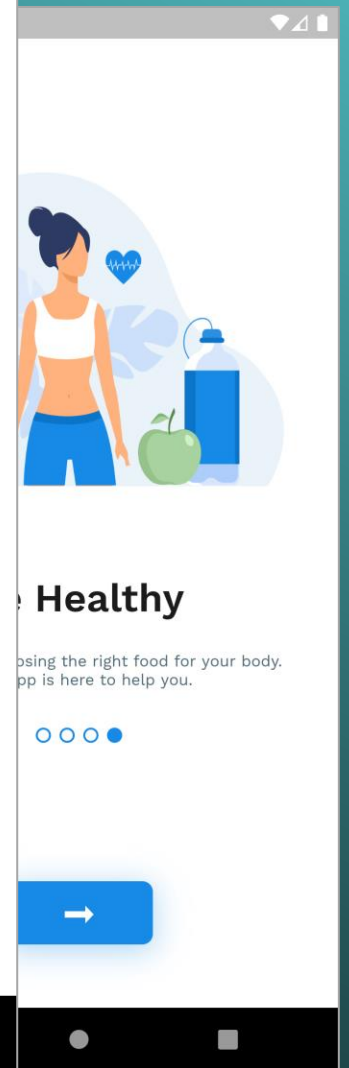
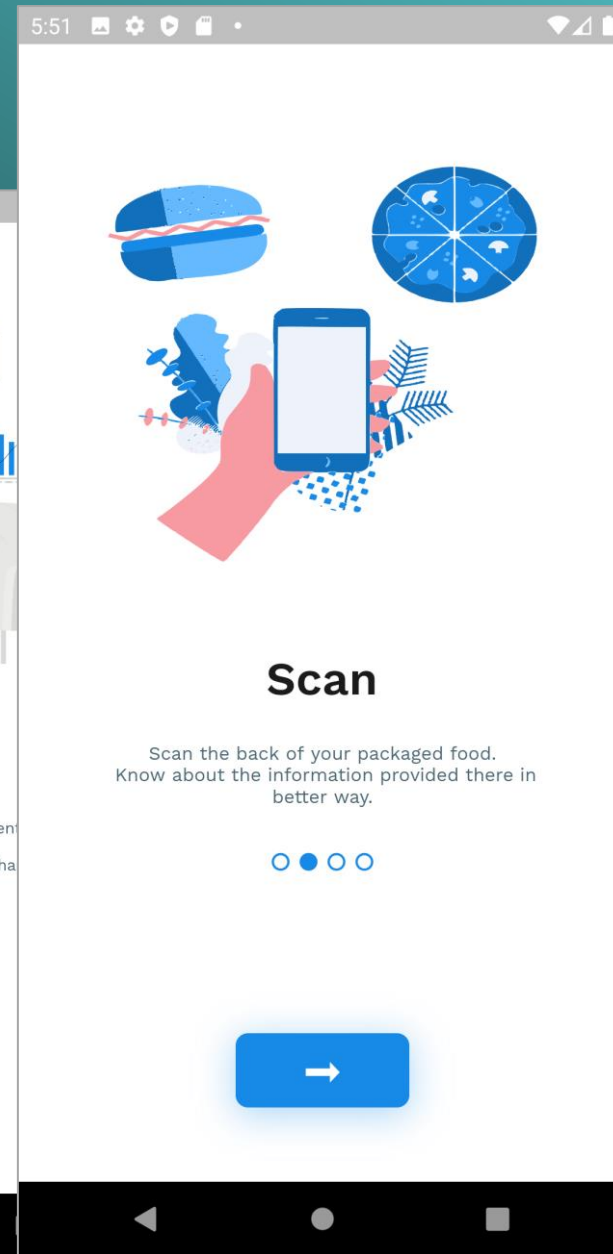
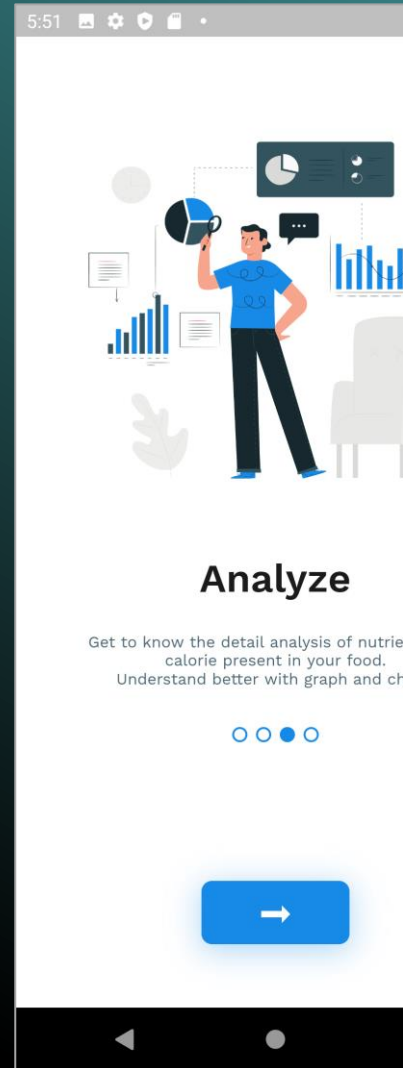
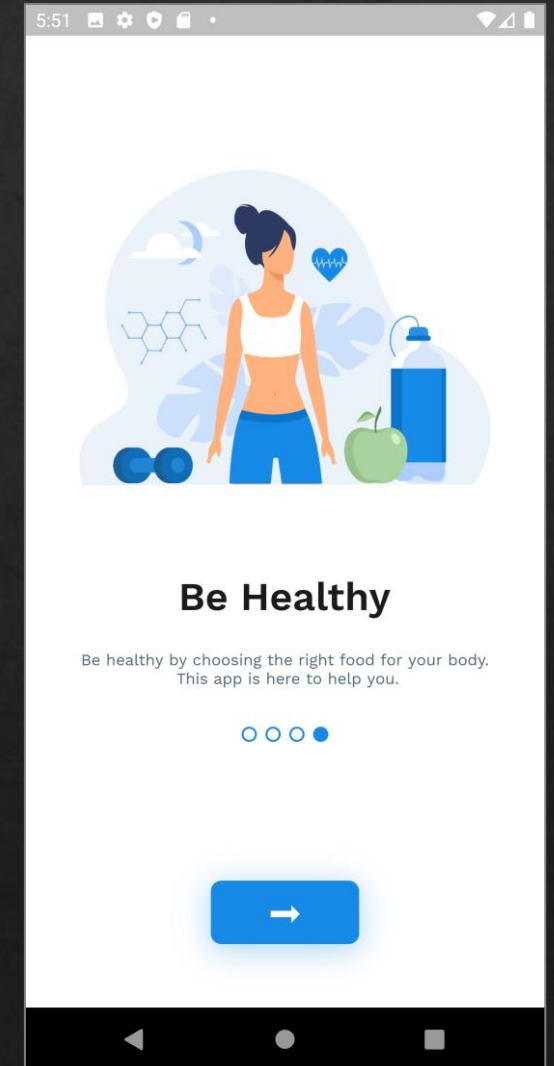


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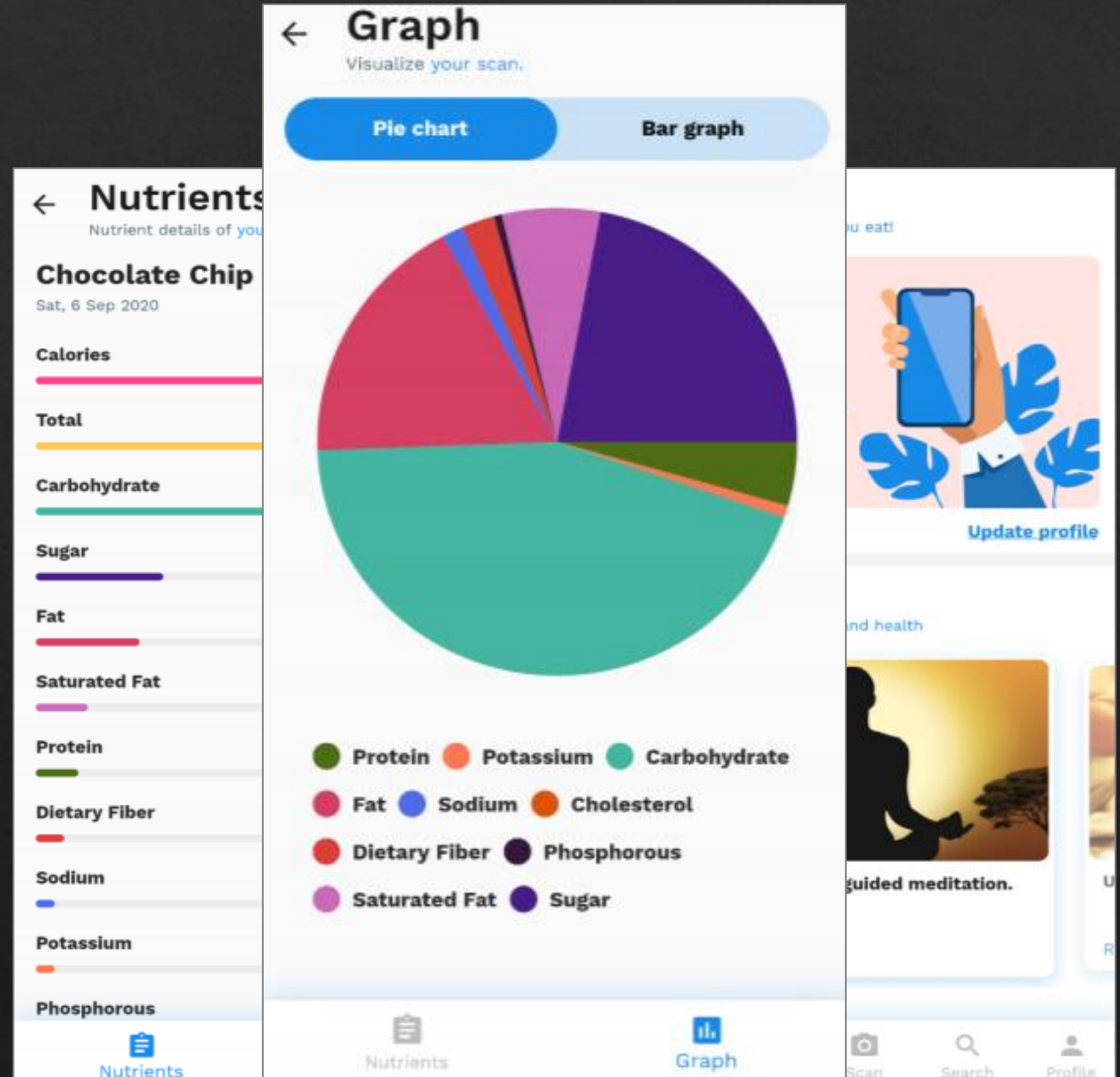
Introduction

Your food choices each day affect your health – how you feel today, tomorrow, and in the future.



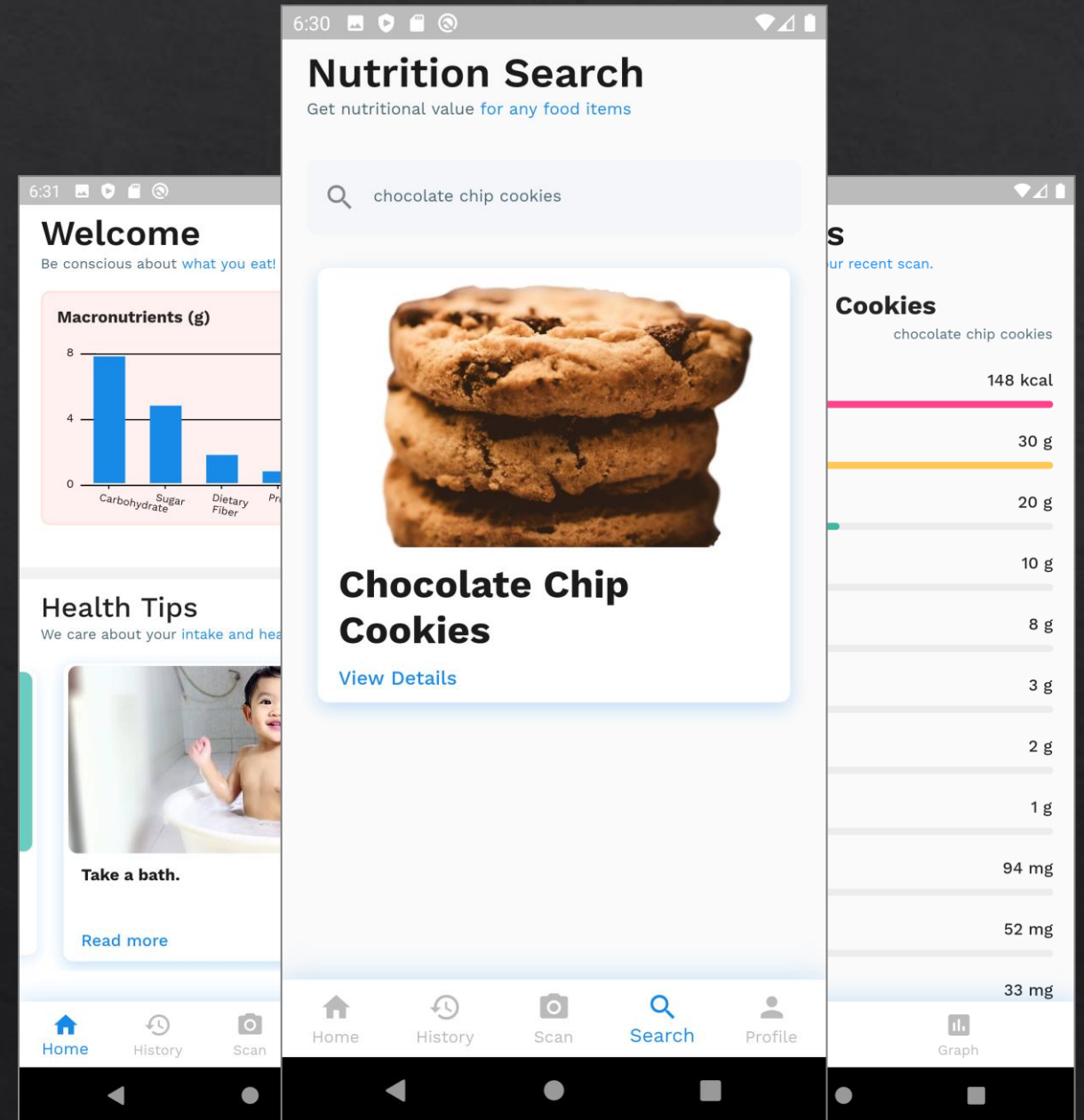
Objectives

- To enable users to get information about the nutrients and calories
- To display graphs on their calorie and nutrition consumption to track their diet.
- To provide health tips



Implementation

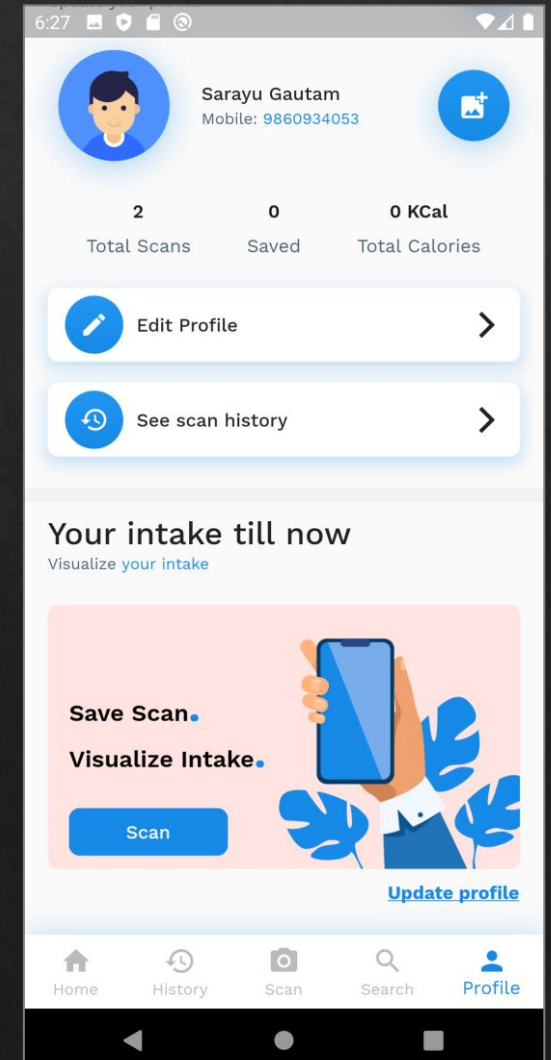
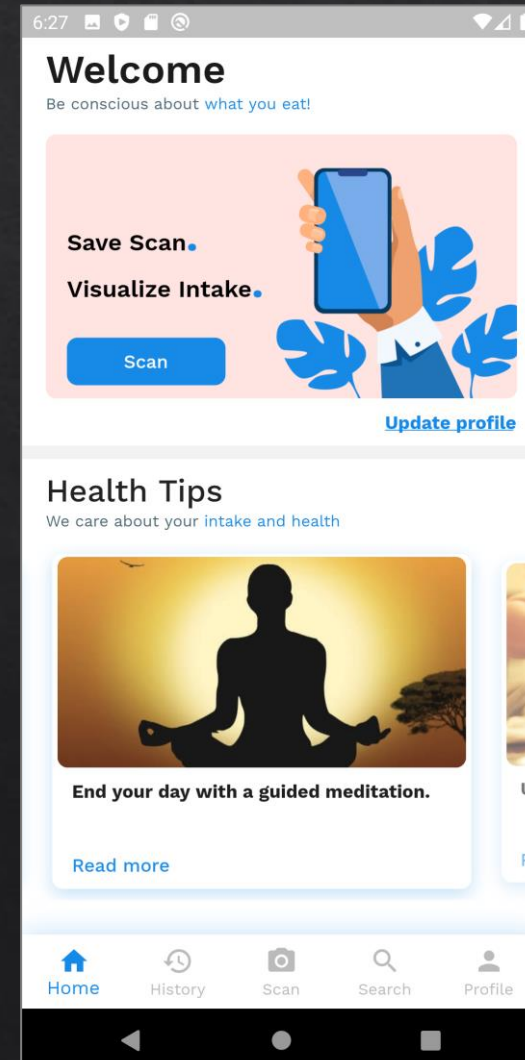
- Layout of the app (Figma Design)
- User authentication
- Front End Implementation
- Image Processing
- Back End API connection
- Front End and Back End Merge
- Documentation



Application flow

Frontend

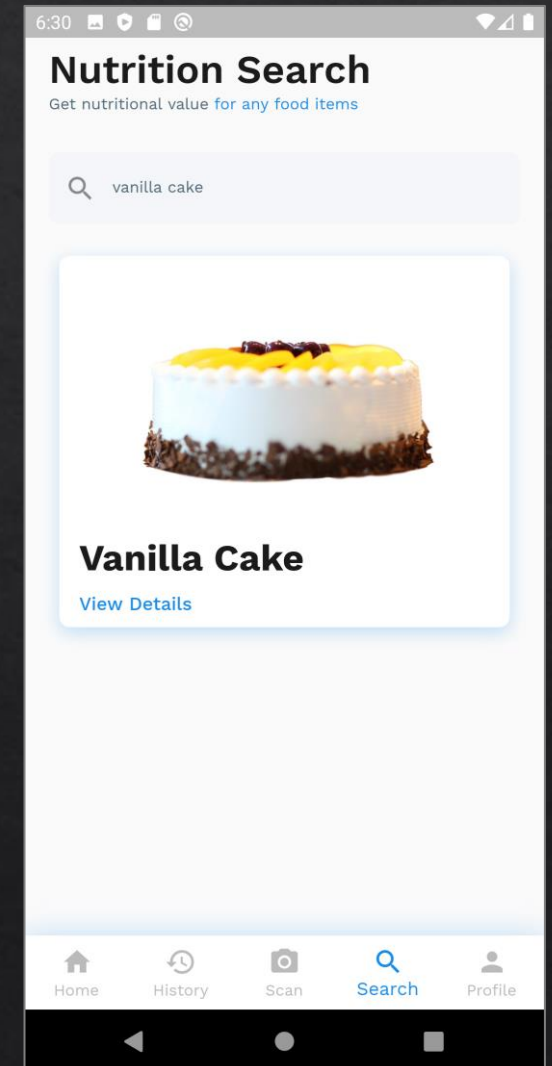
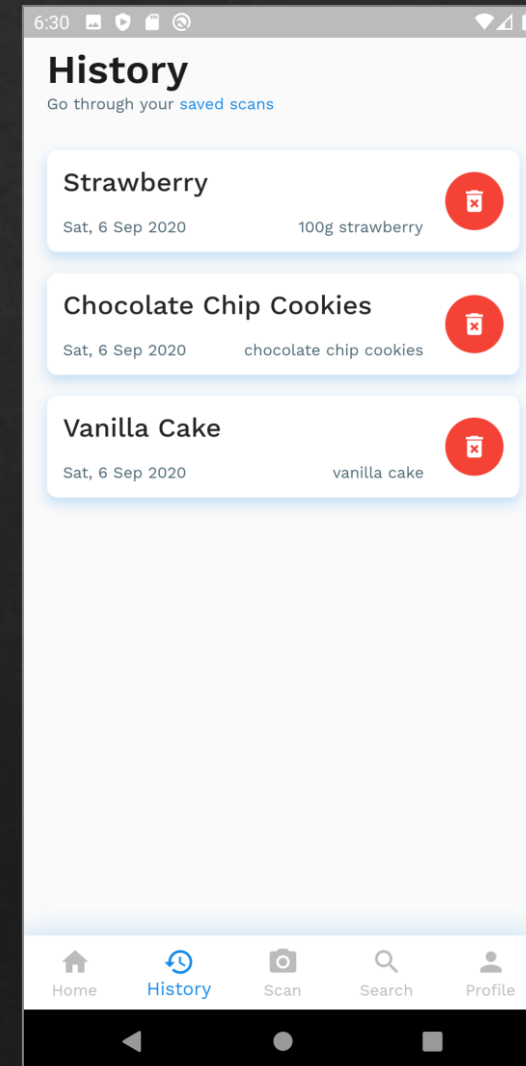
- Designed with Figma
- Cross platform development with Flutter
- Uses Stacked Architecture
- Dart FFI to call OpenCV in Flutter
- pie_chart and charts_flutter for visualization
- SharedPreferences for Local Storage of data
- Dependency Injection with get_it



Application flow

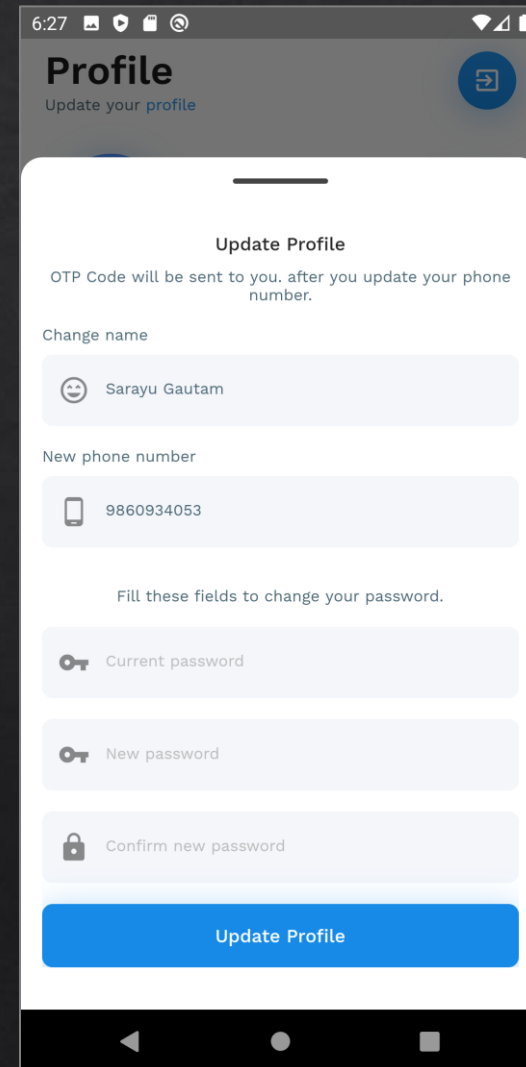
Backend

- Node.js Express App with MongoDB
- Mongoose ODM for model and DB connection
- Nutritionix API for search results
- JWT token for authentication
- Communication with Flask Server for scan results

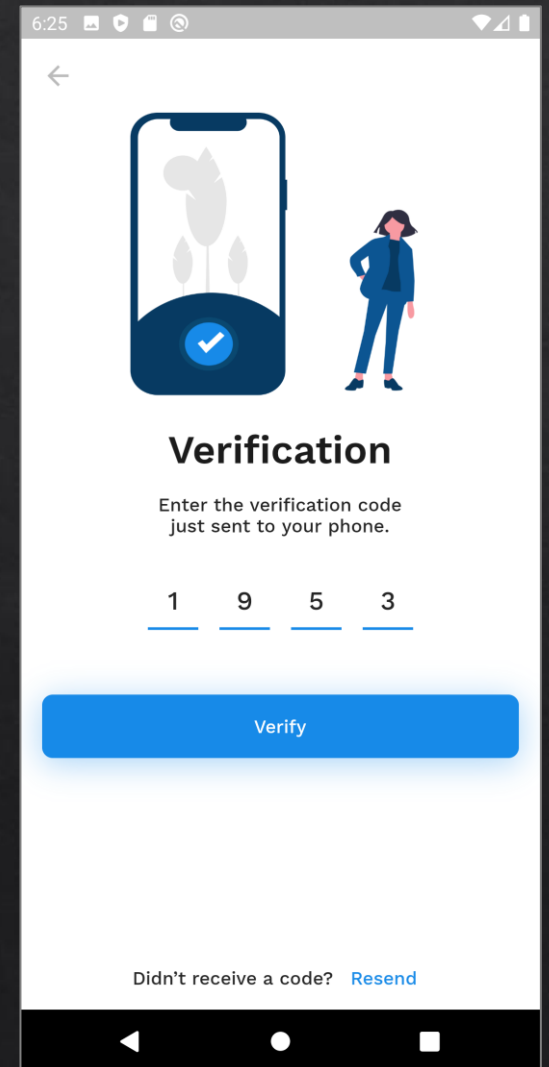


Features

- Scan an image
- Visualize scan result
- Save scan results after logging in
- Search if unable to scan
- View scan history
- Visualize more with graphs
- Health tips



The screenshot shows the 'Profile' section of a mobile application. At the top, there's a header with the title 'Profile' and a subtitle 'Update your profile'. Below this, a modal titled 'Update Profile' is displayed. It contains a message: 'OTP Code will be sent to you, after you update your phone number.' The form has three main sections: 'Change name' with a text input field containing 'Sarayu Gautam', 'New phone number' with a text input field containing '9860934053', and a password change section titled 'Fill these fields to change your password.' which includes three input fields for 'Current password', 'New password', and 'Confirm new password'. A blue 'Update Profile' button is at the bottom of the modal. The app's status bar at the top shows the time as 6:27.



The screenshot shows the 'Verification' screen of a mobile application. It features a large illustration of a smartphone with a plant growing from the bottom and a person standing next to it. Below the illustration, the title 'Verification' is followed by the instruction 'Enter the verification code just sent to your phone.' There are four input fields for the code, with the first three containing the digits '1', '9', and '5'. A blue 'Verify' button is positioned below the input fields. At the bottom, there is a link that says 'Didn't receive a code? Resend'. The app's status bar at the top shows the time as 6:25.

Image Scanning

Nutrition Label Scanning Feature

- Scan with camera
- Frame Adjustment
- Image Picker

How does it work?



Image Scanning

Image Processing and Computer Vision

- Pre-processing
- Label Extraction
- Post-processing



Calories	519 Kcal
Total Fat	33g
Carbohydrate	33g
Protein	15g

```
ImmutableMultiDict([('image', <FileStorage: 'labels_2_cropped.jpg' ('image/jpeg')>)])  
Keywords ['Calories 519 Keal', '', 'Total Fat 33g', 'Carbohydrate 33g', '', 'Polen 15g', '']  
['Calories ', '519', ' Keal'] <class 'list'>  
['Total Fat ', '33', 'g'] <class 'list'>  
['Carbohydrate ', '33', 'g'] <class 'list'>  
['Polen ', '15', 'g'] <class 'list'>
```

Image Scanning

Pre-processing

- Resizing, Graying & Blurring
- Histogram Equalization
- Contour Identification
- Image Thresholding
- Perspective Transformation



Calories	519 Kcal
Total Fat	33g
Carbohydrate	33g
Protein	15g

Image Scanning

Label Extraction

- OCR Engine
- Tesseract Open-Source Engine

Calories	519 Kcal
Total Fat	33g
Carbohydrate	33g
Protein	15g



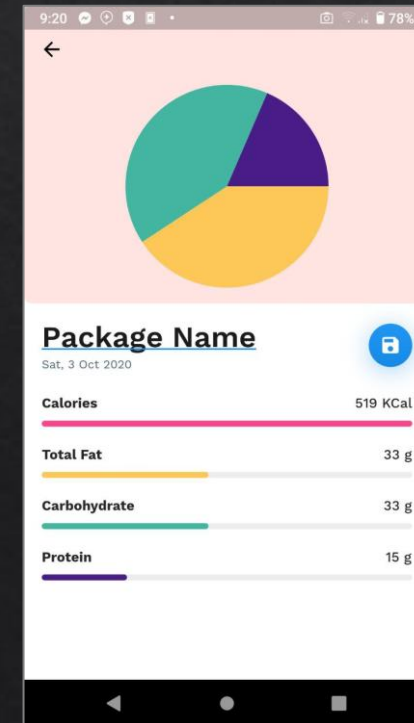
```
ImmutableMultiDict([('image', <FileStorage: 'labels_2_cropped.jpg' ('image/jpeg')>)])  
Keywords ['Calories 519 Keal', '', 'Total Fat 33g', 'Carbohydrate 33g', '', 'Polen 15g', '']  
['Calories ', '519', ' Keal'] <class 'list'>  
['Total Fat ', '33', 'g'] <class 'list'>  
['Carbohydrate ', '33', 'g'] <class 'list'>  
['Polen ', '15', 'g'] <class 'list'>
```

Image Scanning

Post-processing

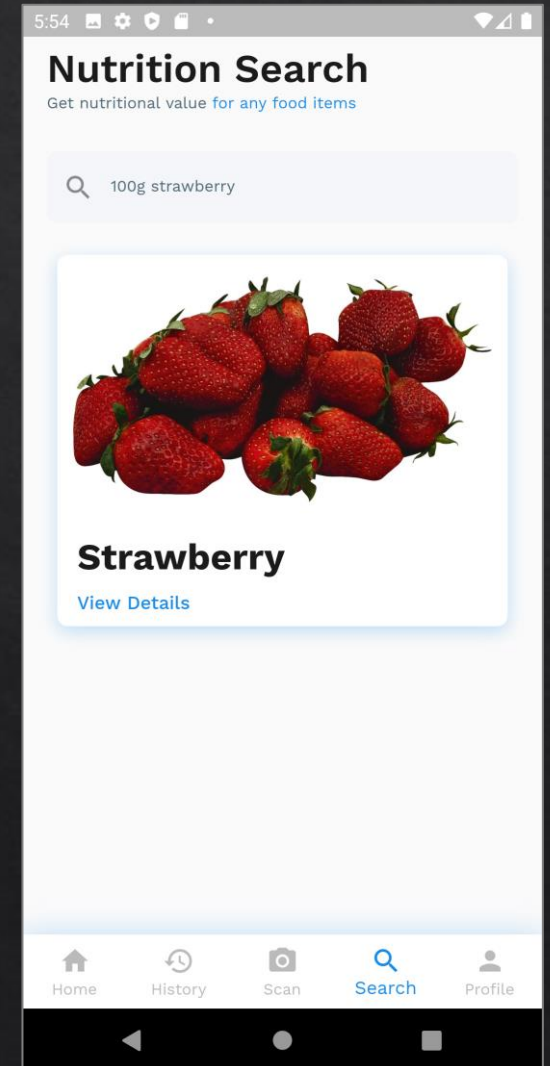
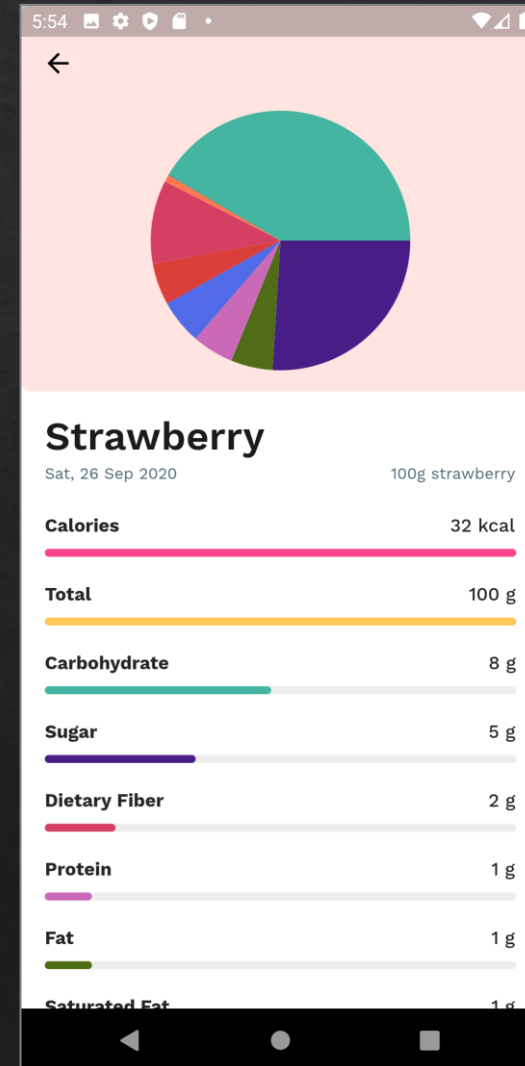
- Decomposition of labels and values
- Keyword Matching
- Data formatting
- Sending over HTTP

```
ImmutableMultiDict([('image', <FileStorage: 'labels_2_cropped.jpg' ('image/jpeg')>)])  
Keywords ['Calories 519 Keal', '', 'Total Fat 33g', 'Carbohydrate 33g', '', 'Polen 15g', '']  
['Calories ', '519', ' Keal'] <class 'list'>  
['Total Fat ', '33', 'g'] <class 'list'>  
['Carbohydrate ', '33', 'g'] <class 'list'>  
['Polen ', '15', 'g'] <class 'list'>
```



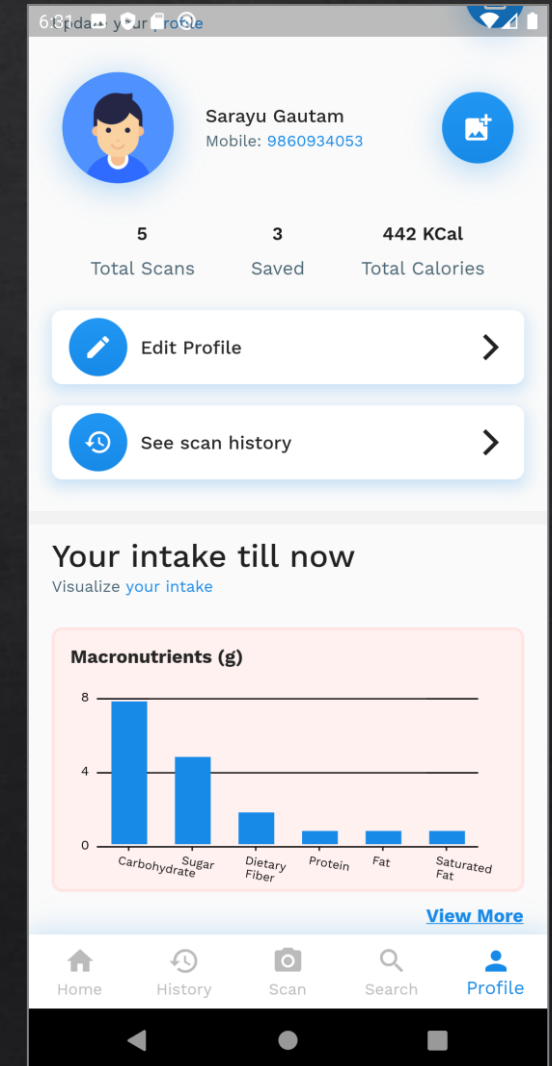
Limitations

- Doesn't respond offline
- Search may not show results for all foods.
- Recommendation feature is not implemented.
- OCR result may contains some error due to technical limitation



Future Enhancement

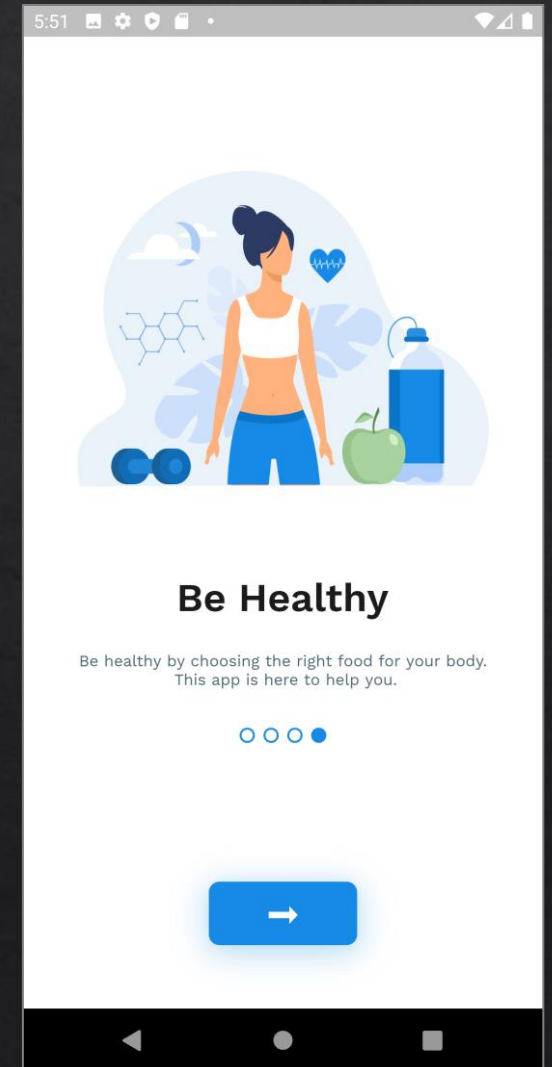
- Offline functionality
- Recommendation based on user scan history
- Building our own food search engine
- Feature to scan other foods except packaged foods
- Enhancing image processing feature without cropping
- Add feature to enable user to edit information of scanned item
- Optimizing UI/UX based on usability principle



Conclusion

nutri.gram

- Scans packaged food items
- Visualizes calorific and nutritional information
- Provides search feature to search unscanned products
- Maintains history of saved scans
- Graphically display the scanned information
- Provides health tips



Group Members

- Sailesh Dahal (10)
- Sarayu Gautam (14)
- Bhabin Khadka (23)
- Ashish Subedi (53)
- Gaurav Singh Thagunna (55)

Stay safe, Stay healthy!

