and Deployment	4	1.292
Total	**28 weeks**	**8.044 person-months**

Gantt Chart

Create a Gantt Chart for scheduling using any scheduling tool


GANTT CHART
FOOD ALLERGY DETECTION APP DEVELOPMENT PROCESS
TASKS
WEEK 1 30/11
WEEK 2 7/11
WEEK 3 14/11
WEEK 4 21/11
WEEK 5 28/11
WEEK 6 4/11
WEEK 7 11/11
WEEK 8 15/11
PROJECT INITIATION
REQUIREMENT GATHERING
DESIGN AND PROTOTYPING
DEVELOPMENT
TESTING AND QUALITY ASSURANCE
DOCUMENTATION AND REPORTING
DEPLOYMENT

4. Architecture & Design Choices and Diagrams

Diagrams of Levels of DFD
Level 0 DFD (Context Diagram):

Processes: External Entity (User), Process (Food Allergy Detection System), External Entity (Product
Database)
Data Flows: Barcode Data, Product Information, Allergy Data, Safe/Unsafe Product Notification
Data Stores: None in the context diagram

Level 1 DFD:
Processes: Barcode Scanning, Extract Ingredients, Evaluate Allergy Data, Notify User
Data Flows: Barcode Data, Product Information, Ingredients Data, Allergy Data, User Lifestyle Data,
Safe/Unsafe Product Notification
Data Stores: Product Database, Allergy Database, User Profile

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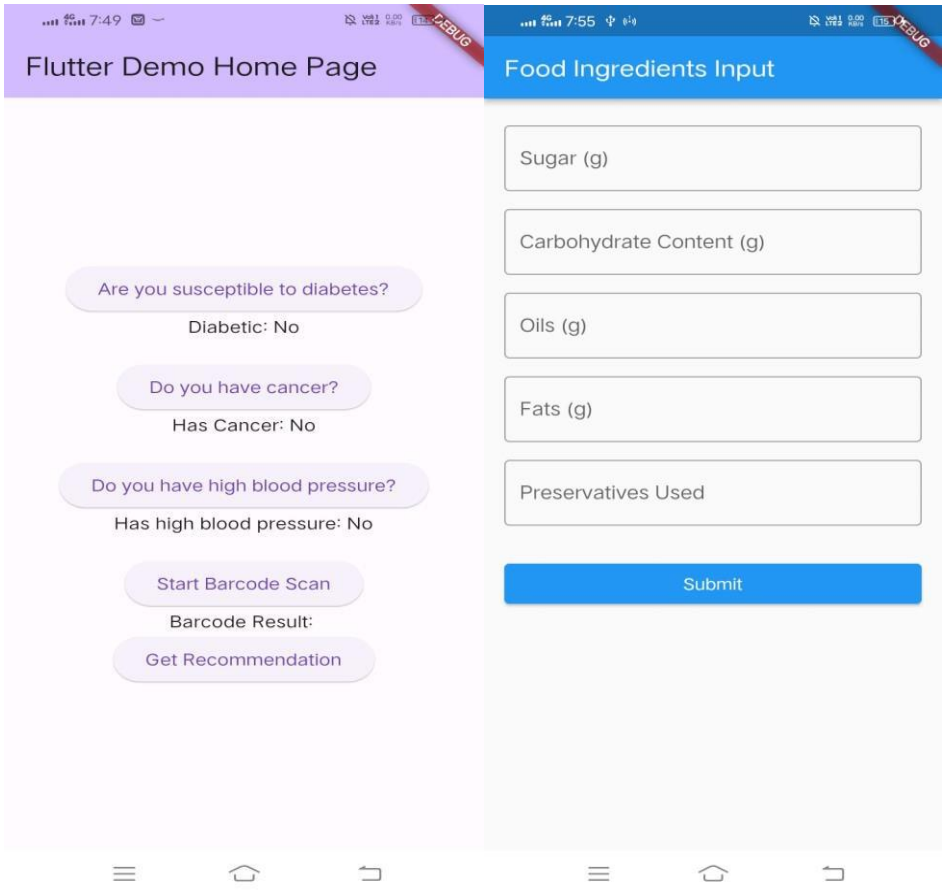
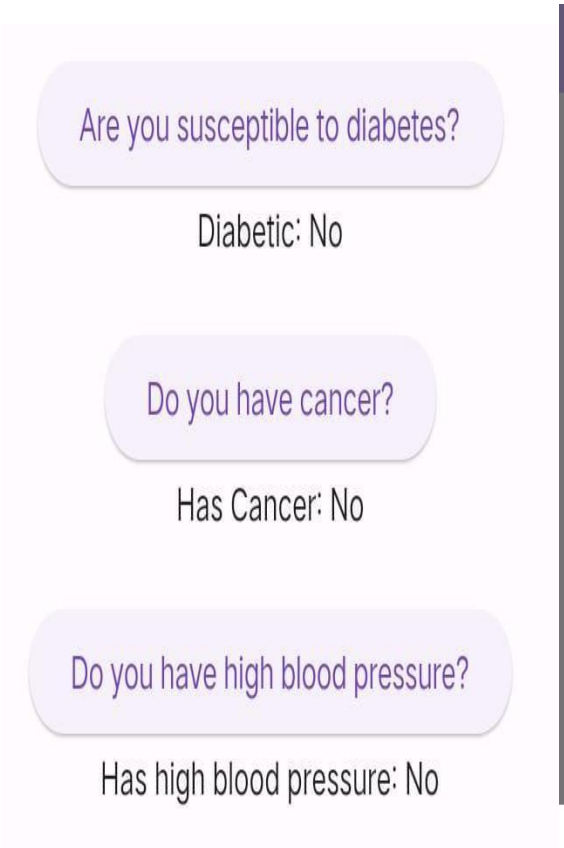
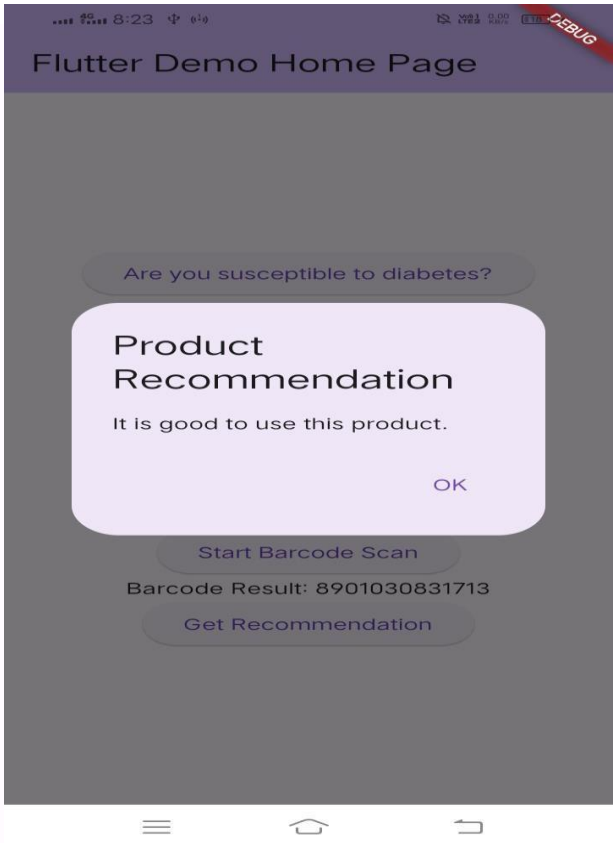
Architectural Design
The architectural design can follow a client-server model where the mobile app acts as a client and communicates with a server that hosts the database and processing logic.
This can ensure scalability and easier maintenance



USER VIEW **ADMIN UPLOADING ITEMS**





UPDATING THE LIFE-STYLE **NOTHING RECOMMENDATIONS**

UML

• **Objects**: User, Barcode Scanner, Product Database, Ingredient Extractor, Allergy Data, Notification System

• I**nteractions**:

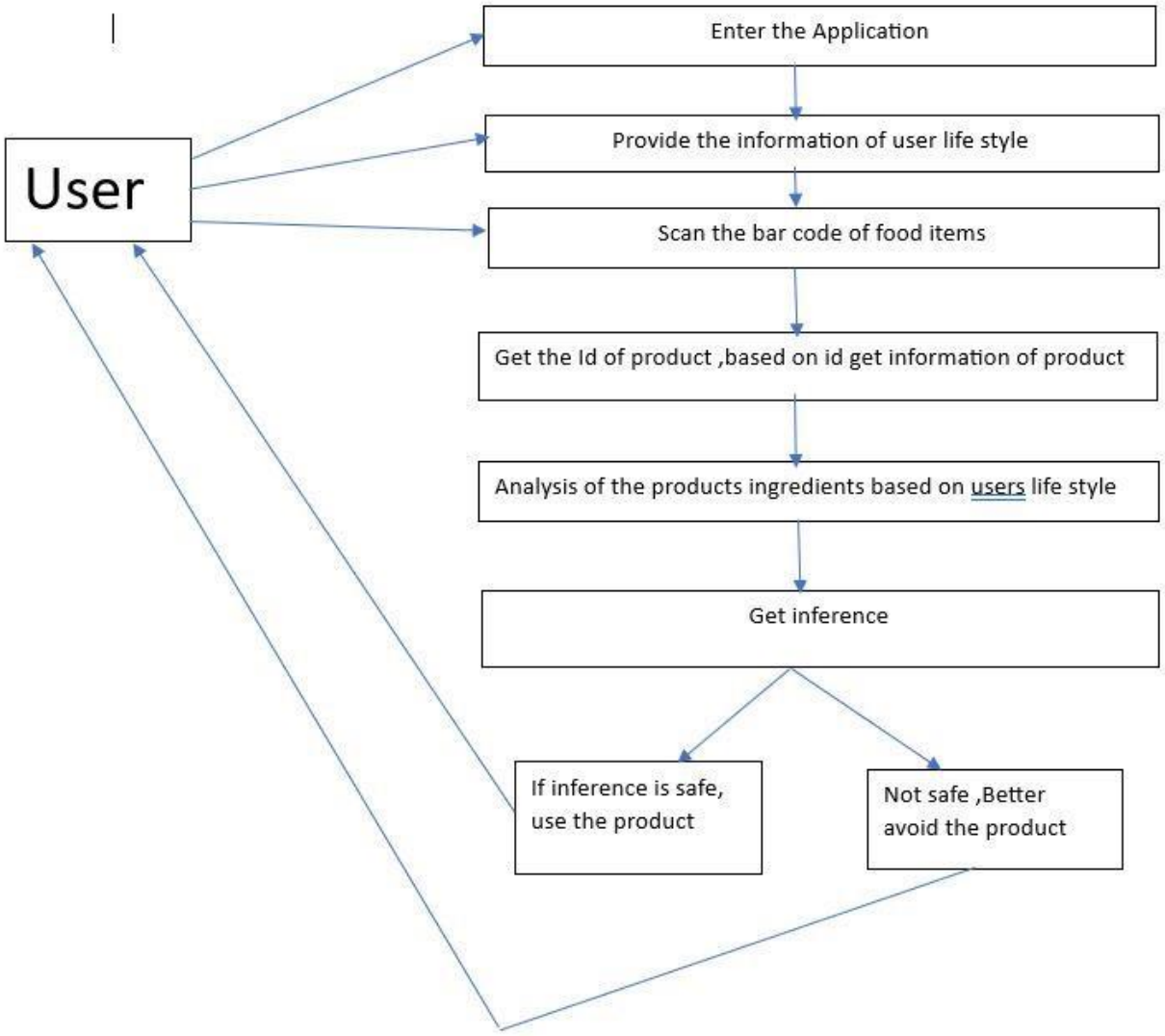
1. User initiates the scanning process.
2. Barcode Scanner sends a request to Product Database to retrieve product information.
3. Product Database queries the database and returns product details.
4. Ingredient Extractor extracts ingredients from the product information.
5. Allergy Data checks the ingredients against the user's allergy information.
6. Notification System sends a notification to the user about the product's safety.

Use Case Diagram

Actors: User

Use Cases: Scan Barcode, View Product Information, Set User Profile, Receive

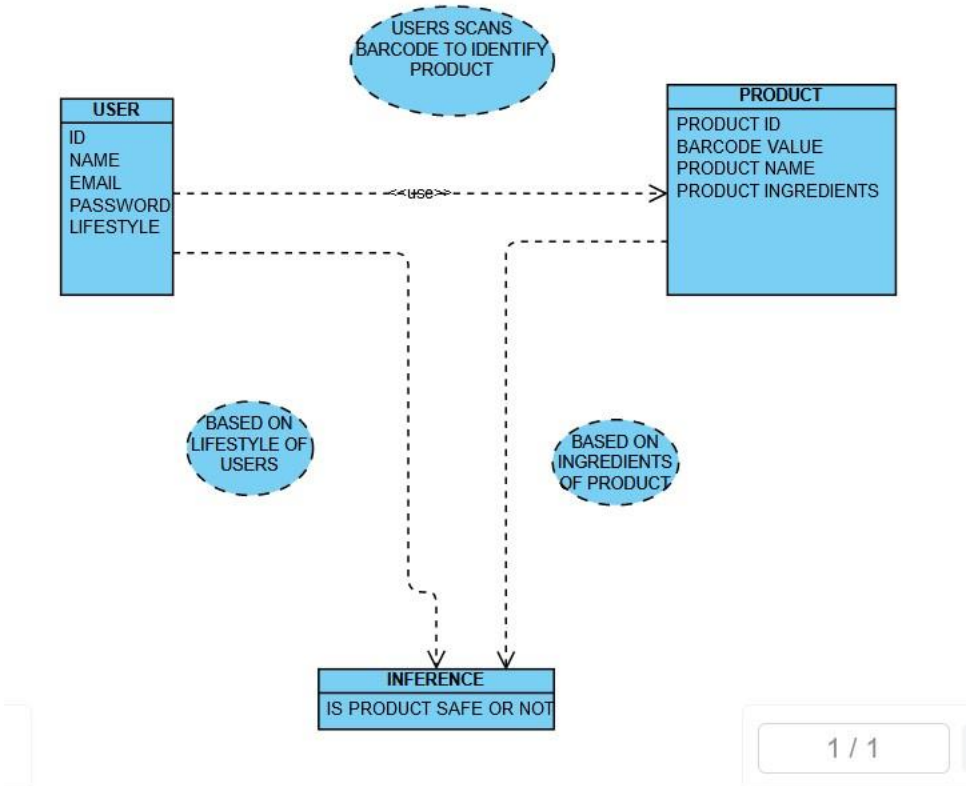
Safe/Unsafe Product Notification



Class Diagram

Classes: User, Product, Barcode Scanner, Ingredient Extractor, Allergy Data, Lifestyle Data

Attributes: User (ID, Name, Age, Allergies), Product (Barcode, Name, Ingredients), Barcode Scanner (Methods for scanning), Ingredient Extractor (Methods for extracting ingredients), Allergy Data (Allergy information), Lifestyle Data (User lifestyle information)



5. Development - Code Files [Git link]

https://github.com/dilipharish/food_allergy_detection_app_v1

6. Test Plans

Test Case Template								
TestCaseId	**TITLE**	**Functionality**	**Pre-requisites**	**Test Steps**	**Test Data**	**Expected Result**	**Actual Result**	**Status**
T-0101	BARCODE SCANNING	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	App is Launched	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode: 890149909661	Scan barcode: 890149909661	Scan barcode: 890149909661	Pass
T-0201	Product Information Retrieval	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	1.App is Launched 2.User has scanned the product barcode	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode: 890149909661	Barcode Result: 890149909661,Product: Corn Flakes	Barcode Result: 890149909661,Product: Corn Flakes	Pass
T-0301	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his allergies	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode : 8901030922787,Diabetic: Yes,Cancer: No,High Blood Pressure:No	Recommendation:It is better to avoid Kissan jam miked fruit	Recommendation:It is better to avoid Kissan jam miked fruit	Pass
T-0401	User Interface	verify if the ui works properly under different orientations of the screen	1.App is Launched 2.auto rotate is turned on	1.Launch the app 2.open in Portrait Mode	Device - 01 (Redmi 10 Prime) Portrait Mode	Should Run without Overflow Error	Running Without Any Error	Pass
T-0501	Internet Connection	verify if the application works under different network strengths	Internet connectivity should be established	On Scanning Barcode Product should be identified	Barcode Result: Product Result:	Barcode Result: 8901499009661,Product Result:Cron Flakes,Wifi: V2029,IPV4: 192.168.70.180	Barcode Result: 8901499009661,Product Result:Cron Flakes,Wifi: V2029	Pass

T-0601	Device Compatibility	verify if the app works on different mobile devices , different versions of android and ios	1.App is installed	1.Launch the app	Device - 01 (Rameshwar) Android 13	App Should Launch Successfully, without any restrictions, provide developer option enabled,in respective device	App Launched Succesfully	Pass	
T-0701	Scalability	verify if the application classifies the product based on the users symptoms	App is Launched and multiple users connected to the application at the same time	1.Launch the app and get results	Devices Connected - 03	Should support synchronization of product data	Supported synchronization of product data	Pass	
T-0801	User Training and Support	verify if the application classifies the product as not in database and reporting to the admin	App is Launched User connected to the internet	1.scan the product 2.choose your symptoms 3.select get recommendation button	Product scanned -01 Report to admin	Barcode: 8901571001415,Report To Admin Message should PopUp, Recommendation:Product Not Found in Database	Barcode: 8901571001415,Report To Admin Message should PopUp, Recommendation:Product Not Found in Database	Pass	

7. Test Cases and Test Results Matrix – including Screenshots of Inputs and Resulting Outputs of Execution of Test Cases

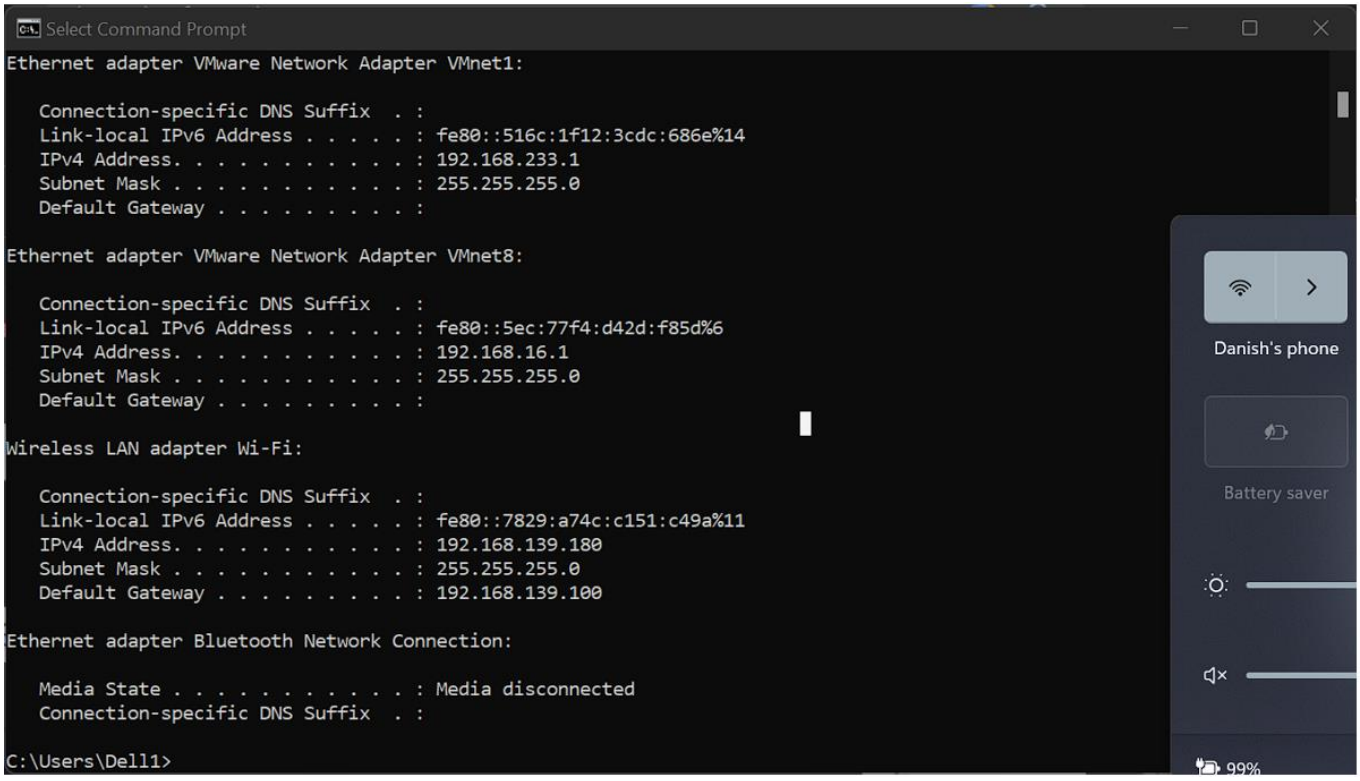
				Test Case Template					
TestCaseId	TITLE	Functionality	Pre-requisites	Test Steps	Test Data	Expected Result	Actual Result	Status	Test Executed By
REQ-1	BARCODE SCANNING	verify when a user scans a barcode the app recognises it and then gives out the barcode Id							
T-0101	BARCODE SCANNING	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	App is Launched	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode:890149909661	Scan barcode:890149909661	Scan barcode:890149909661	Pass	Tester S
T-0102	BARCODE SCANNING	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	App is Launched	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode :7622201756697	Scan barcode :7622201756697	Scan barcode :7622201756697	Pass	Tester S
T-0103	BARCODE SCANNING	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	App is Launched	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode :8902080404117	Scan barcode :8902080404117	Scan barcode :8902080404117	Pass	Tester S
T-0104	BARCODE SCANNING	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	App is Launched	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode:8901058890709	Scan barcode:8901058890709	Scan barcode:8901058890709	Pass	Tester S
T-0105	BARCODE SCANNING	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	App is Launched	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode :8902080000227	Scan barcode :8902080000227	Scan barcode :8902080000227	Pass	Tester S
REQ-2	PRODUCT INFORMATION RETRIEVAL	verify when a user scans a barcode the app recognises it and then gives out the Product information							
T-0201	Product Information Retrieval	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	1.App is Launched 2.User has scanned the product barcode	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode:890149909661	Barcode Result:890149909661,Product: Corn Flakes	Barcode Result:890149909661,Product: Corn Flakes	Pass	Tester S
		verify when a user scans a	1.App is Launched	1.Open the application					
T-0202	Product Information Retrieval	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	1.App is Launched 2.User has scanned the product barcode	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode :7622201756697	Scan barcode :7622201756697,Product :Oreo	Scan barcode :7622201756697,Product :Oreo	Pass	Tester S
T-0203	Product Information Retrieval	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	1.App is Launched 2.User has scanned the product barcode	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode :8902080404117	Scan barcode :8902080404117,Product:No Product	Scan barcode :8902080404117,Product:No Product	Pass	Tester S
T-0204	Product Information Retrieval	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	1.App is Launched 2.User has scanned the product barcode	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode :8901058904772	Scan barcode :8901058904772,Product:Kit Kat	Scan barcode :8901058904772,Product:Kit Kat	Pass	Tester S
REQ-3	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms							
T-0301	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode :8901030922787,Diabetic:Yes,Cancer:No,High Blood Pressure:No	Recommendation:It is better to avoid Kissan jam miked fruit	Recommendation:It is better to avoid Kissan jam miked fruit	Pass	Tester S
T-0302	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode :8901030922787,Diabetic:No,Cancer:Yes,High Blood Pressure:No	Recommendation:It is better to avoid Kissan jam miked fruit	Recommendation:It is better to avoid Kissan jam miked fruit	Pass	Tester S
T-0303	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode :8901030922787,Diabetic:No,Cancer:No,High Blood Pressure:No	Recommendation:It is Good to Use Kissan jam miked fruit	Recommendation:It is Good to Use Kissan jam miked fruit	Pass	Tester S

T-0304	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode :8901499009661,Diabetic:Yes,Cancer:Yes,High Blood Pressure:Yes	Recommendation:It is Good to Use Corn Flakes	Recommendation:It is Good to Use Corn Flakes	Pass	Tester S
T-305	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode : 8901491361026,Diabetic:No,Cancer:No,High Blood Pressure:No	Recommendation:It is better to avoid Kurkure_Masala_Munch	Recommendation:It is better to avoid Kurkure_Masala_Munch	Pass	
T-306	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode : 8901058904772,Diabetic:Yes,Cancer:No,High Blood Pressure:No	Recommendation:It is better to avoid Kit Kat	Recommendation:It is better to avoid Kit Kat	Pass	
T-307	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode : 8901058904772,Diabetic:No,Cancer:No,High Blood Pressure:No	Recommendation:It is better to avoid Kit Kat	Recommendation:It is better to avoid Kit Kat	Pass	
T-308	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode : 8901058890709,Diabetic:No,Cancer:Yes,High Blood Pressure:No	Recommendation:It is better to avoid Maggi	Recommendation:It is better to avoid Maggi		
REQ-4	User Interface	verify if the ui works properly under different orientations of the screen							
T-0401	User Interface	verify if the ui works properly under different orientations of the screen	1.App is Launched 2.auto rotate is turned on	1.Launch the app 2.open in Portrait Mode	Device - 01 (Redmi 10 Prime) Portrait Mode	Should Run without Overflow Error	Running Without Any Error	Pass	Tester S
T-0402	User Interface	verify if the ui works properly under different orientations of the screen	1.App is Launched 2.auto rotate is turned on	1.Launch the app 2.open in Portrait Mode	Device - 01 (Redmi 10 Prime) Landscape Mode	Should Run without Overflow Error	Running Without Any Error	Pass	Tester S
T-0403	User Interface	verify if the ui works properly under different orientations of the screen	1.App is Launched 2.auto rotate is turned on	1.Launch the app 2.open in Portrait Mode	Device - 02 (V2029) Portrait mode	Should Run without Overflow Error	Running Without Any Error	Pass	Tester S
T-0404	User Interface	verify if the ui works properly under different orientations of the screen	1.App is Launched 2.auto rotate is turned on	1.Launch the app 2.open in Portrait Mode	Device - 02(2029) Landscape Mode	Should Run without Overflow Error	Running Without Any Error	Pass	Tester S
REQ-5	Internet Connection	verify if the application works under different network strengths	Internet connectivity should be established	On Scanning Barcode Product should be identified	Barcode Result: Product Result:				Tester S
T-0501	Internet Connection	verify if the application works under different network strengths	Internet connectivity should be established	On Scanning Barcode Product should be identified	Barcode Result: Product Result:	Barcode Result:8901499009661,Product Result:Cron Flakes,Wifi:V2029,IPV4:192.168.70.180	Barcode Result:8901499009661,Product Result:Cron Flakes,Wifi:V2029	Pass	
T-0502	Internet Connection	verify if the application works under different network strengths	Internet connectivity should be established	On Scanning Barcode Product should be identified	Barcode Result: Product Result:	Barcode Result:8901491503037,Product Result:Lays_American,Wifi:Danish	Barcode Result:8901491503037,Product Result:Lays_American,Wifi:Danis	Pass	
T-0503	Internet Connection	verify if the application works under different network strengths	Internet connectivity should be established	On Scanning Barcode Product should be identified	Barcode Result: Product Result:	Barcode Result:8901491503037,Product Result:Lays_American,Wifi:Pesu-Element Block,IPV4:10.20.201.23	Program got Crashed,Error : Network is Unreachable	Failed	
REQ-6	Device Compatibility	verify if the app works on different mobile devices , different versions of android and ios							
T-0601	Device Compatibility	verify if the app works on different mobile devices , different versions of android and ios	1.App is installed	1.Launch the app	Device - 01 (Rameshwar) Android 13	App Should Launch Successfully,without any restrictions,provide developer option enabled,in respective device	App Launched Succesfully	Pass	Tester S
T-0602	Device Compatibility	verify if the app works on different mobile devices , different versions of android and ios	1.App is installed	1.Launch the app	Device - 02(Danish) Android 12	App Should Launch Successfully,without any restrictions,provide developer option enabled,in respective device	App Launched Succesfully	Pass	Tester S
T-0603	Device Compatibility	verify if the app works on different mobile devices , different versions of android and ios	1.App is installed	1.Launch the app	Device - 03 Android 10	App Should Launch Successfully,without any restrictions,provide developer option enabled,in respective device			Tester S
T-0604	Device Compatibility	verify if the app works on different mobile devices , different versions of android and ios	1.App is installed	1.Launch the app	Device - 04 Android 09	App Should Launch Successfully,without any restrictions,provide developer option enabled,in respective device			Tester S
T-0605	Device Compatibility	verify if the app works on different mobile devices , different versions of android and ios	1.App is installed	1.Launch the app	Device - 05 Ios	App Should Launch Successfully,without any restrictions,provide developer option enabled,in respective device			Tester S

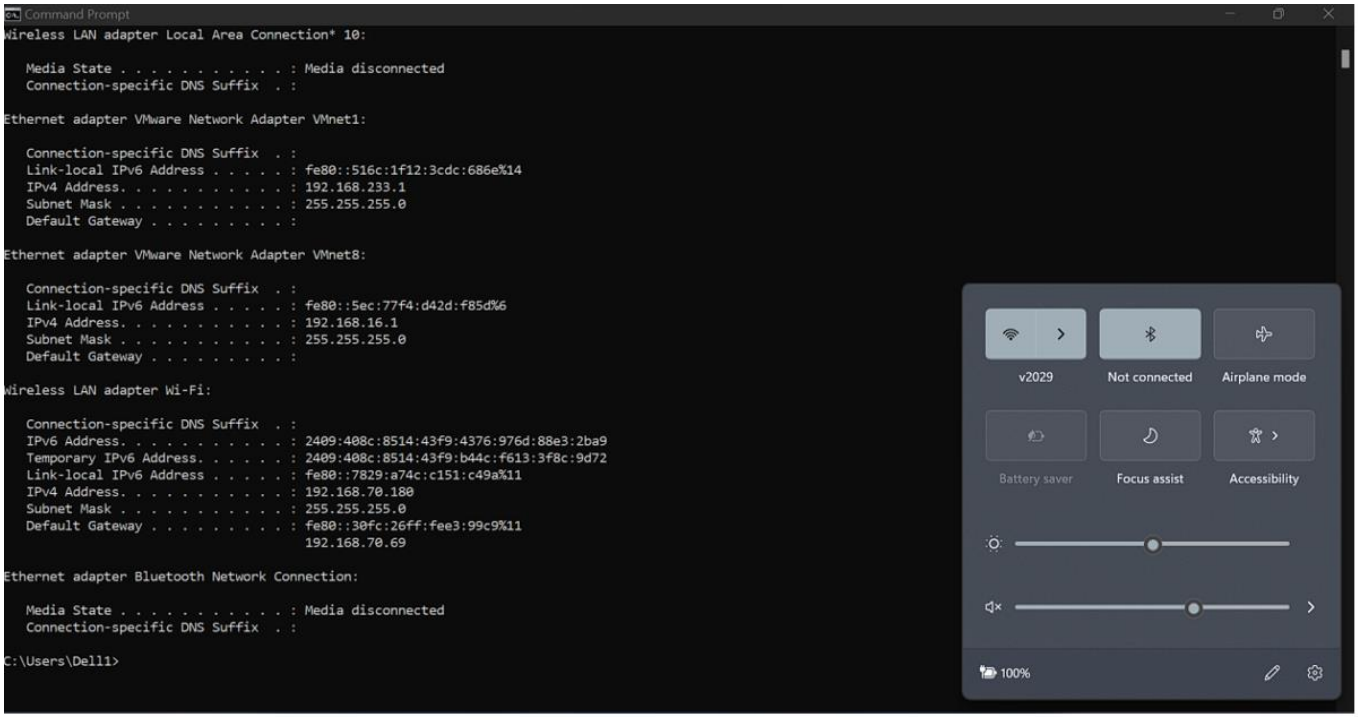
REQ-7	Scalability	verify if the application classifies the product based on the users symptoms							
T-0701	Scalability	verify if the application classifies the product based on the users symptoms	App is Launched and multiple users connected to the application at the same time	1.Launch the app and get results	Devices Connected - 03	Should support synchronization of product data	Supported synchronization of product data	Pass	Tester S
T-0702	Scalability	verify if the application classifies the product based on the users symptoms	App is Launched and multiple users connected to the application at the same time	1.Launch the app and get results	Devices Connected - 05	Should support synchronization of product data	Supported synchronization of product data	Pass	Tester S
T-0703	Scalability	verify if the application classifies the product based on the users symptoms	App is Launched and multiple users connected to the application at the same time	1.Launch the app and get results	Devices Connected - 07	Should support synchronization of product data	Supported synchronization of product data	Pass	Tester S
T-0704	Scalability	verify if the application classifies the product based on the users symptoms	App is Launched and multiple users connected to the application at the same time	1.Launch the app and get results	Devices Connected - 09	Should support synchronization of product data	Cannot able to connect on mobile hotspot more than 8 devices including Laptop as server,Also Depends on Maximum Connection Allowed in The wifi.	Failed	Tester S
T-0705	Scalability	verify if the application classifies the product based on the users symptoms	App is Launched and multiple users connected to the application at the same time	1.Launch the app and get results	Devices Connected - 10	Should support synchronization,of product data	Cannot able to connect on mobile hotspot more than 8 devices including Laptop as server,Also Depends on Maximum Connection Allowed in The wifi.	Failed	Tester S
REQ-8	User Training and Support	verify if the application classifies the product as not in database and let the user suggest it for adding to the database by reporting to the							
T-0801	User Training and Support	verify if the application classifies the product as not in database and reporting to the admin	App is Launched User connected to the internet	1.scan the product 2.choose your symptoms 3.select get recommendation button	Product scanned -01 Report to admin	Barcode:8901571001415,Report To Admin Message should PopUp,Recommendation:Product Not Found in Database	Barcode:8901571001415,Report To Admin Message should PopUp,Recommendation:Product Not Found in Database	Pass	Tester S
T-0802	User Training and Support	verify if the application classifies the product as not in database and reporting to the admin	App is Launched User connected to the internet	1.scan the product 2.choose your symptoms 3.select get recommendation button	Product scanned -02 Report to admin	Barcode:6291035877123,Report To Admin Message should PopUp,Recommendation:Product Not Found in Database	Barcode:6291035877123,Report To Admin Message should PopUp,Recommendation:Product Not Found in Database	Pass	Tester S
T-0803	User Training and Support	verify if the application classifies the product as not in database and reporting to the admin	App is Launched User connected to the internet	1.scan the product 2.choose your symptoms 3.select get recommendation button	Product scanned -03 Report to admin	Barcode:8003063000378,Report To Admin Message should PopUp,Recommendation:Product Not Found in Database	Barcode:8003063000378,Report To Admin Message should PopUp,Recommendation:Product Not Found in Database	Pass	Tester S

Screen-Shots:

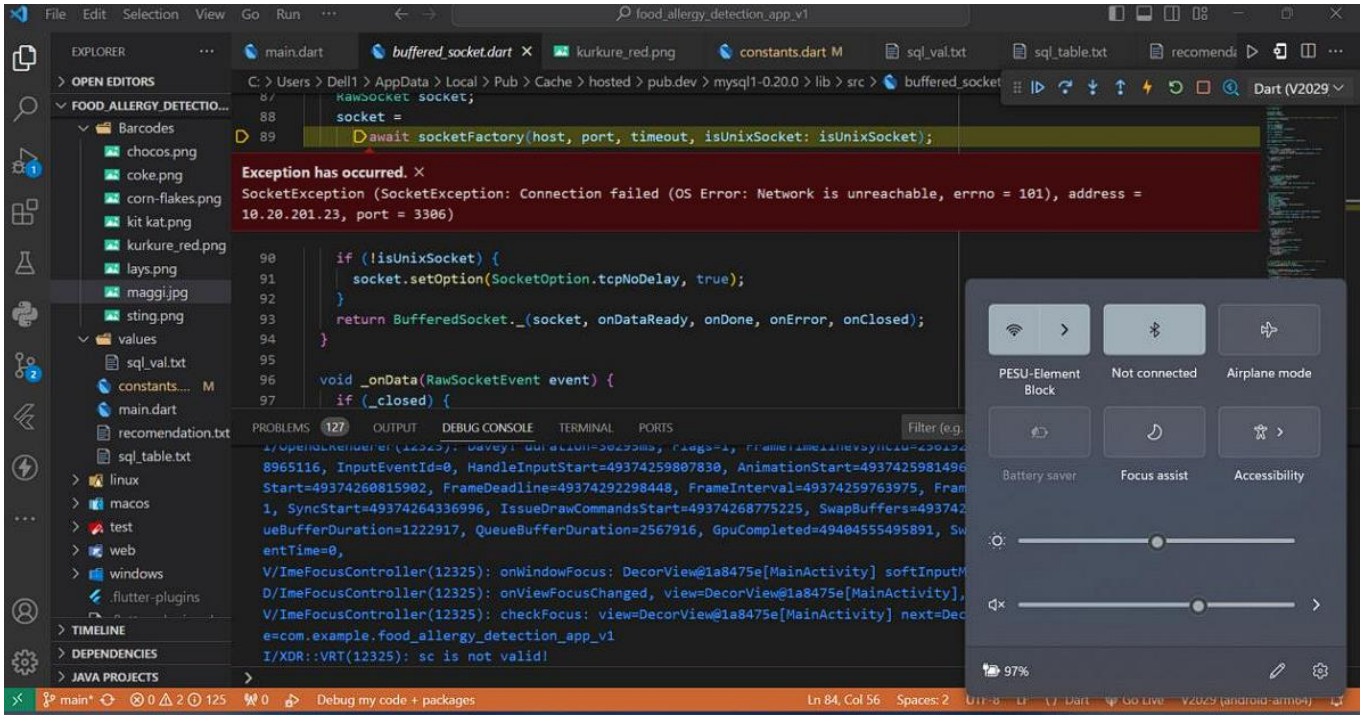
Internet Connection – REQ 5:



Danish phone connected to pesu wifi:



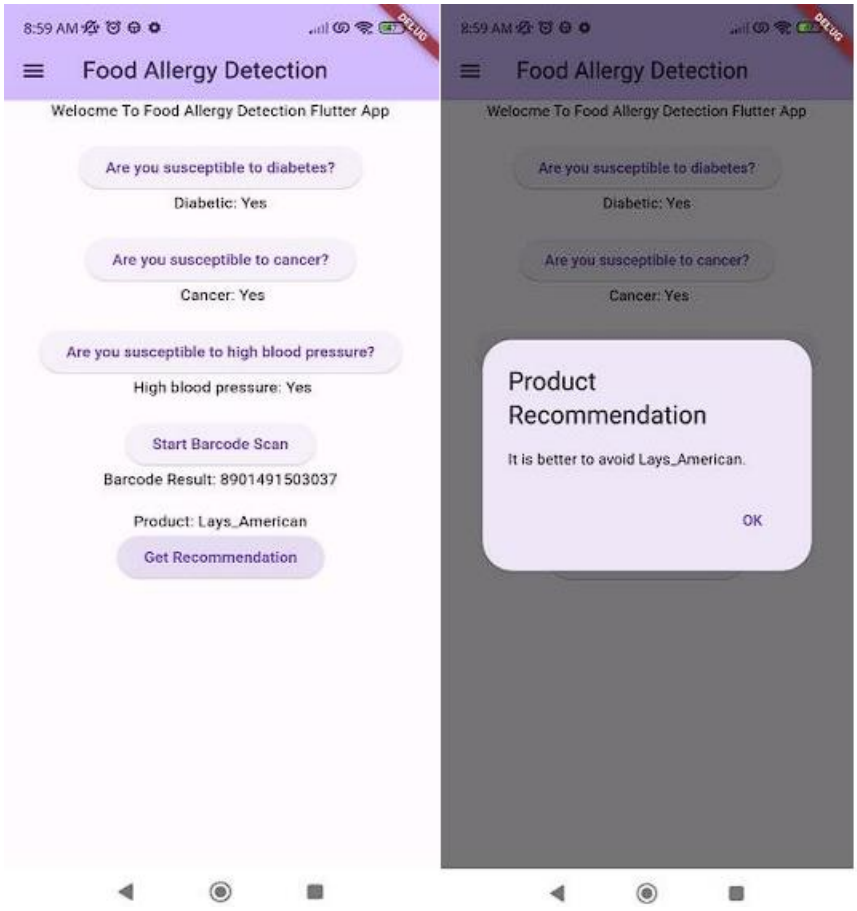
V2029 phone connected to personal hotspot:

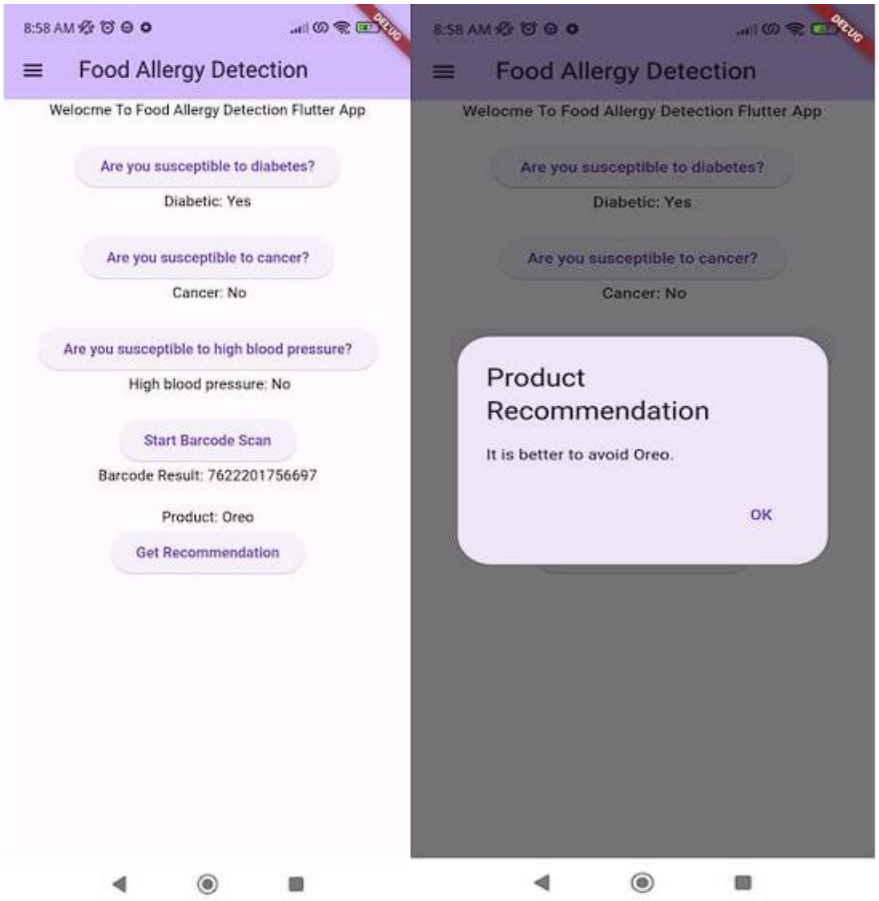


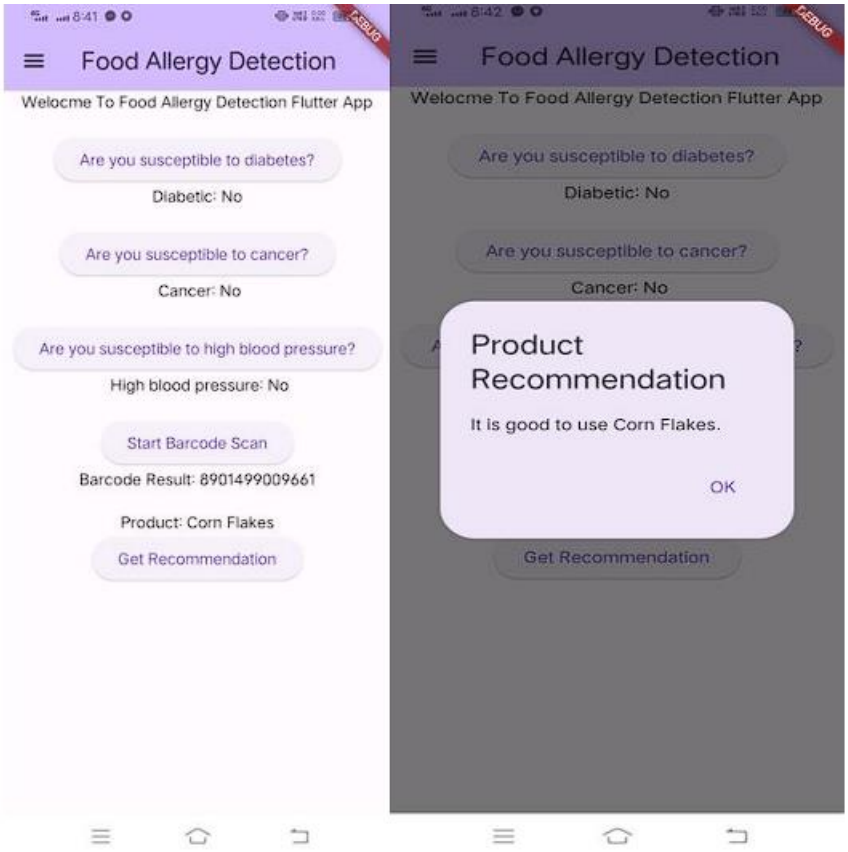
Pesu wifi without vpn blocks the local host, with error Network is Unreachable.

Allergy Detection: REQ- 3

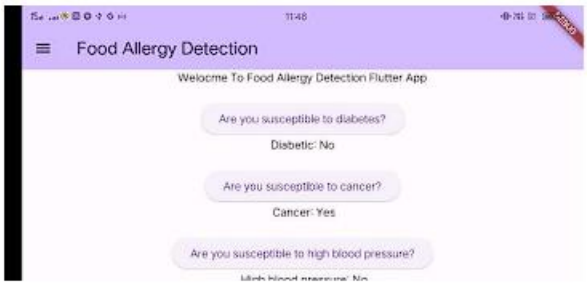
Susceptibility to [Diabetes , Cancer ,Blood_pressure]:


8:59 AM
Food Allergy Detection
Welocme To Food Allergy Detection Flutter App
Are you susceptible to diabetes?
Diabetic: Yes
Are you susceptible to cancer?
Cancer: Yes
Are you susceptible to high blood pressure?
High blood pressure: Yes
Start Barcode Scan
Barcode Result: 8901491503037
Product: Lays_American
Get Recommendation
8:59 AM
Food Allergy Detection
Welocme To Food Allergy Detection Flutter App
Are you susceptible to diabetes?
Diabetic: Yes
Are you susceptible to cancer?
Cancer: Yes
Product Recommendation
It is better to avoid Lays_American.
OK

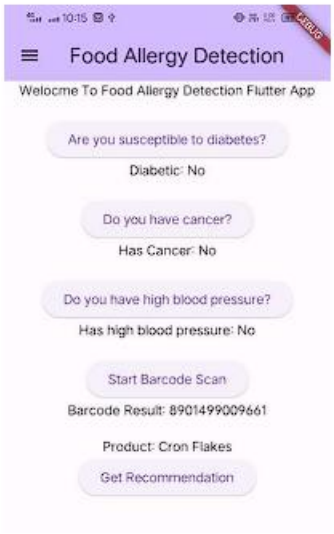

8:58 AM
Food Allergy Detection
Welocme To Food Allergy Detection Flutter App
Are you susceptible to diabetes?
Diabetic: Yes
Are you susceptible to cancer?
Cancer: No
Are you susceptible to high blood pressure?
High blood pressure: No
Start Barcode Scan
Barcode Result: 7622201756697
Product: Oreo
Get Recommendation
8:58 AM
Food Allergy Detection
Welocme To Food Allergy Detection Flutter App
Are you susceptible to diabetes?
Diabetic: Yes
Are you susceptible to cancer?
Cancer: No
Product Recommendation
It is better to avoid Oreo.
OK



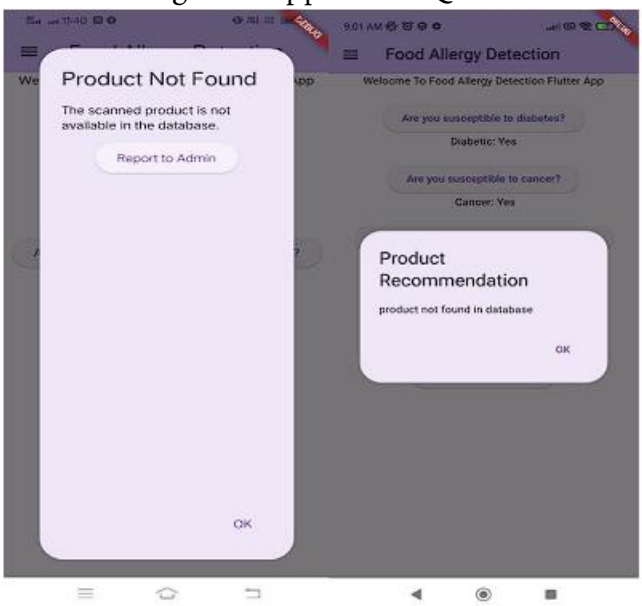
User Interface :REQ-4
Landscape ,Dilip's Phone



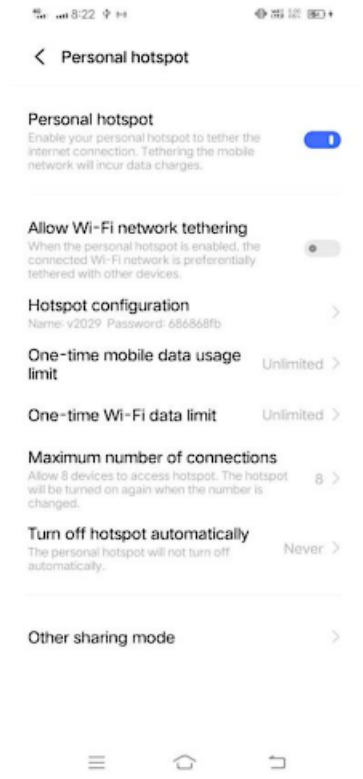
Portrait ,Dilip's Phone:



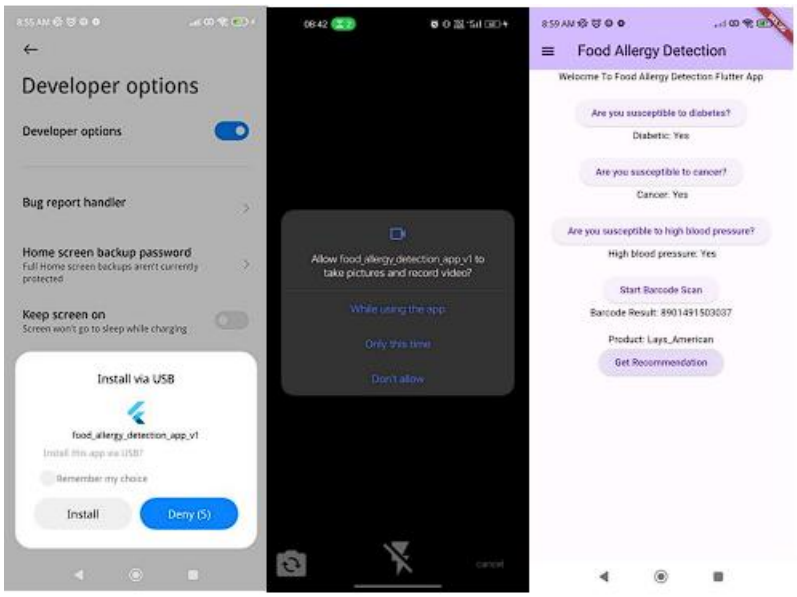
User Training and Support -REQ8



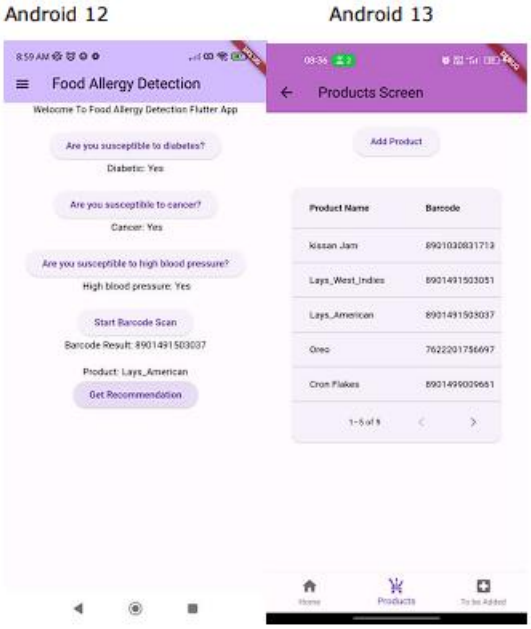
Scalability – REQ-7



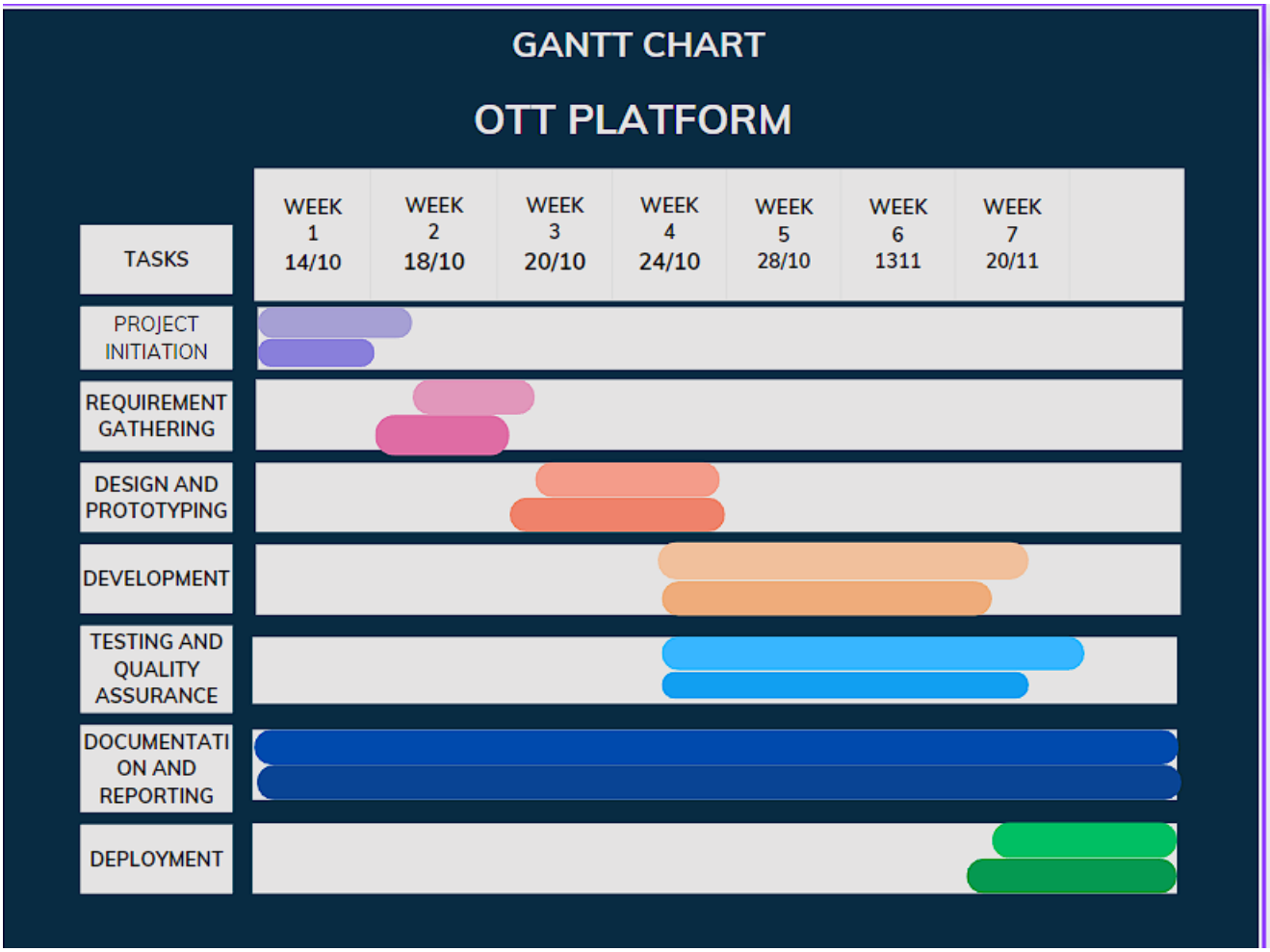
Barcode Scanning: REQ-1 and Product Information Retrieval :REQ-2



Device Compatibility :REQ – 6:



8. Final Gantt Chart (Baseline and Final Timelines):



9. **Conclusions**:

In conclusion, the Food Allergy Detection App represents a significant advancement in empowering users to make informed and health-conscious decisions about the food products they consume. By integrating health susceptibility assessments for conditions like diabetes, cancer, and high blood pressure, the app not only addresses allergies but also caters to broader health considerations.

The ability to scan product barcodes enhances the user experience, providing real-time feedback on the safety of a given product based on the user's health profile. This feature is instrumental in promoting dietary choices aligned with individual health needs and preferences.

As we continue to prioritize health and well-being, technology solutions like this app play a pivotal role in creating a more connected and informed society. By leveraging the latest advancements in mobile technology and health sciences, the Food Allergy Detection App exemplifies the potential for innovation to positively impact our daily lives.

We hope that this app contributes to a healthier lifestyle for users by fostering awareness, facilitating informed decision-making, and ultimately promoting a more mindful approach to nutrition. As the field of health and technology evolves, we remain committed to enhancing and expanding the capabilities of the app to meet the dynamic needs of our users.

Thank you for joining us on this journey towards healthier living through the Food Allergy Detection App. Your well-being is our priority, and we look forward to continuing to provide innovative solutions for a healthier and happier future

10. Appendix B: RTM (Final version):

Test Case Template								
TestCaseId	**TITLE**	**Functionality**	**Pre-requisites**	**Test Steps**	**Test Data**	**Expected Result**	**Actual Result**	**Status**
req-0101	BARCODE SCANNING	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	App is Launched	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode:8901 49909661	Scan barcode:8901 49909661	Scan barcode:8901 49909661	Pass
req-0201	Product Information Retrieval	verify when a user scans a barcode the app recognises it and then gives out the barcode Id	1.App is Launched 2.User has scanned the product barcode	1.Open the application 2.open the scanner 3.scan the barcode using the scanner	Scan barcode:8901 49909661	Barcode Result:89014 9909661,Product: Corn Flakes	Barcode Result:89014 9909661,Product: Corn Flakes	Pass
req-0301	Allergen Detection	verify if the application classifies the product as consumable or not based on the users symptoms	1.App is Launched 2.User has scanned the product barcode 3.User has entered his allergies	1.scan the product 2.choose your symptoms 3.select get recommendation button	Scan barcode :8901030922 787,Diabetic: Yes,Cancer:No,High Blood Pressure:No	Recommendation:It is better to avoid Kissan jam miked fruit	Recommendation:It is better to avoid Kissan jam miked fruit	Pass
req-0401	User Interface	verify if the ui works properly under different orientations of the screen	1.App is Launched 2.auto rotate is turned on	1.Launch the app 2.open in Portrait Mode	Device - 01 (Redmi 10 Prime) Portrait Mode	Should Run without Overflow Error	Running Without Any Error	Pass
req-0501	Internet Connection	verify if the application works under different network strengths	Internet connectivity should be established	On Scanning Barcode Product should be identified	Barcode Result: Product Result:	Barcode Result:89014 99009661,Product Result:Cron Flakes,Wifi:V2029,IPV4:192.168.70.180	Barcode Result:89014 99009661,Product Result:Cron Flakes,Wifi:V2029	Pass
req-0601	Device Compatibility	verify if the app works on different mobile devices , different versions of android and ios	1.App is installed	1.Launch the app	Device - 01 (Rameshwar) Android 13	App Should Launch Successfully, without any restrictions,provide developer option enabled,in respective device	App Launched Succesfully	Pass
req-0701	Scalability	verify if the application classifies the product based on the users symptoms	App is Launched and multiple users connected to the application at the same time	1.Launch the app and get results	Devices Connected - 03	Should support synchronization of product data	Supported synchronization of product data	Pass
req-0801	User Training and Support	verify if the application classifies the product as not in database and reporting to the admin	App is Launched User connected to the internet	1.scan the product 2.choose your symptoms 3.select get recommendation button	Product scanned -01 Report to admin	Barcode:8901571001415, Report To Admin Message should PopUp,Recommendation:Product Not Found in Database	Barcode:8901571001415, Report To Admin Message should PopUp,Recommendation:Product Not Found in Database	Pass

11. Appendix C: Technology stack and References [Books, Links to web pages/portals, tools]:

a. FLUTTER , MYSQL, Modules used: cupertino_icons: ^1.0.2

simple_barcode_scanner: ^0.0.8

to connect mysql and flutter

mysql1: ^0.20.0

provider: ^6.0.5

file_picker: ^5.5.0

intl: ^0.18.1

to scan barcode

flutter_barcode_scanner: ^2.0.0.

b. Android Application for Food Allergy Detection using Machine Learning Technique: https://www.ijcrt.org/papers/IJCRT2008177.pdf

c. Consumer-friendly food allergen detection: moving towards smartphone-based immunoassays https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiR_OiT29aCAxV07zgGHVxiBykQFnoECCoQAQ&url=https%3A%2F%2Fwww.ncbi.nlm.nih.gov%2Fpmc%2Farticles%2FPMC6096701%2F&usg=AOvVaw0Tn6qb3hpz5QDeohCtmliM&opi=89978449

THANK YOU