MAD Project Report

Project Title: Food Ingredients Scanner

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1. Introduction:

Description - This project is a mobile application focused on health-conscious users, offering barcode scanning for food products and delivering nutritional information.

Problem & Purpose - The app addresses the need for quick nutritional information access, helping users make healthier choices.

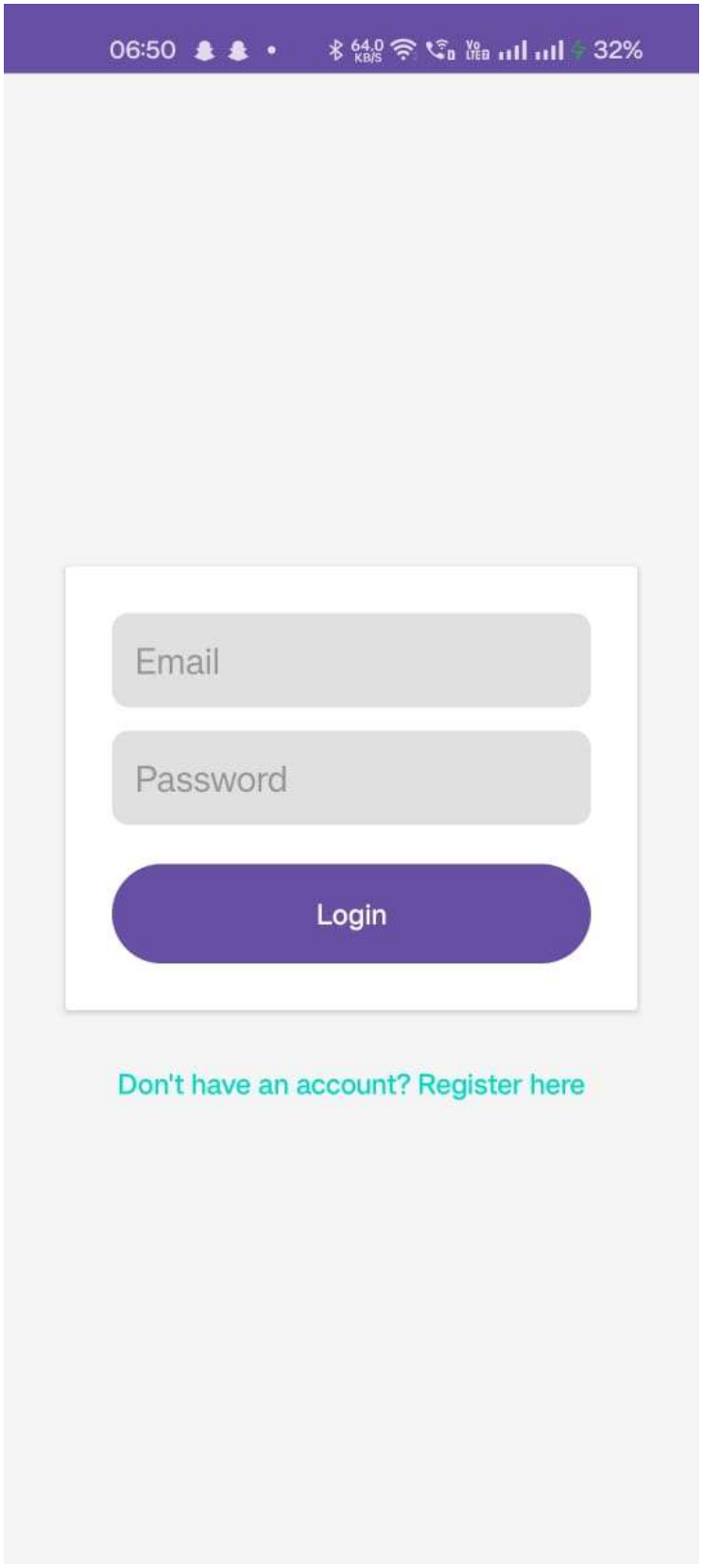
Target Audience - Health-conscious individuals, particularly those with medical conditions like diabetes.

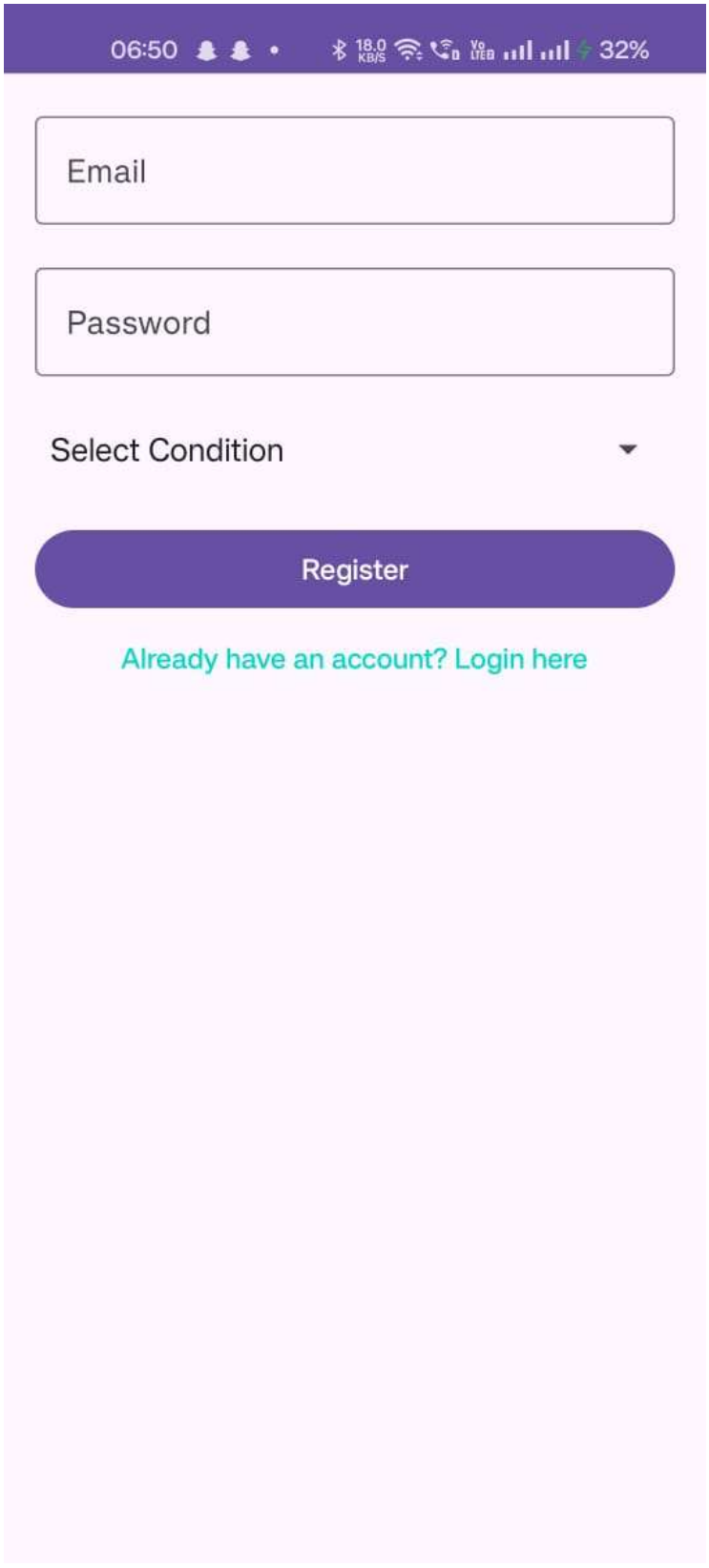
2. Design and UI (15%)

2.1 User Interface: (sc of login etc)

Design Considerations -
Color Scheme: A neutral palette for readability and accessibility.
Fonts and Icons: Clear fonts and intuitive icons for better user interaction.
Layouts: Simple, responsive layouts providing a consistent experience across different devices.

User Experience -
The app is designed for ease of navigation, with intuitive flow between screens and easy-to-access features. Accessibility considerations include font size for readability and color contrast for visual clarity.


06:50
32%
Email
Password
Login
Don't have an account? Register here


06:50
32%
Email
Password
Select Condition
Register
Already have an account? Login here

2.2 User Flow:

1. Login/Register → 2. Home Screen → 3. Scan Product (Camera Screen) → 4. View Product Info → 5. User Dashboard.

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3. Functionality (20%)

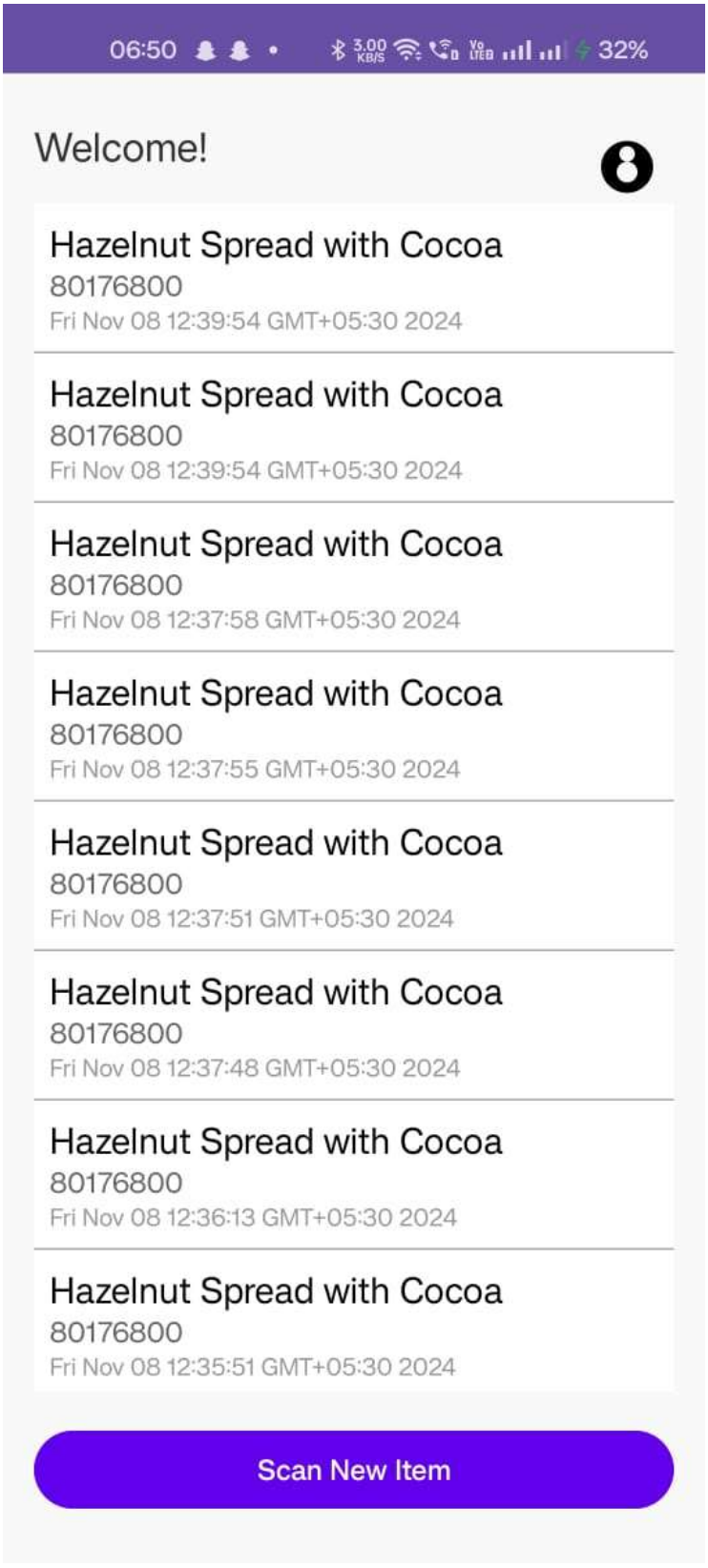
3.1 Core Features:

User Authentication - Secure login and registration with Firebase Authentication.

Barcode Scanning - Uses ML Kit to scan barcodes and retrieve product data.

Nutritional Information Display - Shows product details, including sugar content and other nutrients, sourced from OpenFoodFacts.

Personalized Warnings - For users with medical conditions (e.g., diabetes), provides warnings when scanned products exceed safe sugar limits.


06:50
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Welcome!
Hazelnut Spread with Cocoa
80176800
Fri Nov 08 12:39:54 GMT+05:30 2024
Hazelnut Spread with Cocoa
80176800
Fri Nov 08 12:39:54 GMT+05:30 2024
Hazelnut Spread with Cocoa
80176800
Fri Nov 08 12:37:58 GMT+05:30 2024
Hazelnut Spread with Cocoa
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Fri Nov 08 12:37:51 GMT+05:30 2024
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Hazelnut Spread with Cocoa
80176800
Fri Nov 08 12:36:13 GMT+05:30 2024
Hazelnut Spread with Cocoa
80176800
Fri Nov 08 12:35:51 GMT+05:30 2024
Scan New Item

3.2 Additional Features:

Medical Condition Integration - Allows users to select a medical condition (e.g., diabetes) and displays warnings when a product's nutritional content may not be suitable.

Product History - Users can view previously scanned items on the Home screen for easy reference.

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4. Innovation & Creativity (10%)

4.1 Unique Features or Approaches:

Novel Integration of ML Kit and Firebase - The app combines barcode scanning with Firebase's real-time database, enabling secure storage and retrieval of scanned product data.

Health-Specific Warning - By personalizing nutritional alerts based on medical conditions, the app offers a unique value for users with dietary restrictions.

Data-Driven Insights - Provides not only nutritional data but also detailed product information like allergens, helping users make informed dietary decisions.

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5. Technical Complexity (15%)

5.1 Technical Challenges:

1) Real-Time Barcode Scanning - Implementing real-time scanning using ML Kit required handling camera permissions and managing scan delays to avoid duplicate reads.

- Code Snippet - The analyzeImage() function in Camera Activity processes barcodes and prevents duplicate scans within a set time delay.

2) Firebase Fire store Integration - Managing secure user authentication and storing scanned product data for individual users.

- Code Snippet - The saveProductScan() function in CameraActivity uploads scanned data to Firestore and associates it with the user ID.

3) API Data Parsing - Retrieving and parsing data from OpenFoodFacts API presented challenges with JSON handling, especially for nested nutritional information.

- Code Snippet - The handleApiResponse() function parses and displays JSON data from the API.

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6. Security and Data Management (10%)

6.1 Data Handling:

Data Storage - User and product scan data are securely stored in Firebase Firestore, with user-specific access based on authentication.

Data Retrieval - The app retrieves user-related data, including previous scans, upon login. It also securely retrieves medical condition information to tailor warnings.

6.2 Security Measures:

Firebase Authentication - Ensures only authenticated users can access and save data.

Input Validation - Validates user input during registration to prevent incorrect data storage.

Secure API Calls - Uses HTTPS for all API requests, ensuring secure data transmission between the app and external services.

7. Testing and Debugging (10%)

7.1 Testing Strategy:

Manual Testing - Core functionalities like login, barcode scanning, data retrieval, and displaying product information were manually tested on multiple devices.

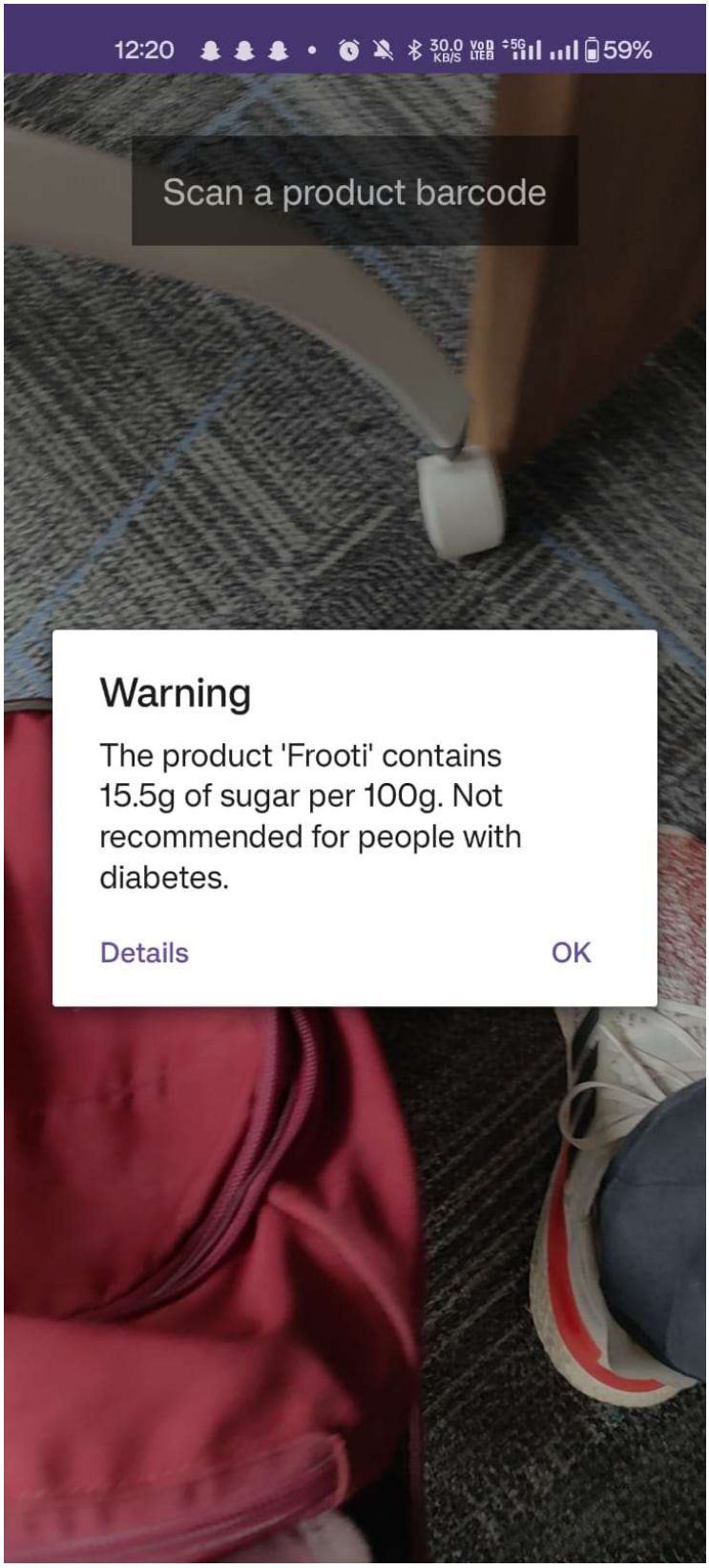
Tools Used - Used Logcat in Android Studio for debugging and ensuring that data flows correctly through Firebase.

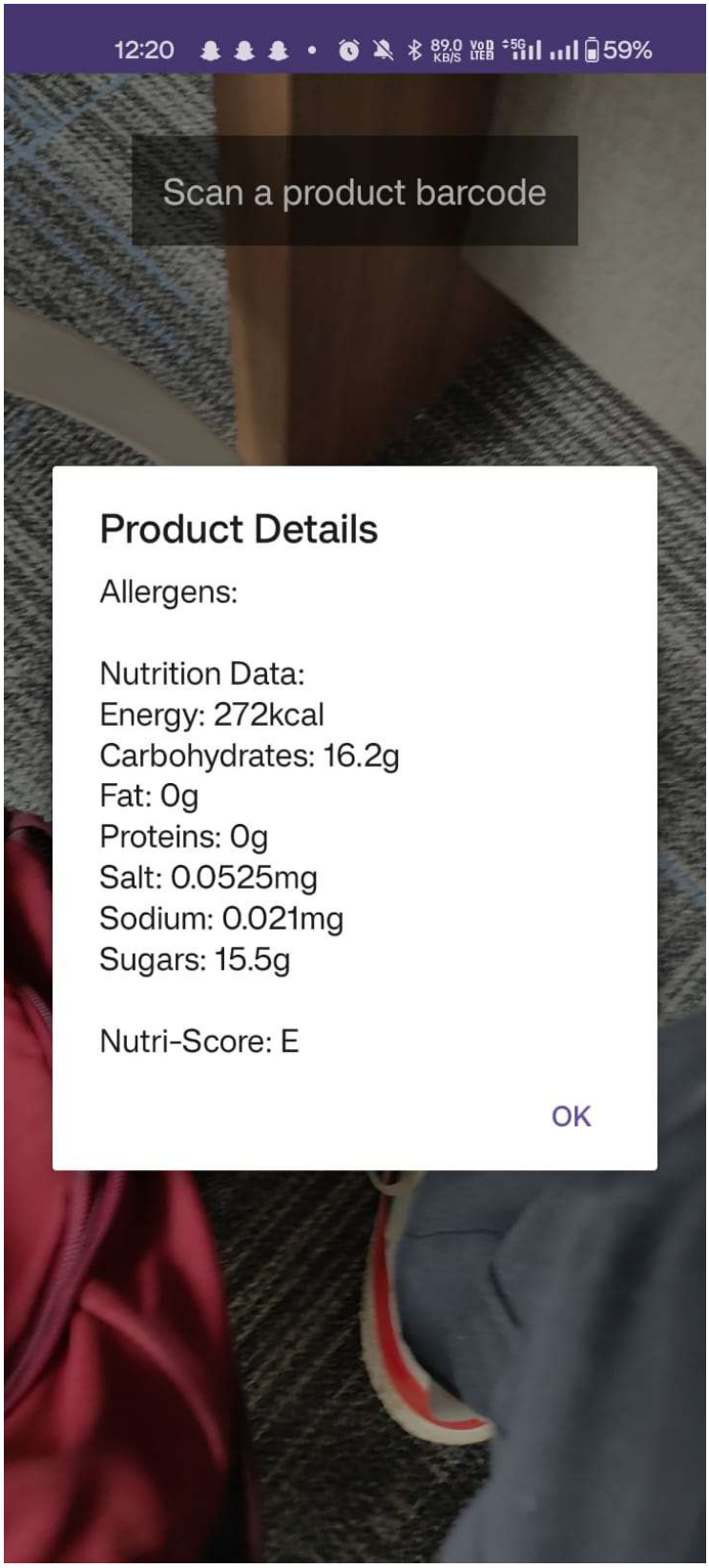
7.2 Debugging Process:

Common Bugs:

Camera Permissions - Ensured camera permissions are requested and handled gracefully.

Firebase Connection Issues - Encountered issues with Firestore retrieval, resolved by retrying failed requests.


12:20
59%
Scan a product barcode
Warning
The product 'Frooti' contains 15.5g of sugar per 100g. Not recommended for people with diabetes.
Details
OK


12:20
59%
Scan a product barcode
Product Details
Allergens:
Nutrition Data:
Energy: 272kcal
Carbohydrates: 16.2g
Fat: 0g
Proteins: 0g
Salt: 0.0525mg
Sodium: 0.021mg
Sugars: 15.5g
Nutri-Score: E
OK

8. Demo & Viva (10%)

Prepare a demonstration video showing your app in action / Give demo on emulator in front of faculty, highlighting its main features, functionality, and how it meets the project requirements. Additionally, be prepared for viva questions regarding your project's technical aspects, teamwork, and decision-making process.

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9. Conclusion:

In developing the Food Ingredient and Nutrition Scanner, our team gained experience in real-time data handling, Firebase integration, and ML Kit's barcode scanning capabilities. We overcame challenges related to permissions, API handling, and user data management. This project not only strengthened our technical skills but also provided insights into app design focused on health-conscious users. Future improvements could include expanding the database of products and adding more health metrics.

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10. Appendix:

a. **12.1 Full Code Repository:** Include a link to the GitHub repository or attach the full code in the report.

b. **12.2 References:** List any references, tutorials, or external resources used during development.

Grading Criteria:

c. **Design and UI:** 15 marks

d. **Functionality:** 20 marks

e. **Innovation & Creativity:** 10 marks

f. **Technical Complexity:** 15 marks

g. **Security and Data Management:** 10 marks

h. **Testing and Debugging:** 10 marks

i. **Team Collaboration:** 5 marks

- **Documentation:** 5 marks
- **Demo & Viva:** 10 marks