
Software Requirements Specification

for

RecycleBean

Version 1.0 approved

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Team RuntimeError

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Revision History

Name	Date	Reason For Changes	Version
Kaichen	1/11/2022	Init commit	1
Zeng Lam	1/11/2022	Add in diagram and features	2
Mary	2/11/2022	Add in requirement	3
Meredydd	3/11/2022	Update features and interface	4
Jamie	4/11/2022	Update Appendix	5
Le Ying	5/11/2022	Resolve conflict	6

1. Introduction

1.1 Purpose

RecycleBean aims to **promote sustainable waste management in Singapore**, by providing a **one-stop application with multiple functionalities**, to our users. Effectively, RecycleBean aims to achieve the following intent:

1.1.1 Increase Awareness and Proliferate Information. Within RecycleBean, we provide an information and article portal that is targeted at educating our users on the benefits of sustainable waste management. Through this portal, our users can learn more about the appropriate methods of waste management and how to contribute to our fight against global warming.

1.1.2 Facilitate Locating Appropriate Waste Bins. We provide a landing page that allows users to locate waste bins, based on different categories. Users are given an option to search for these waste bins based on their current location; or through inputting a specific location through the search bar provided. A myriad of waste bin locations will be displayed, with more information provided when users click into each bin displayed.

1.1.3 Build a Culture of Sharing. We provide a feedback page that allows our community of users to share feedback about the bins that they used so that others may know the condition of the bins before they visit them.

1.2 Document Conventions

1.2.1 The entire document, excluding headers and subheaders, is written in Times New Roman, font size 12.

1.2.2 Words or phrases that are bolded are targeted to draw your attention as it highlights our main point of the sentence.

1.2.3 Each bullet point for every section is to be assumed to have equal and its own priority.

1.3 Intended Audience and Reading Suggestions

This document is intended for developers, project managers, testers and users of our application. The SRS will contain detailed descriptions on RecycleBean's functionalities, design, dependencies, interfaces, functional and non-functional requirements and supporting diagrams, organised in the aforementioned manner. It is recommended for readers to read our document sequentially from its introduction to gain a more holistic understanding of our web application. Besides the overview of our document, users may find sections on Product Functions and User Documentation more relevant for their reading. On the other hand, developers, project managers and testers may

additionally find our use case descriptions, dialog map, as well as use case, class and sequential diagrams useful for assessment.

1.4 Product Scope

RecycleBean is a web application which aims to offer users a service to explore different waste bin locations in Singapore. With our user-friendly interface and seamless user experience, RecycleBean will increase awareness on responsible waste disposal amongst the general populace, thereby increasing our community of environmentally-conscious users. This will ultimately help our team achieve our main goal of aiding Singapore in her quest for sustainability.

Our objectives include allowing users to:

- 1.4.1 Search for the location of a waste bin belonging their desired waste category (E-waste, lighting waste, second-hand goods or cash-for-trash)
- 1.4.2 Use a image recognition machine learning model to identify the type of waste they possess
- 1.4.3 Read educational articles on sustainability
- 1.4.4 Create an account/log in for members-exclusive features
- 1.4.5 Add and view feedback on specific bin locations
- 1.4.6 Bookmark frequented bin locations as Favourites

1.5 References

2nd Hand Goods Collection Points. (n.d.). Data.gov.sg. Retrieved November 5, 2022, from
<https://data.gov.sg/dataset/2nd-hand-goods-collection-points>

Lighting Waste Collection Points. (n.d.). Data.gov.sg. Retrieved November 5, 2022, from
<https://data.gov.sg/dataset/lighting-waste-collection-points>

Cash For Trash. (n.d.). Data.gov.sg. Retrieved November 5, 2022, from
<https://data.gov.sg/dataset/cash-for-trash>

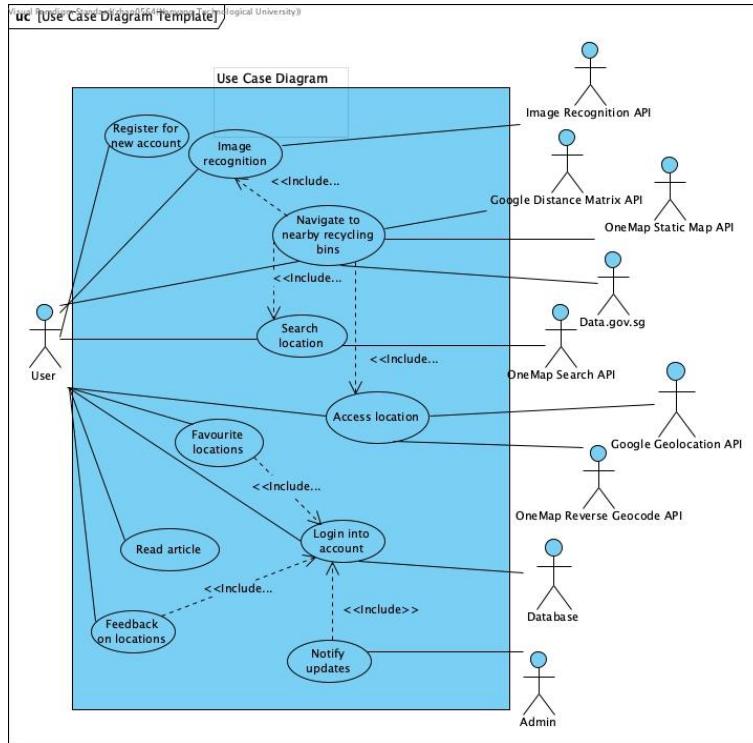
E-waste Recycling. (n.d.). Data.gov.sg. Retrieved November 5, 2022, from
<https://data.gov.sg/dataset/e-waste-recycling>

Welcome to Flask — Flask Documentation (2.2.x). (n.d.). Retrieved November 5, 2022, from
<https://flask.palletsprojects.com/en/2.2.x/>

2. Overall Description

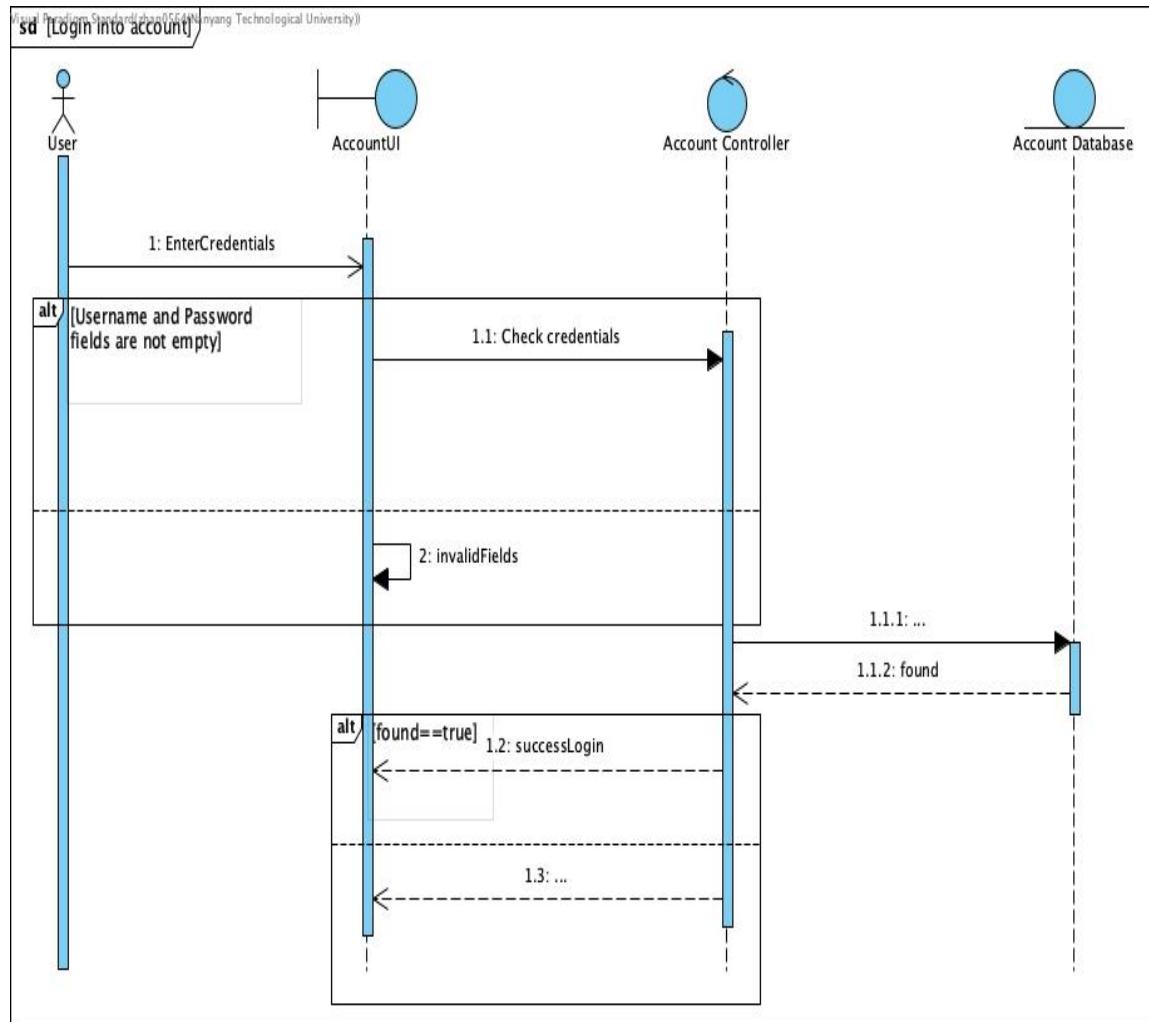
2.1 Product Perspective

RecycleBean is a **new, self-contained product** that our team has designed. The diagram below is the Use Case Diagram that we have created. It illustrates how each use case interacts with other use cases and external actors.

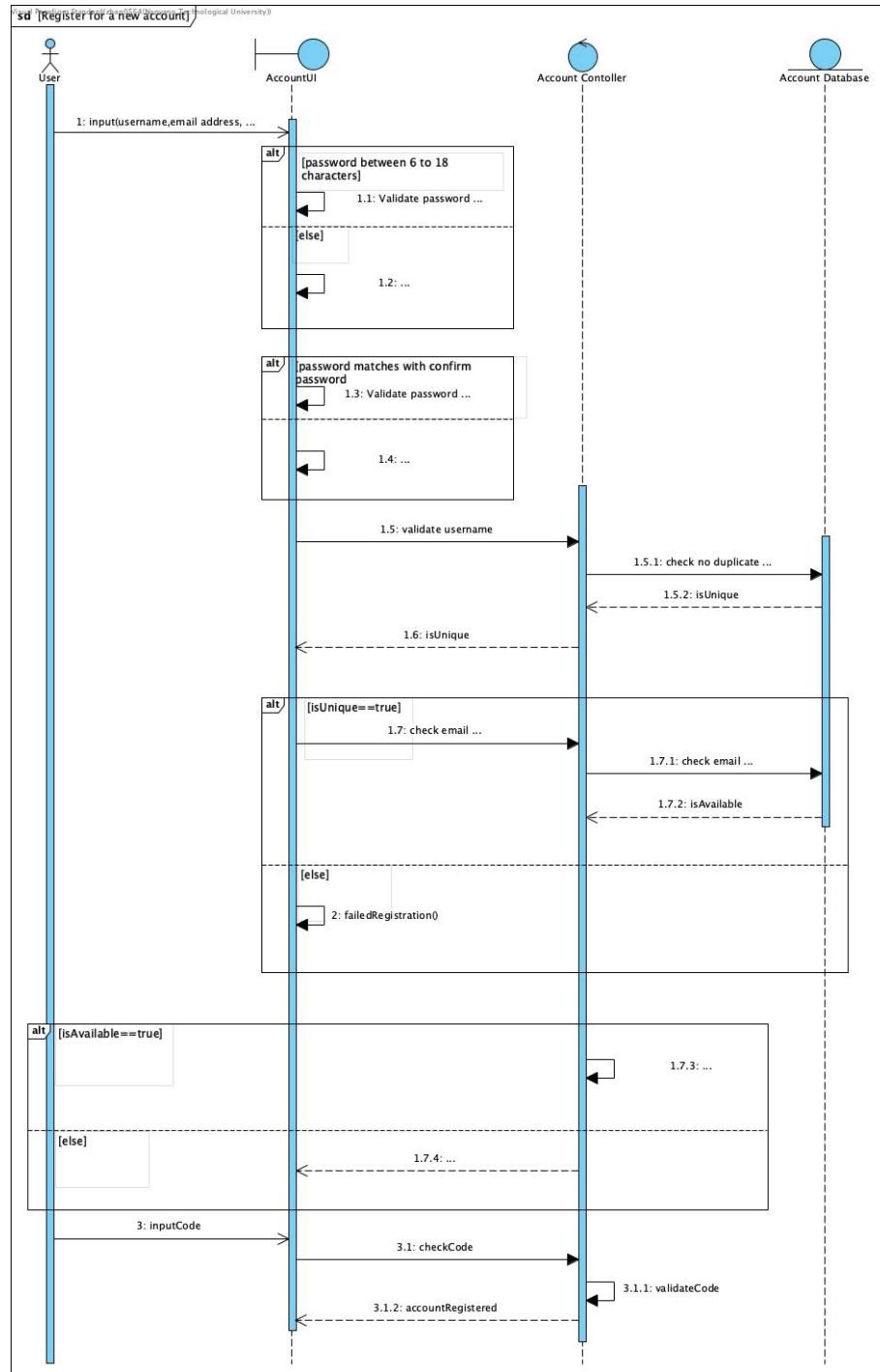


2.2 Product Functions

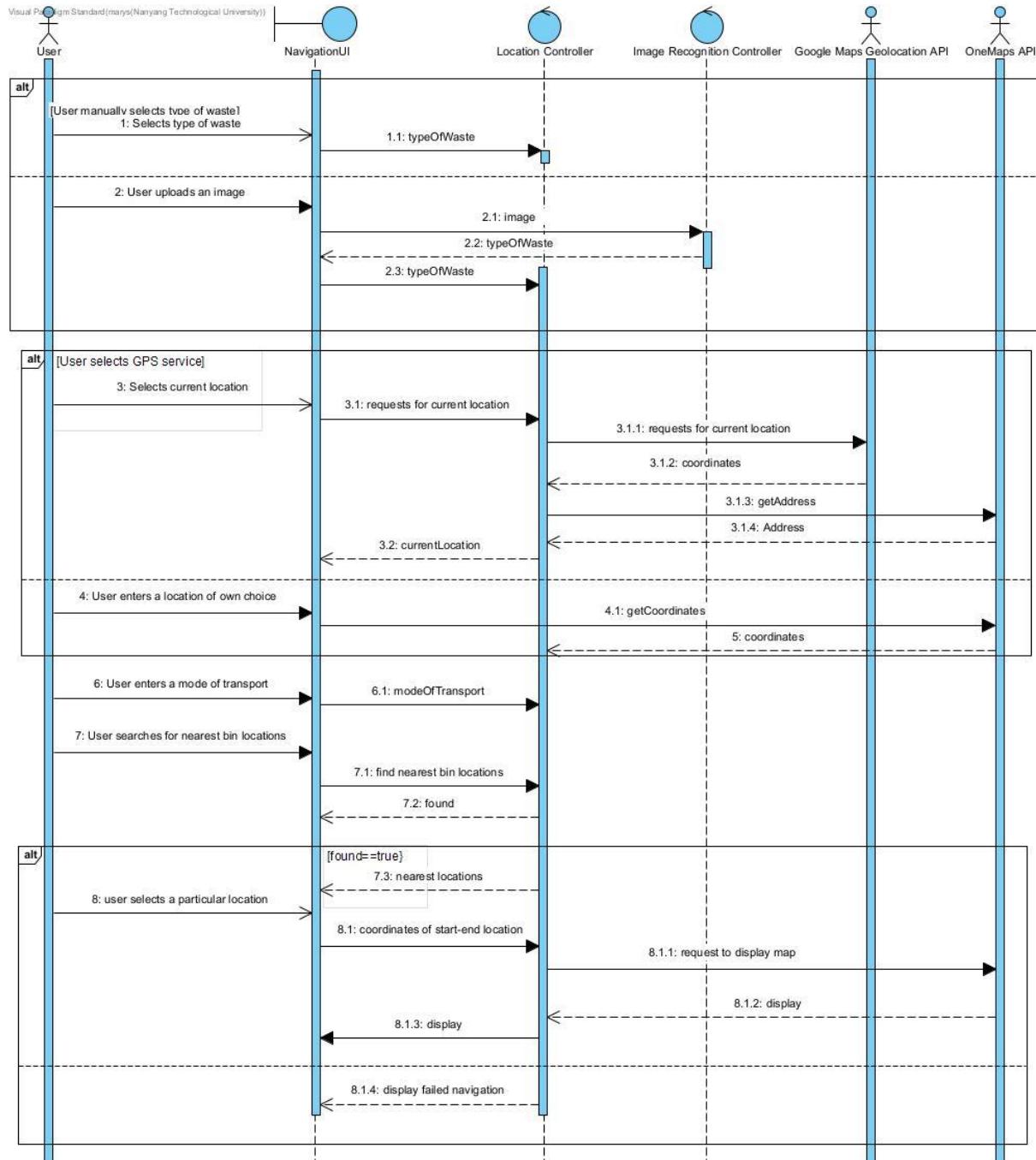
2.2.1 Login: Allow user to login with their account



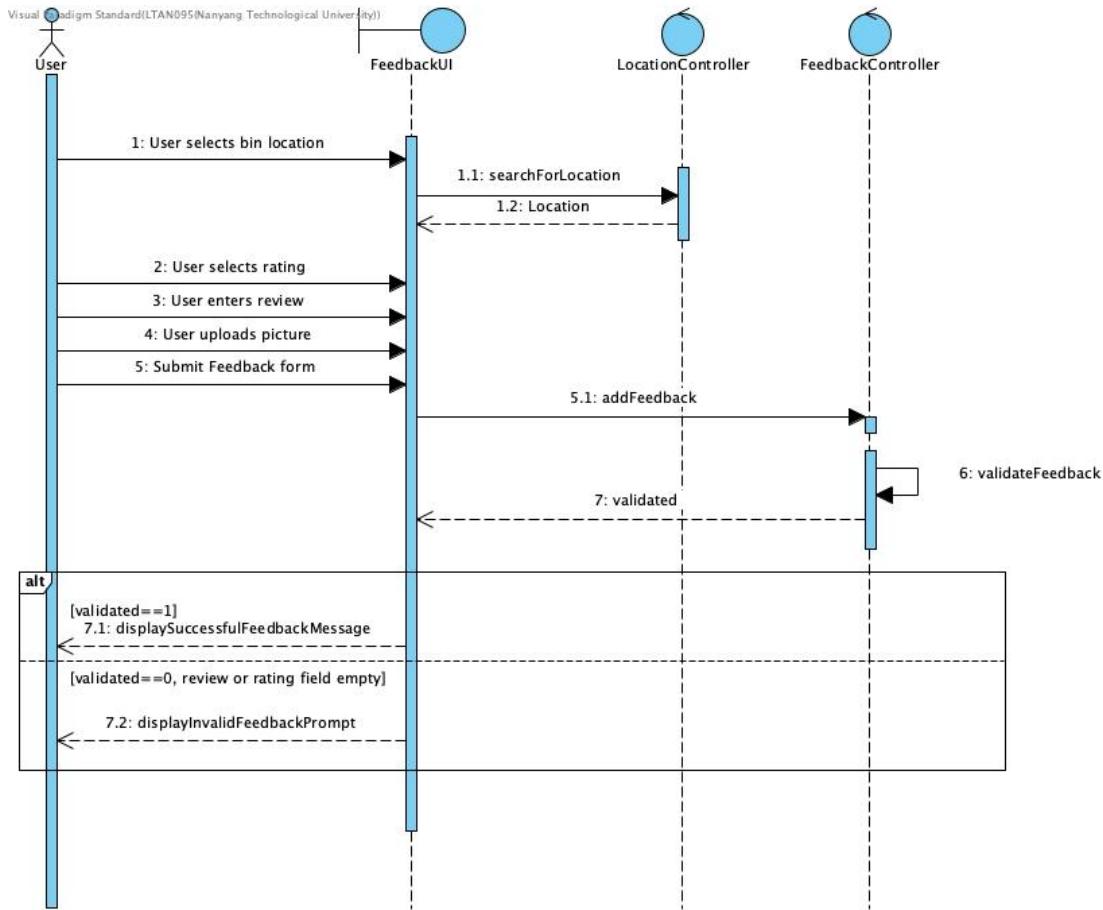
2.2.2 Register: Allow new user to create an account on our website



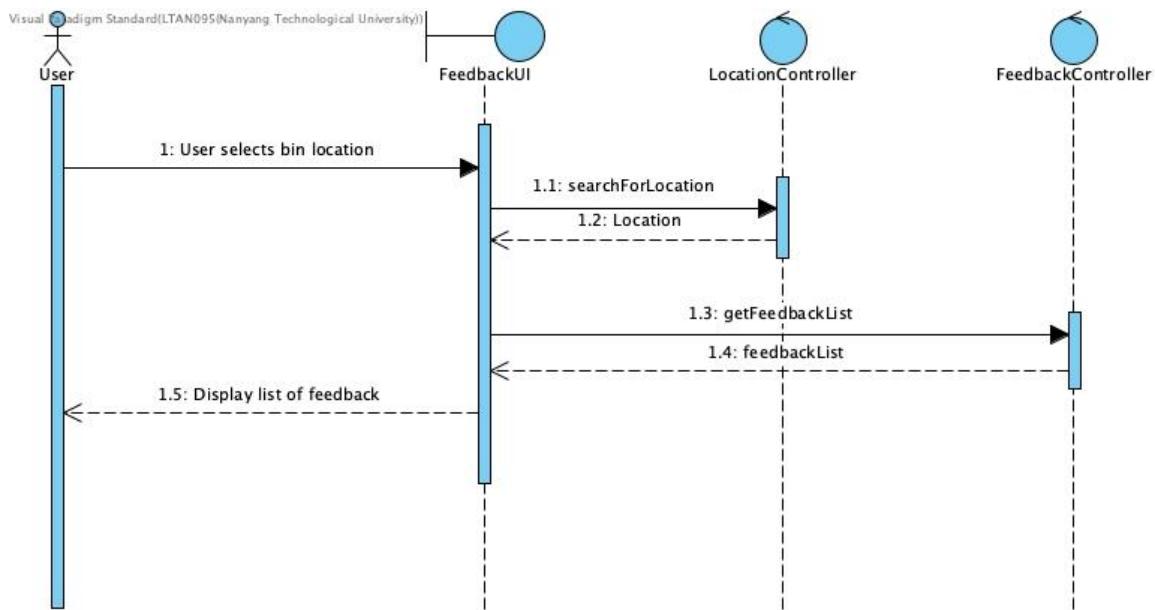
2.2.3 Navigate: Allow user to search for a list of recycling points nearest to their input location



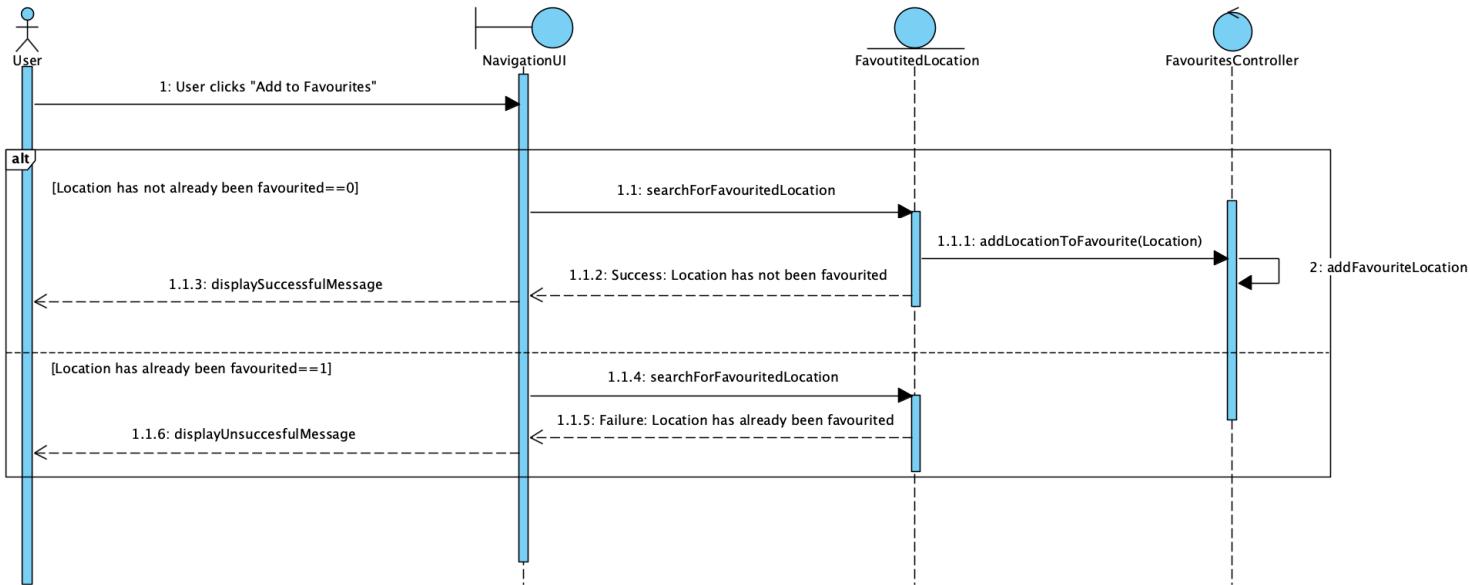
2.2.4 Create Feedback: Allow user to add feedback on a specific bin location



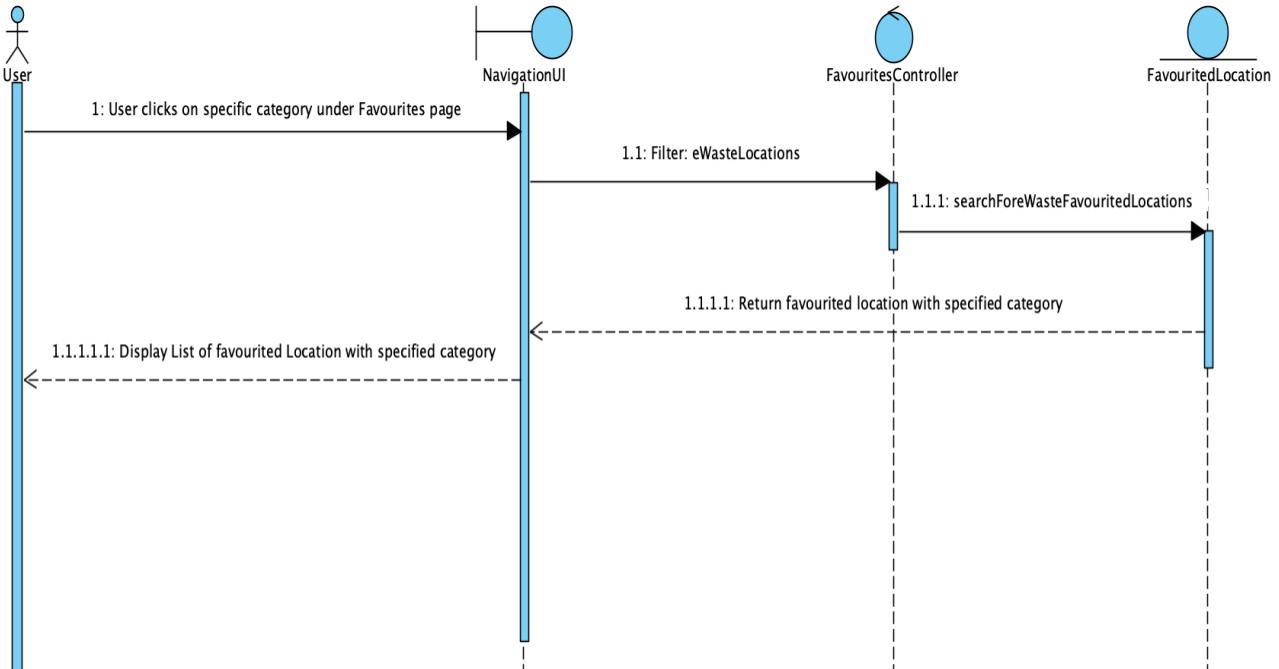
2.2.5 Display Feedback: Allow user to view a list of feedback on a specific bin location



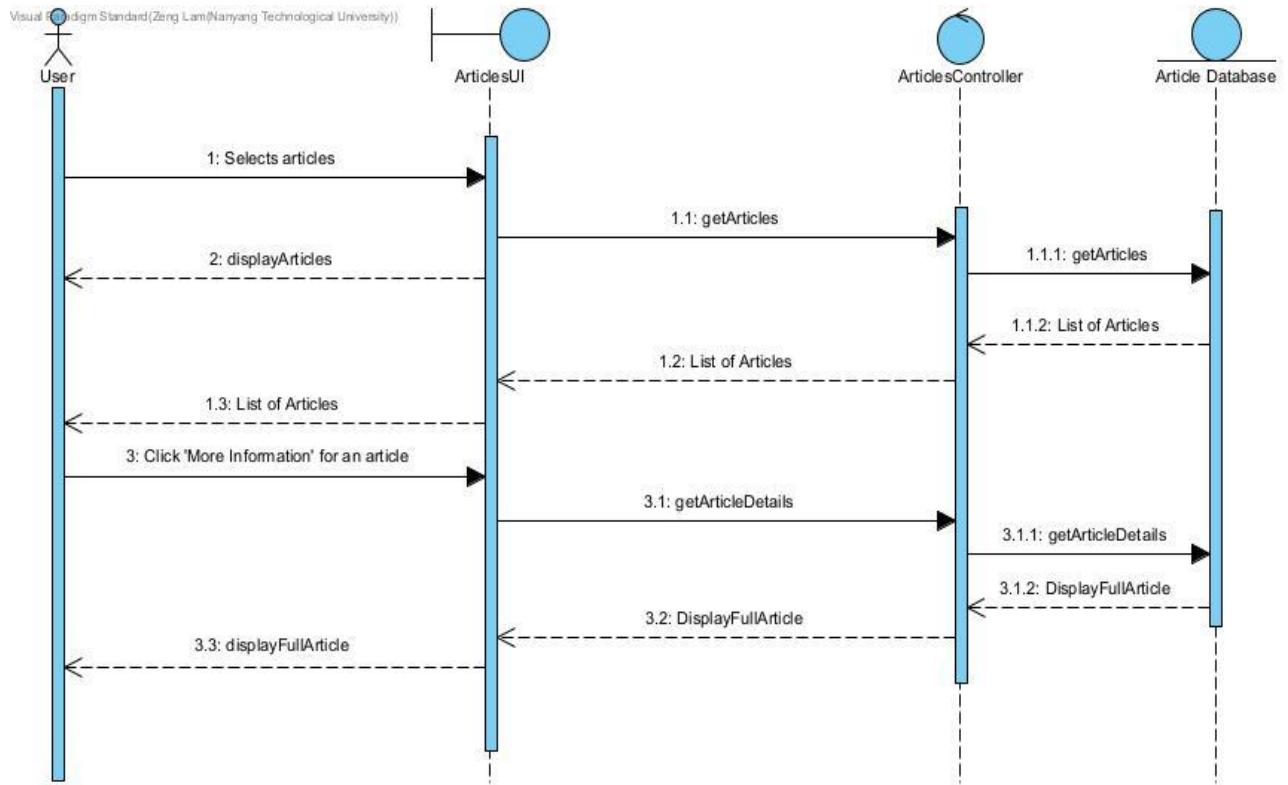
2.2.6 Add Favourites: Allow user to add specific bin locations as favourites.



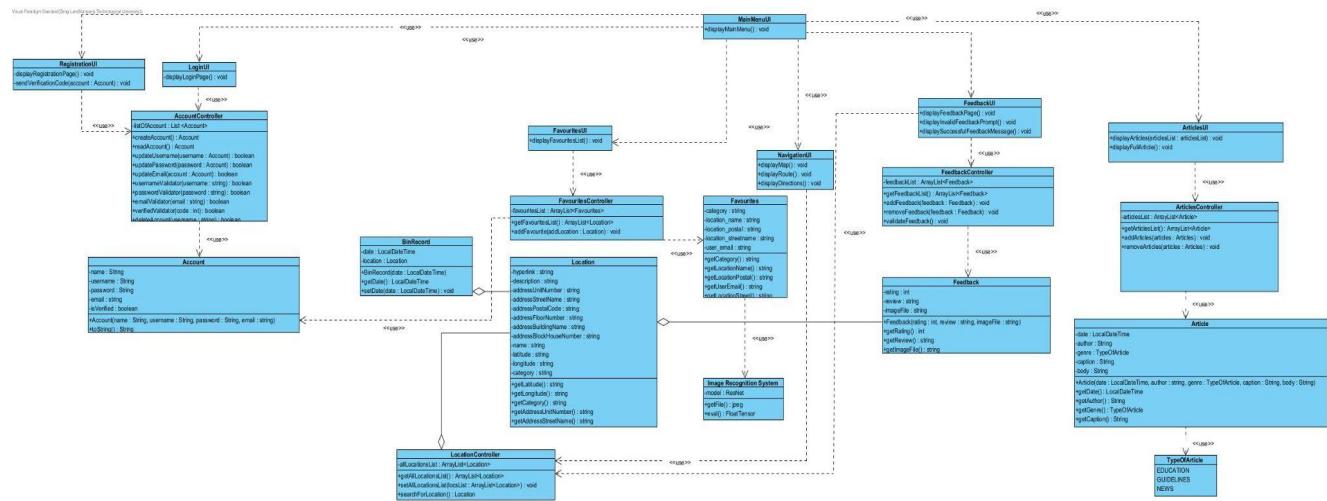
2.2.7 Display Favourites: Allow user to view list of favourited locations according to each waste category.

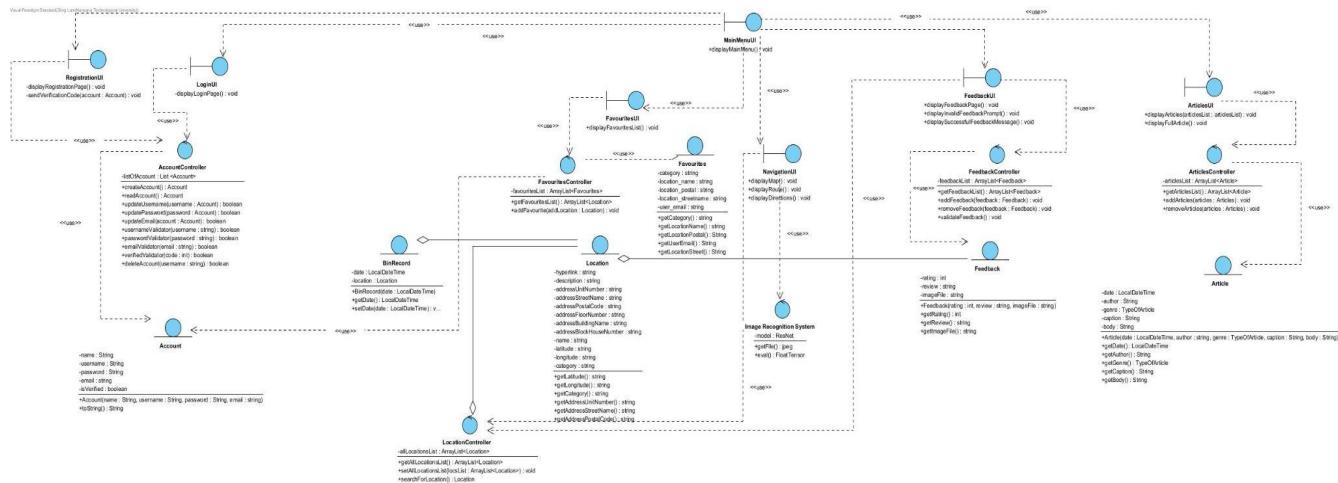


2.2.8 Display articles: Allow users to read up on articles



2.2.9 Overall Class Diagrams





2.3 User Classes and Characteristics

2.3.1 Administrators. This group of users is the product design team. The characteristics of **administrators** are as follows:

2.3.1.1 Frequency of Use. Once per day.

2.3.1.2 Product Functions Used. All available functions designed in this product will be utilised by administrators.

2.3.1.3 Technical Expertise. Administrators are to be conversant with the technologies used to design this product. Technologies include: (1) Flask Framework; (2) My SQLite; (3) Bootstrap.

2.3.1.4 Privilege Levels. Administrators will be granted additional privileged functions such as editing of the product's database, managing users, and updating relevant articles targeted to educate users on sustainable waste management.

2.3.2 Subscribed Users. This group of users refers to the general population in Singapore that signs up with RecycleBean. The characteristics of **subscribed users** are as follows:

2.3.2.1 Frequency of Use. 50 times per day.

2.3.2.2 Product Functions Used. Subscribed users will have access to these features: (1) Bin Navigator; (2) Article Library; (3) Feedback Forum; and (4) Bin Bookmark.

2.3.2.3 Technical Expertise. Subscribed users need not have any technical expertise. They will only have access to the product interface.

2.3.2.4 Privilege Levels. Subscribed users **will not** have any privilege functions.

2.3.3 **Visitors**. This group of users refers to the general population in Singapore that does not sign up with RecycleBean. The characteristics of **visitors** are similar to that of subscribed users, **with the exception** of a reduction of Product Functions Used. Visitors will only have access to (1) Bin Navigator; and (2) Article Library.

2.4 Operating Environment

2.4.1 In order to use our system, **administrators** are required to have Internet Explorer, Microsoft Edge, Google Chrome, Firefox, or Safari downloaded onto their Mac, Windows or Linux platform. In addition, the following softwares must be downloaded in order to scale, troubleshoot, or extend the product:

Software	Version	Remarks
Flask	2.2.2	
Flask-login	0.6.2	
Flask-mail	0.9.1	
Flask-sqlalchemy	2.5.1	
Flask-wtf	1.0.1	
itsdangerous	2.1.2	
email-validator	1.3.0	
werkzeug	2.2.2	
wtforms	3.0.1	
NumPy	1.23.3	
Pytorch	1.13.0.dev20220928	Pytorch-nightly
Torchaudio	0.13.0.dev20220928	Pytorch-nightly
TorchVision	0.14.0.dev20220928	Pytorch-nightly
Pillow	9.2.0	
BS4	0.0.1	
Beautifulsoup4	4.11.1	
Pandas	1.5.0	

2.4.2 In order to use our system, **subscribed users and visitors** are required to have Internet Explorer, Microsoft Edge, Google Chrome, Firefox, or Safari downloaded onto their Mac, Windows or Linux platform.

2.5 Design and Implementation Constraints

Developers need to have a laptop that has enough memory to load the app and the required files for the machine learning model. The developers must have SQLite installed. The app is developed using the Flask framework and HTML, CSS and JavaScript for frontend so the developers will be limited to these.

2.6 User Documentation

Every form component where users are required to input information, have headers to describe what information is required to be input. Every button also has a description on what clicking the button does. This helps users to navigate the app.

2.7 Assumptions and Dependencies

The server must have SQLite running.

The server must have a valid token for the One Map API.

The users must connect to the internet.

The users must be in Singapore.

The users' device must allow location services.

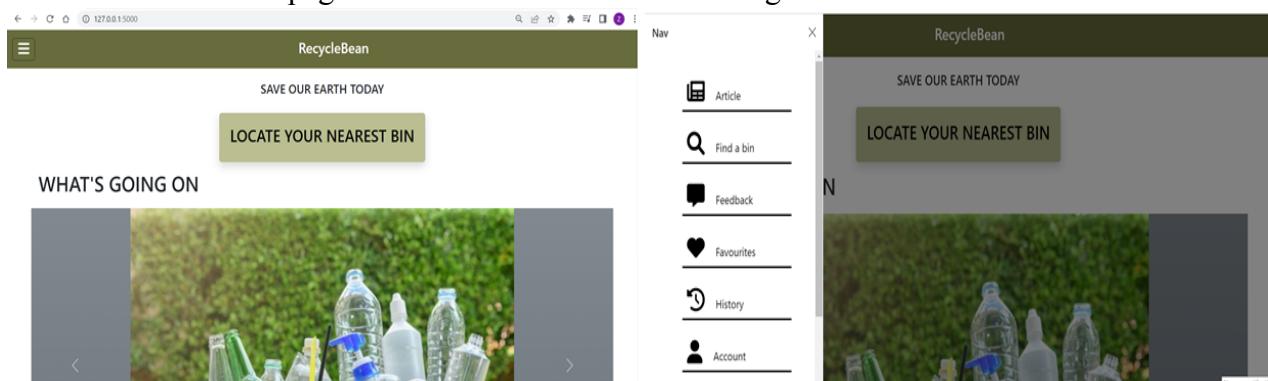
The users must have a valid email address.

The users must use a laptop.

3. External Interface Requirements

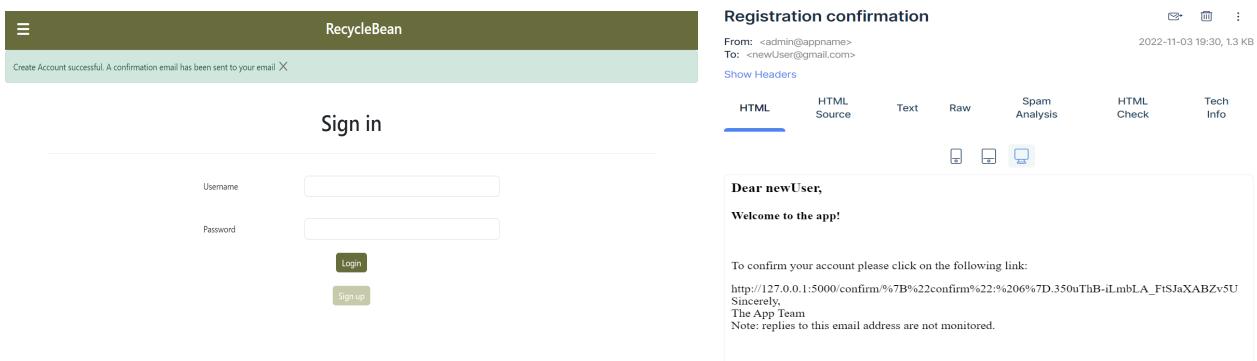
3.1 User Interfaces

3.1.1 This is the main page where users will see with a navigation bar on the side.



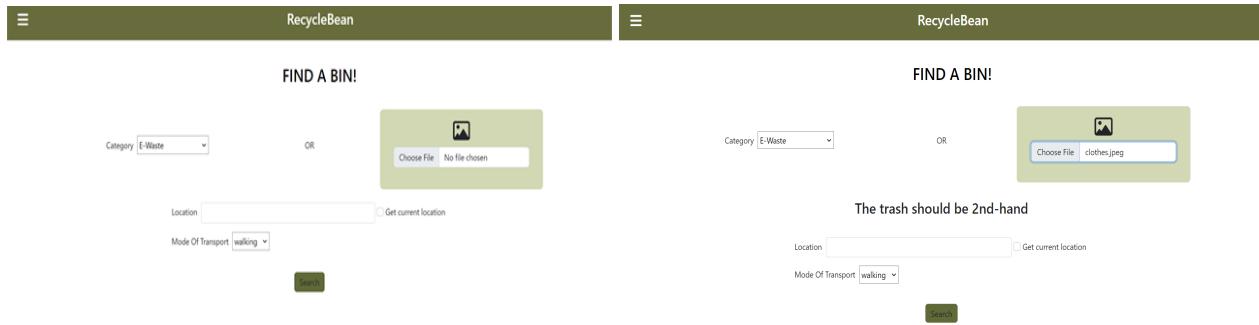
3.1.2 Users can create an account and login here

3.1.3 For successful registration and account confirmation via email



3.1.4 In these pages, users can read different articles

3.1.5 In this page, users can select the type of waste, starting location and mode of transport. For uncertainty in the type of trash, they can use our image recognition for identification.

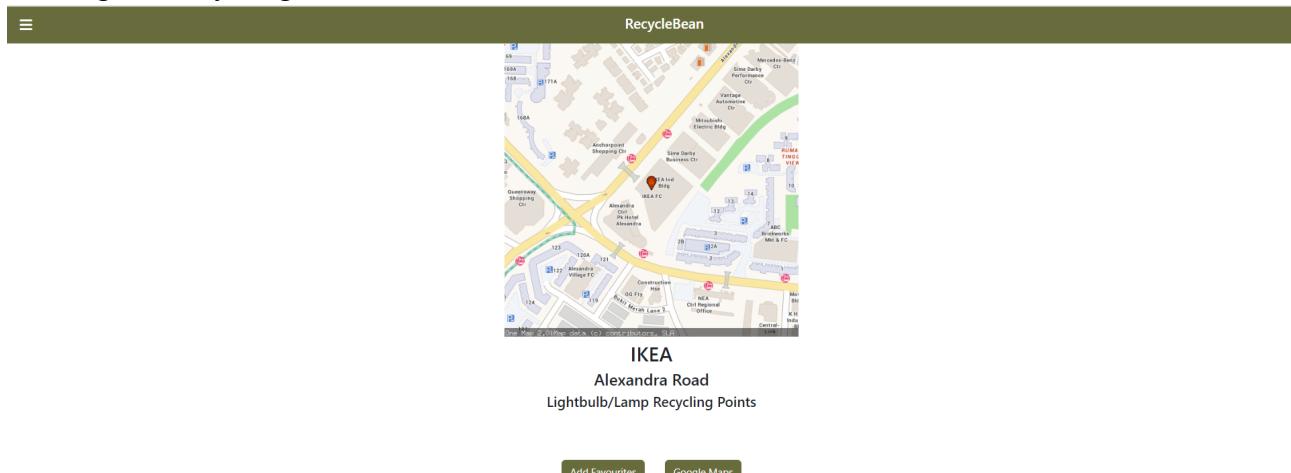


3.1.6 Results of the nearest recycling bins

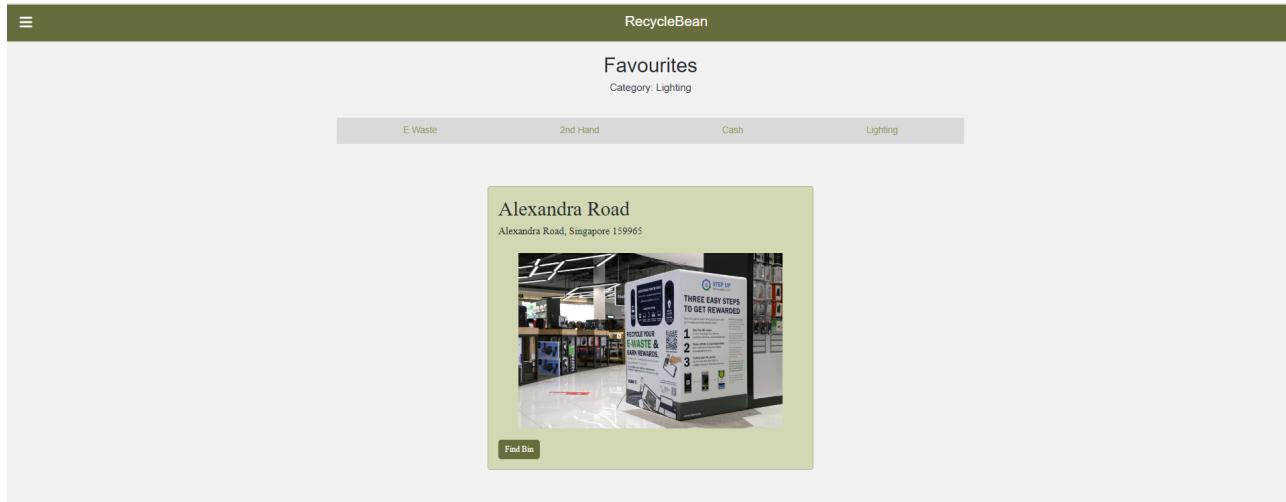
Showing bins for Lighting Waste near ntu



3.1.7 In this page, users can either favourite the location for future use or view the direction route for the given recycling bin location.



3.1.8 This page displays the locations that a user added to favourites



3.1.9 The left is a feedback form that users can add and the right is the list of posted feedback in a specific recycling bin location.

This screenshot shows two side-by-side sections of the RecycleBean app. On the left, a feedback form is displayed with fields for "Select a waste category" (set to "Cash for Trash"), "Select an address" (set to "Tampines Street 45"), and a "Rating" scale from 0 to 5 (set to 5). There's also a "Review" text input field and a "Create Feedback" button. On the right, a card for a recycling bin at "Tampines Street 45" is shown. The card includes a thumbnail image of the bin, a rating of "Rating: ★★★★", and a review summary "Review: Clean".

3.2 Hardware Interfaces

Supported Device Type : Linux, Mac, windows

Processor : M1 Chips 16G memory, Intel Core i7

Communication Protocols: Local host server (eg. 127.0.0.1)

3.3 Software Interfaces

Cookies: Used to store the current user information. The user information will be used as a global data and share between different pages.

Map API : Google Maps, One Map:

- When a request is sent from the website, System will use Google Maps API to search the path and geolocation of the bin.
- Use One Map to embed map inside the website.

Register:

- Input data: username, password, confirm password, email
- Processing details:
 - 1) Check whether username only contains characters, underscores, letters, or dots
 - 2) Check whether confirm password is the same as password
 - 3) Check email is a valid email
 - 4) Check the username is unique in the database
 - 5) Check the email is unique in the database
- Output result: Redirect to login page, flash message “ Register successful! Confirmation email has been sent”
- Connection: mailtrap.io smtp server

Login:

- Input data: Username, password
- Processing details:
 - 1) Check the username exists in the database
 - 2) Hash the input password
 - 3) Check the hashed input password equals to the hashed password in the database
- Output result: Redirect to main page, flash message “ Login successful” if username and password valid, “Unsuccessful login” otherwise

Article:

- Connection : External Organizations (NEA, gov.sg etc.)

Image recognition system:

- Input data: jpeg, jpg file
- Processing details:
 - 1) Convert file into byte io format
 - 2) Convert to io file into tensor
 - 3) Feed to tensor to the model
 - 4) Get result from the model and fill in the html block
- Output result: Trash category type

Find bin:

- Input data: string
- Processing details:
 - 1) Search the location
 - 2) Find the nearest bin according to the location and trash type
- Output result: Display best matching bins

Create feedback:

- Input data: select drop down, string, int, jpeg, jpg file
- Processing details:
 - 1) Save the image
 - 2) Add the rating and review into the database
- Output result: Redirect to main page, flash message “Feedback created successfully!”

Display feedback:

- Input data: select drop down
- Processing details:
 - 1) Query feedback given to selected location in database
- Output result: Display list of feedback on selected location

Favourite:

- Input data: add favourite request
- Processing details:
 - 1) Query location of the bin in database
 - 2) Add the bin information to the current user in database
- Output result: Current user's favourite bin

3.4 Communications Interfaces

- 3.4.1 smtp mail server : mailtrap.io
- 3.4.2 Forms: FlaskForm
- 3.4.3 Cookies : Storing current user information (username)
- 3.4.4 Website running server: Localhost
- 3.4.5 Hash: pbkdf2:sha1 algorithm

4. System Features

4.1 Register

4.1.1 Description and Priority

4.1.1.1 User will be able to create an account with their email

4.1.1.2 Priority: Medium

4.1.2 Stimulus/Response Sequences

4.1.2.1 Users enter username, password, confirm password, and email.

4.1.2.2 System check whether the input is validated.

4.1.2.3 System displays “Create account successful” and send confirmation email to the user.

4.1.2.4 System redirect to the login page

4.1.3 Functional Requirements

REQ-1: User must be able to create an account

REQ-2: User must create a unique username for their account

REQ-3: User must create a password for their account.

REQ-3-1: Password must be between 6 and 18 characters

REQ-4: System must send an email with a verification code to user to verify their email address for their first time login

AF-S-4.1.2.2: The username existed in the database.

1. System will display “Username is already taken”
2. Return to step 2.

AF-S-4.1.2.2: The email address input is invalid.

1. System will display “Invalid email address. Please try again.”
2. Return to step 2.

AF-S-4.1.2.2: The email address exists in the database.

1. System will display “Email address is already taken”
2. Return to step 2.

AF-S-4.1.2.2: System detects mismatch between the password and confirm password.

1. System displays error message “Password and Confirm Password mismatch. Please re-enter.”
2. Return to step 2.

4.2 Login

4.2.1 Description and Priority

4.2.1.1 User will be able to login application using their account

4.2.1.2 Priority: Medium

4.2.2 Stimulus/Response Sequences

4.2.2.1 User enters the username and password.

4.2.2.2 System verify the input is valid.

4.2.2.1 System display error message or otherwise display “successful login” and redirect to home page

4.2.3 Functional Requirements

REQ-1: User shall be able to login into the website

AF-S-4.2.2.2: System detects empty username or password fields.

1. System displays error message “Username or password field cannot be Empty.”
2. Return to step 2.

AF-S-4.2.2.2: Username and password does not match the database records

1. System will display “Incorrect username or password provided. Please Re-enter.”
2. Return to step 2.

4.3 Create Feedback

4.3.1 Description and Priority

4.3.1.1 User will be able to give rating, review, and upload an image as feedback on a particular recycling location.

4.3.1.2 Priority: Medium

4.3.2 Stimulus/Response Sequences

4.3.2.1 User selects the feedback icon from the navigation bar.

4.3.2.2 User clicks on “Add Feedback”.

4.3.2.3 User selects desired waste category.

4.3.2.4 User selects desired bin address.

4.3.2.5 User presses “Select location” button.

4.3.2.6 From a range of 1 to 5, user selects a rating.

4.3.2.7 User writes a text review.

4.3.2.8 User uploads desired picture.

4.3.2.9 User selects “Create Feedback” button.

4.3.2.10 System validates the rating, review, and picture.

4.3.3 Functional Requirements

REQ-1: User shall be able to create feedback on a specific bin location.

AF-S-4.3.2.6: User did not select a rating for the location.

1. System displays “Select one of these options”
2. Return to step 4.3.2.5.

AF-S-4.3.2.7: User did not provide any text review.

1. System displays “Fill out this field”.
2. Return to step 4.3.2.6.

4.4 Display List of Feedback on Specific Bin Location

4.4.1 Description and Priority

4.4.1.1 User will be able to display a list of feedback given to a particular recycling location.

4.4.1.2 Priority: Medium

4.4.2 Stimulus/Response Sequences

4.3.2.1 User selects the feedback icon from navigation bar.

4.3.2.2 User selects desired waste category.

4.3.2.3 User selects desired bin location.

4.3.2.4 User presses “Search” button.

4.3.2.5 User presses “Display” button.

- 4.3.2.6 System displays list of feedback according to desired location.
- 4.4.3 Functional Requirements
 - REQ-1: User shall be able to view a list of feedback given to a bin location.

4.5 Add Favourites

- 4.5.1 Description and Priority
 - 4.5.1.1 User shall be able to add a specific bin location to favourites.
 - 4.5.1.2 Priority: Medium
- 4.5.2 Stimulus/Response Sequences
 - 4.5.2.1 User navigates to “Find a bin” page.
 - 4.5.2.2 User clicks on “Add Favourites” button located below the picture of the location of the bin.
 - 4.5.2.3 System displays message indicating user has successfully added location to favourites.
- 4.5.3 Functional Requirements
 - REQ-1: User shall be able to add specific bin locations to their favourite list.
 - AF-S-1-4.5.2.2: User has already added location to favourites.
 - 1. System displays a message to indicate that the specific bin location has already been added to favourites.
 - 2. Specific location will not be added to favourites.

4.6 View Favourites

- 4.6.1 Description and Priority
 - 4.6.1.1 User shall be able to view list of favourited locations.
 - 4.6.1.2 Priority: Medium
- 4.6.2 Stimulus/Response Sequences
 - 4.6.2.1 User navigates to “Favourites” page.
 - 4.6.2.2 User can choose the category of the waste type on the favourites page.
- 4.6.3 Functional Requirements
 - REQ-1: User shall be able to view their list of favorited locations based on the category.

4.7 Image Recognition

- 4.7.1 Description and Priority
 - 4.7.1.1 User shall be able to choose a trash picture and get trash type result
 - 4.7.1.2 Priority: Medium
- 4.7.2 Stimulus/Response Sequences
 - 4.7.2.1 User clicks upload file.
 - 4.7.2.2 User selects the image file that they want to upload.
 - 4.7.2.3 System display the result according to the model
- 4.7.3 Functional Requirements

REQ-1: User shall be able to choose a trash picture and get trash type result

4.8 Email confirmation

4.8.1 Description and Priority

4.8.1.1 User shall be able to receive email confirmation after create the account

4.8.1.2 Priority: Medium

4.8.2 Stimulus/Response Sequences

4.8.2.1 User clicks “register” from the register use case with valid credentials.

4.8.2.2 User receives a email with a given link to confirm the account

4.8.2.3 User navigates to the given link

4.8.2.4 System shows that the user’s account is confirmed

4.8.3 Functional Requirements

REQ-1: User must be able to receive email confirmation with url after create the account

REQ-2: User must be able to confirm their account when they access the website with the given account

AF-S-4.8.2.3: User enters an incorrect url link:

1. Account will not be confirmed
2. Redirect to main page

4.9 Read Articles

4.9.1 Description and Priority

4.9.1.1 Users will be read articles to gain knowledge on recycling

4.9.1.2 Priority: Medium

4.9.2 Stimulus/Response Sequences

4.9.2.1 User navigates to “Articles” page

4.9.2.2 User selects an article

4.9.2.3 User will be able to read the article

4.9.3 Functional Requirements

REQ-1: User must be able to view at least one article about the importance of recycling

REQ-2: User must be able to view the following information in an article:

REQ-2.1 Author of the article

REQ-2.2 Date of publication

REQ-2.3 Caption of the article

REQ-2.4 Genre of the article

REQ-2.5 Content of the article

REQ-3: User must be able to view other organisational sites for more information

AF-S-4.9.2.2: User clicks on an external organisation site:

1. User will be redirected to the selected to the selected organisational site
2. User can read the latest updates and information from this organisational site

4.10 Navigate to nearest bin

4.10.1 Description and Priority

4.10.1.1 Users will search for recycling locations nearest to their location

4.10.1.2 Priority: High

4.10.2 Stimulus/Response Sequences

4.10.2.1 User navigates to “Find a bin” page

4.10.2.2 User selects category of waste

4.10.2.3 User inputs location

4.10.2.4 User selects mode of transport

4.10.2.5 User clicks search

4.10.2.6 User selects a specific bin location

4.10.2.7 User will be able to see details of selected location

4.10.3 Functional Requirements

REQ-1: User must be able to view list of locations nearest to them

REQ-1.1: List of locations must be arranged from nearest to input location to furthest

REQ-2: System must be able to get user’s current location

REQ-2.1: User must be able to manually input a location to search

REQ-3: System must be able to show user the location of the bin on a map

REQ-4: User must be able to click specific bins to view the bin’s details

REQ-5: User must be able to add the bin to favourites

REQ-6: User must be able to be redirected to Google Maps routing directions

AF-S-4.10.2.2: User uploads an image of waste to be categorised:

1. System will display the category of waste in the image uploaded

AF-S-4.10.2.3: User selects Get Current Location

1. System will flash a message to show where is the current location

5. Other Nonfunctional Requirements

5.1 Performance Requirements

5.1.1 All pages on the web application will load within 5 seconds.

5.1.2 The system shall not crash when the user opens the application.

5.1.3 After a system reboot, the application shall fully restore functionality within 30 seconds.

5.1.4 Errors will be flashed on screen within 1 second.

5.1.5 System shall validate a user sign-up within 10 seconds.

5.1.6 The validation email with confirmation token shall arrive within 30 seconds.

5.1.7 System shall validate a user log-in within 10 seconds.

5.1.8 Selected article shall load within 3 seconds.

5.1.9 Image Recognition model shall detect the type of waste in uploaded image within 10 seconds.

5.1.10 System shall get current location of user within 5 seconds.

5.1.11 System shall provide the list of nearby bins within 10 seconds.

- 5.1.12 System shall validate a user action of favouriting a bin location within 3 seconds.
- 5.1.13 List of favourite locations shall load within 10 seconds.
- 5.1.14 System shall validate a user's feedback form within 5 seconds.
- 5.1.15 List of feedback on a bin location shall load within 10 seconds.
- 5.1.16 80% of the first users must be able to learn how to utilise all features of the application within 5 minutes.

5.2 Safety Requirements

- 5.2.1 User can get a list of nearby bins by revealing their current location to the system. This personal location information shall not be stored in the system.
- 5.2.2 System shall hash all passwords before storing them into the database.
- 5.2.3 User's account information shall not be shared with third-party companies.

5.3 Security Requirements

- 5.3.1 APIs shall be implemented
 - 5.3.1.1 Google API shall be used to get route, distance and time taken to reach destination.
 - 5.3.1.2 One Map API shall be used to get longitude and latitude of current location.
- 5.3.2 The system shall handle exceptions
 - 5.3.2.1 During the creation of an account, an error message shall be displayed if user signs up with an invalid email address.
 - 5.3.2.2 During the creation of an account, an error message shall be displayed if a user entered an email address which has already been registered.
 - 5.3.2.3 During the creation of an account, an error message shall be displayed if a user's confirmed password differs from the password.
 - 5.3.2.4 During the verification of account, an error message shall be displayed if a user entered the wrong verification code.
 - 5.3.2.5 During the navigation of the feedback page, an error message shall be displayed if the user has not logged in.
 - 5.3.2.6 During the navigation of the feedback page, an error message shall be displayed if the user submits feedback without rating.
 - 5.3.2.7 During the navigation of the feedback page, an error message shall be displayed if the user submits feedback without review.
 - 5.3.2.6 During the navigation of the favourites page, an error message shall be displayed if the user has not logged in.
 - 5.3.2.7 During the navigation of the find bin page, a reminding message shall be displayed if the user entered an invalid location.
 - 5.3.2.8 During the navigation of the find bin page, a reminding message shall be displayed if the user add already favourited locations.
- 5.3.3 The application shall keep user information confidential
 - 5.3.3.1 User email and password shall be kept confidential at all times.
 - 5.3.3.2 User username shall not be revealed in feedback page.
 - 5.3.3.3 User favourited locations shall remain confidential.
 - 5.3.3.4 User current location shall remain confidential and be only be used to get route.

5.4 Software Quality Attributes

5.4.1 Availability

- 5.4.1.1 The application shall be accessible to anyone who owns a computer.
- 5.4.1.2 The application shall be accessible to anyone with access to Wifi.

5.4.2 Interoperability

- 5.4.2.1 The application shall be able to work with Google API.
- 5.4.2.2 The application shall be able to work with OneMap API.
- 5.4.2.3 The application shall be able to work with SQLite.
- 5.4.2.4 The application shall be able to work with PyTorch.

5.4.3 Accuracy

- 5.4.3.1 The application shall pin point user location accurately using longitude and latitude obtained from OneMap API.

5.4.4 Flexibility

- 5.4.4.1 The application shall be responsive to all screen sizes

6. Other Requirements

Setting up mail server

1. Go to <https://mailtrap.io/>
2. Click “sign up” button if you don’t have an account
3. Create a free account
4. Go to Sandbox – inboxes at the side dashboard
5. Click at the inbox you want to use
6. Go to SMTP settings
7. Choose Flask-Mail at Integrations
8. Copy the setting below and paste it to `__init__.py` under `create_app()`
9. Uncomment the sending email function in `view.py`
10. Run the app

Setting up machine learning model

1. Go and download model checkpoints
<https://drive.google.com/drive/folders/1e3pajKB8ogWH-BynGu3k2B6rOedngEma?usp=sharing>
2. Create a folder inside app and put the checkpoints there
3. Edit the hard code path for loading checkpoints

Setting up dataframes

1. Go to `initDataFrame.py` under the app folder
2. Go to lines 86,87,91 and 177, replace the path with the absolute paths of `secondhand.kml`, `cash-for-trash-kml.kml`, `lighting-waste-collection-points-kml.kml` and `e-waste-recycling-kml.kml` respectively.

```

86 df1 = create_df(r'C:\Users\marys\OneDrive\Documents\GitHub\SC2006-Software-Engineering_Team_RuntimeError')
87 df2 = create_df(r'C:\Users\marys\OneDrive\Documents\GitHub\SC2006-Software-Engineering_Team_RuntimeError')
88
89
90 #initialise df4 for lighting waste
91 path =r'C:\Users\marys\OneDrive\Documents\GitHub\SC2006-Software-Engineering_Team_RuntimeError\appname\

```

Setting up OneMap API key

1. Private API key is needed for getAddress(lat,long) in view.py.
2. This key expires every 3 days. (Update: Current key will expire on 31/10/2022)

Step 1: Sign up for an account at <https://developers.onemap.sg/register>

A Singapore Government Agency Website

Map ONEMAP

Register for an
OneMap API account

First Name:

Last Name:

Company:

Email:

Confirm Email:

I'm not a robot

In order to process your request, please read the [Personal Data Notice \(PDN\)](#) document and acknowledge your consent by checking the checkbox.

I Consent

By submitting, I agree to the [Terms and Conditions](#) for the use of Onemap API.

SUBMIT

3. To get a new token after it expires:
4. 1. Go to <https://www.onemap.gov.sg/docs/#register-free-account>
5. 2. Follow the instructions given to register an account
6. 3. If you already have an account and forgot the password, go to <https://www.onemap.gov.sg/docs/#forget-password>
7. 4. Follow the instructions given to change password and retrieve new token
8. Copy and paste the token into "token =" as shown in line 115 of the following picture

```

113 def getAddress(lat,long):
114     # print("your lat is " + str(lat) + " long is " + str(long))
115     token = 'eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.eyJzdWIiOiJkzNjEsInVzZXJfaWQo0jkzNjEsImVtYWlsIjoibWFyeXNvaGhjQGdtYWlsLmNvbSIiImZvcmV'
116     #token expires every 3 days, get a new one at one map api after 31 oct (pls update this date)
117     req = requests.get('https://developers.onemap.sg/privateapi/commonsvc/revgeocode?location=' + str(lat) + ',' + str(long) +
118                         '&token=' + token)

```

Appendix A: Glossary

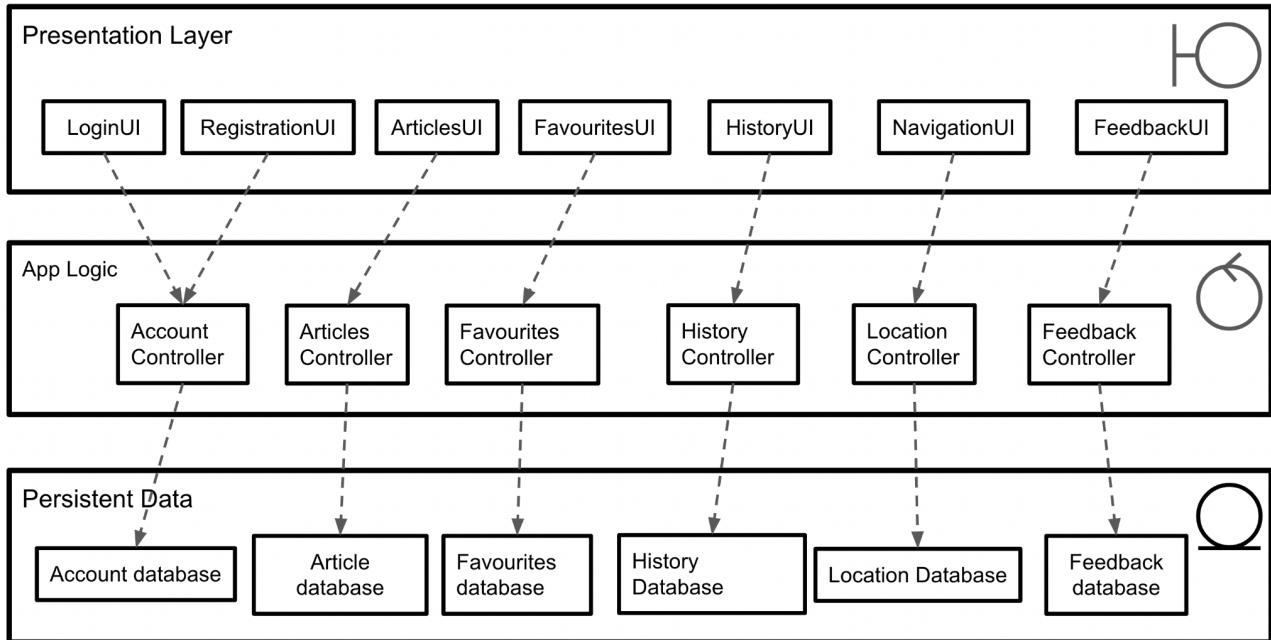
Data Dictionary

No.	Term	Definition
1	User	Any person who visits the web application to utilise its services (i.e. to find a suitable waste bin to discard their specific type of waste).
2	System	The <application_name> web application.
3	Username	The unique name attached to a user's account, chosen by the user at the time of registration. No two users can have the same username.
4	Navigation	Directions to the user's chosen waste bin location, which will be displayed along with a map.
5	Rating	The number of stars a user gives to a specific waste bin location based on the user's assessment on its qualities (e.g. accessibility, cleanliness).
6	Review	Text feedback that a user gives to a specific waste bin location based on the user's assessment on its qualities (e.g. accessibility, cleanliness).
7	Registration	A feature whereby a user signs up for an account on the website using a chosen username and password.
8	Recycling History	A feature which shows a list of waste bin locations that the user had previously visited, as well as the type of waste they discarded there. Only users with accounts can access this feature.
9	Favourites	A feature which allows users to bookmark waste bin locations that they like or frequent. Users can retrieve a list of their favourite locations or remove favourites too. Only users with accounts can access this feature.
10	Image Recognition Model	A machine learning model that can identify objects from photographs and pinpoint the category of waste said object falls under (e.g. lighting, e-waste).
11	API	An Application Programming Interface that can enable <application_name> to communicate with other applications such as Google Maps.
12	Notification	A feature whereby an email is automatically sent to a user to inform them of changes in waste bin details or remind them to recycle. Only users with accounts can access this feature.
13	Global	Satellite navigation system used to determine the user's precise location.

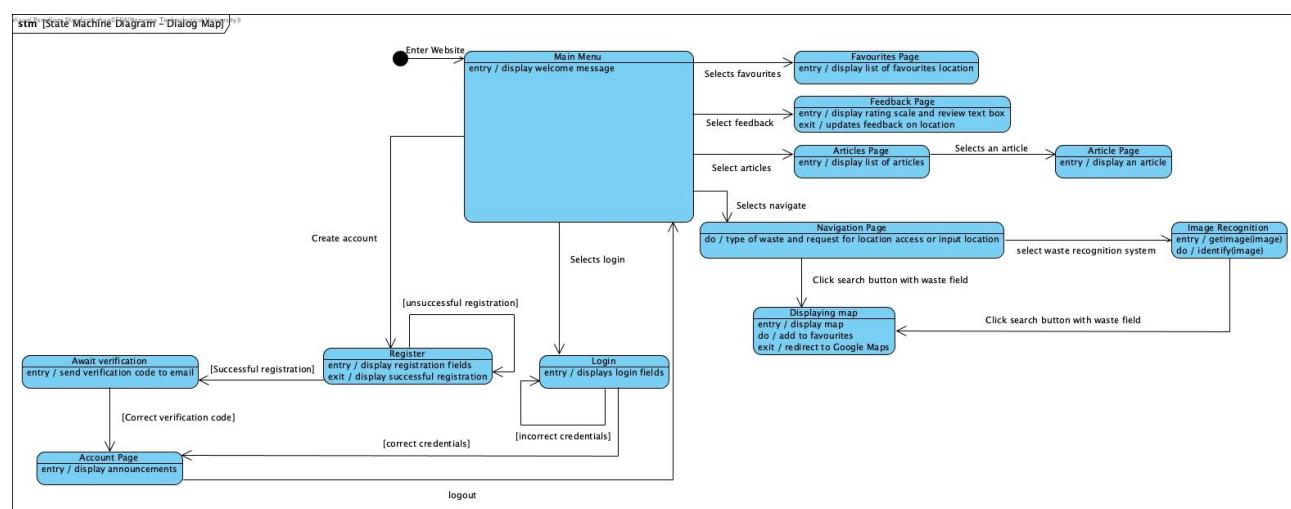
	Positioning System (GPS)	
--	--------------------------	--

Appendix B: Analysis Models

Software Architecture



Dialog Map



Test Case Table

Use Case	Input	Expected Output	Actual Output	Status
Register	Username: "" Password: "" Confirm Password: "" Email: ""	Display Error "Please fill in the fields"	Display Error "Please fill in the fields"	Approval
Register	Username: "John" Password: "12345" Confirm Password: "123" Email: "abcde"	Display Error "Password must be the same" "Please enter a valid email"	Display Error "Password must be the same" "Please enter a valid email"	Approval
Register	Username: "John" Password: "12345" Confirm Password: "12345" Email: "John@xyz.com"	Redirect to login page Flash message "Create Account successful. A confirmation email has been sent to your email"	Redirect to login page Flash message "Create Account successful. A confirmation email has been sent to your email"	Approval
Register	Username: "John" Password: "12345" Confirm Password: "12345" Email: "John@xyz.com"	Display Error "Username already exists" "Email already exists"	Display Error "Username already exists" "Email already exists"	Approval
Login	Username: "John" Password: "12345"	Redirect to main page Flash message "Login successful"	Redirect to main page Flash message "Login successful"	Approval
Login	Username: "Jo" Password: "123"	Flash message "Invalid username or password"	Flash message "Invalid username or password"	Approval
Account	current_user == None	Redirect to login page Flash message "Please login to access this page"	Redirect to login page Flash message "Please login to access this page"	Approval
Image recognition	File: "clothes8.jpg"	Display message "The trash should be 2 nd hand"	Display message "The trash should be 2 nd hand"	Approval
Image recognition	File: "5wh0lsj1gtwy.jpg"	Display message "The trash should be E-waste"	Display message "The trash should be E-waste"	Approval
Image recognition	File: "5-1-1-1.jpg"	Display message "The trash should be E-waste"	Display message "The trash should be cash for trash"	Failed
Image recognition	File: "0902ledlighting.jpg"	Display message "The trash should be lightning waste"	Display message "The trash should be lightning waste"	Approval

Image recognition	File: "plastic7.jpg"	Display message "The trash should be cash for trash"	Display message "The trash should be cash for trash"	Approval
Navigate to Nearest Recycling Bin	Category: "Lighting Waste" Location: "Choa Chu Kang" Get Current Location: Unchecked Mode of Transport: "transit"	Display message "Showing bins for Lighting Waste for Choa Chu Kang" Displays list of Lighting Waste Bins in ascending order of distance.	Display message "Showing bins for Lighting Waste for Choa Chu Kang" Displays list of Lighting Waste Bins in ascending order of distance.	Approval
Navigate to Nearest Recycling Bin	User option of bin choice	Redirect to selected bin page Display content Selected Bin Name Location Type of Bin	Redirect to selected bin page Display content Selected Bin Name Location Type of Bin	Approval
Navigate to Nearest Recycling Bin	User option of Google Map	Redirect to Google Maps with bin location inputted	Redirect to Google Maps with bin location inputted	Approval
Navigate to Nearest Recycling Bin	Category: "Lighting Waste" Location: "" Get Current Location: Unchecked Mode of Transport: "transit"	Flash message "No location found! Please try again."	Flash message "No location found! Please try again."	Approval
Access Locations	Category: "Lighting Waste" Location: "Choa Chu Kang" Get Current Location: Checked Mode of Transport: "transit"	Flash message "Current location is: (User's current location) BLK 315 YISHUN RING RD" Display list of Lighting Waste Bins in ascending order of distance to user's current location	Flash message "Current location is: (User's current location) BLK 315 YISHUN RING RD" Display list of Lighting Waste Bins in ascending order of distance to user's current location	Approval
Access Locations	Category: "Lighting Waste" Location: "Choa Chu Kang" Get Current Location: Checked Mode of Transport: "transit" User does not allow GPS access on their device	Flash message "No location found! Please try again."	Flash message "No location found! Please try again."	Approval
Display Feedback	Select a waste category: "Lighting Waste" Select a location: "Siglap Road"	List of feedbacks given for location	List of feedbacks given for location	Approval

	Press “Search” and “Display”			
Create Feedback	Press “Add Feedback” button Select a waste category: “Lighting Waste” Select an address: “Siglap Road” Press “Select Location” Rating: “4” Review: “Good” Choose file: Add any picture of choice	Redirect to “Create Feedback” page Redirect to home page Flash “Feedback created successfully!”	Redirect to “Create Feedback” page Redirect to home page Flash “Feedback created successfully!”	Approval
Create Feedback	Rating: “” Review: “”	Display Error “Please fill in the fields”	Display Error “Please fill in the fields”	Approval
Create Feedback	Choose file: “”	Picture uploaded will be default picture	Picture uploaded will be default picture	Approval
Add Favourites	Selects “Add Favourites” under “Find a bin” page	Flash “Favourites added successfully”	Flash “Favourites added successfully”	Approval
Add Favourites	Selects “Add Favourites” under “Find a bin” page with the same location as previous test case	Flash “Favourites has already been added!”	Flash “Favourites has already been added!”	Approval
Display Favourites	Selects a waste category “Lighting Waste”	List of favourited location with lighting waste as category displayed	List of favourited location with lighting waste as category displayed	Approval
Display Favourites	Selects another waste category “Second-hand”	List of favourited location with second hand as category displayed	List of favourited location with second hand as category displayed	Approval
Read Article	Selects Articles	Redirect to articles page	Redirect to articles page	Approval
Read Article	Selects “more information” for article “how do you know what to recycle”	Display Written by: John Tan Published on: 11 February 2019	Display Written by: John Tan Published on: 11 February 2019	Approval
Read Article	Selects NEA in “other organisation sites”	Redirect to nea.gov.sg	Refirect to nea.gov.sg	Approval

Appendix C: To Be Determined List

Source: http://www.frontiernet.net/~kwiegers/process_assets/srs_template.doc