SQUANDER

CAPSTONE PROJECT
- FALL 2022
PROF HENRY WONG

Aakansha Agarwala
Austin Blaise
Nicholas Wong
Rajat Nagavkar
Suryadeep Nallana

AGENDA

- Team Members
- Project Overview
- Personas
- Technologies
- Design Architecture
- Sprint Overview
- Product Backlog
- Sprint Backlog
- Retrospective
- Future Sprint
- Project Demo
- Conclusion

TEAM MEMBERS
ROLES & RESPONSIBILITIES

Aakansha Agarwala: Project Manager/Scrum Master
1. Led team meetings and kept the team on task
2. Maintains the project's GitHub repository and Wiki
3. Documented test cases and co-authored technical paper

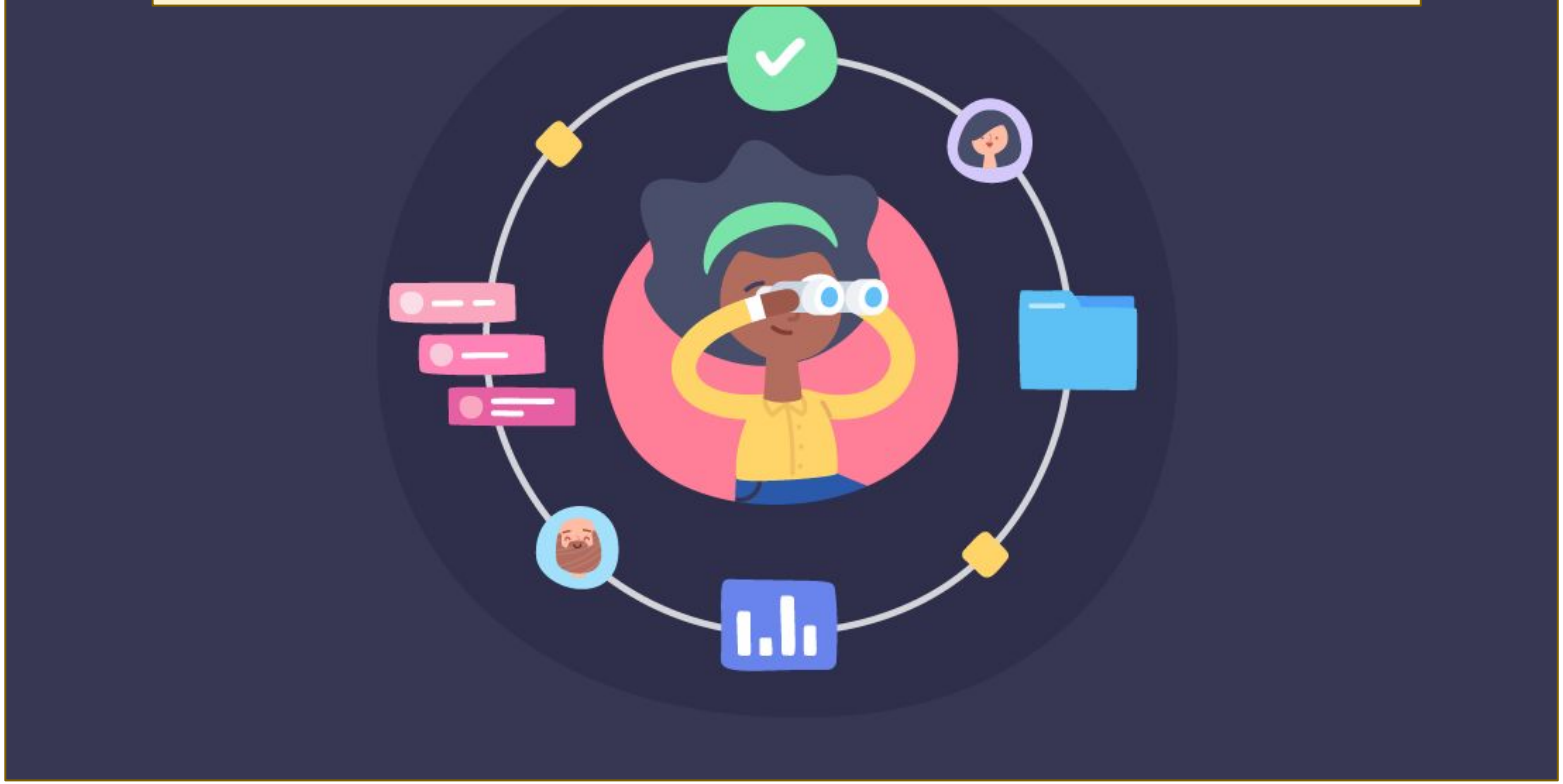
Austin Blaise: Cloud Engineer
1. Contribute to the architecture of the project
2. Creates Infrastructure as code
3. Integrated features and services

Nicholas Wong: Machine Learning Engineer
1. Design Computer Vision Model Architecture
2. Train and Evaluate Model Performance
3. Gather representative image data for training

Rajat Nagavkar: Ios Developer
1. Design and Development of Application.
2. Integrating ML model to provide specified results.
3. Testing the app to provide a better user experience.

Suryadeep Nallana: FullStack Developer/Quality Analyst
1. Contribution to design and development of the app layout
2. Authored technical document of the project
3. Working towards making our app user-friendly

PROJECT OVERVIEW



PROBLEM STATEMENT

As the population is increasing the amount of waste produced is also increasing.

The world produces 2.01 billion tons of urban solid waste yearly, with the United States being the highest producer of waste.

Most of the waste produced remains unprocessed due to a lack of recycling knowledge.

Squander app overcomes this problem by providing a way for waste recycling through a machine learning platform.

PROJECT DESCRIPTION

Squander app provides a complete solution to organize and plan the disposal of waste. It uses a machine learning algorithm to detect recyclable waste from images and provide proper disposal.

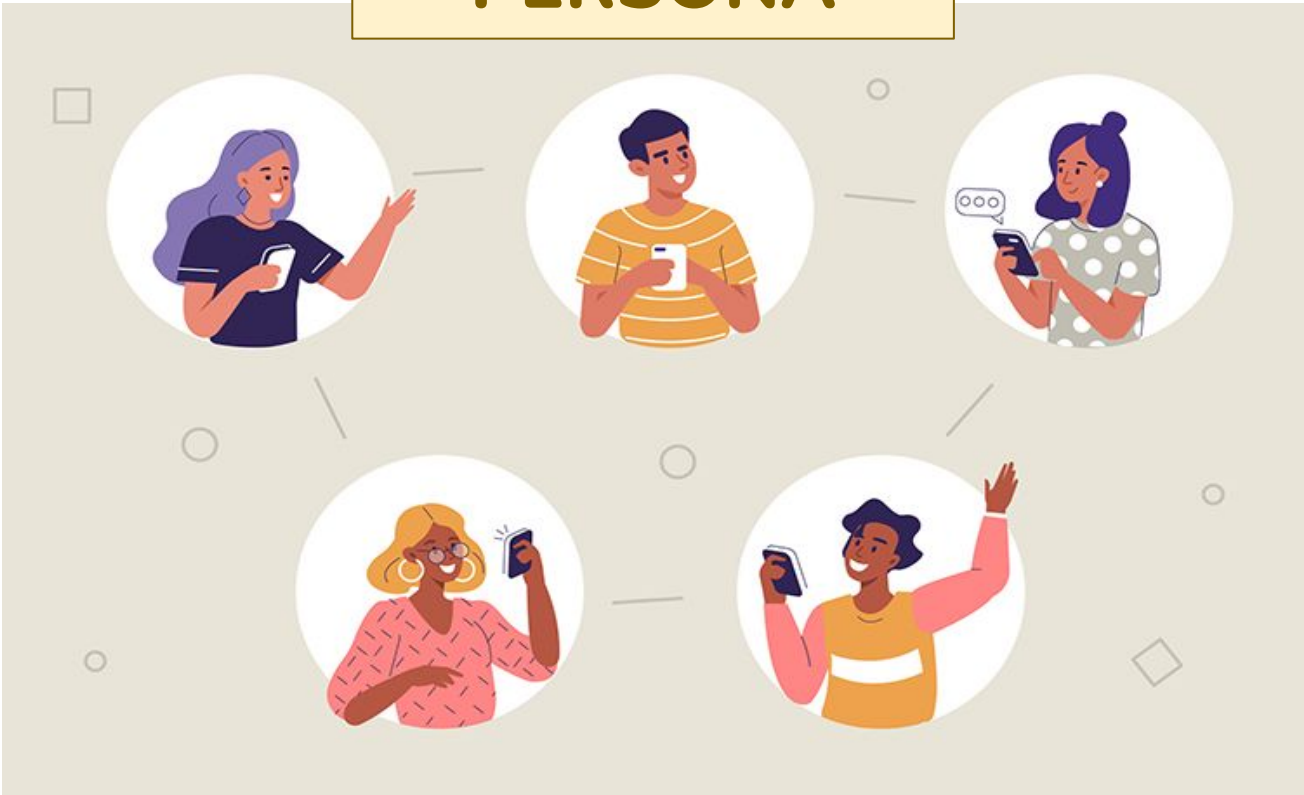
Squander app is an Image-based Waste detection mobile application.

The app works with an image submission by the user and a trained machine learning-based model runs on the image which gives results and information about that image.

As Squander is an image-based application, it’s an easy tool to detect waste by underlying simple steps in the application.

And the application also has a feature that provides the nearest recycling location with an option to schedule a pick of your waste by the recycling factory

PERSONA



Jill, the party host

Background Profile:

Jill, a 32-year-old. He is an event organizer of a well-reputed company in the city. He has organized many big parties and is always busy with his job. He takes all the responsibility and his duties also include providing a good food service. He gets many clients, particularly for the food he provides. His organization is popular among the people Jill does many parties and he collected more food waste by the end of the party. Jill would like to know the waste identified from the image uploaded so that he can confirm the photo he uploaded was processable.

How can Squander help?

Jill being responsible for organizing the party. He wants to recycle all the waste by segregating in rightful manner and help the surrounding environment. He can use an application. Squander which provides his needs by showing the results of nearest recycling company location for all the food waste from his parties that happen wherever in the city. Squander makes an efficient and easiest way in someone’s life like Jill’s

Simon, the mechanic

Background Profile:

Simon is a mechanic for ten years. His age is of 35 years. His jobs is to inspect and repair vehicles, machinery, and light trucks. And he is known for his good service providing for his customers. He works in an indoor garage. Simon’s culminated with metallic waste from his work and he wants to find a recycling location to recycle it and make some money from scrap

How can Squander help?

Simon can use the Squander application that helps him to find the nearest recycling company location for the waste to recycle from the comfort of his garage. This would allow him to find and provide easy access directly to the recycling company. He doesn’t have to worry about the waste and where to recycle it. Through Squander it makes his life easier.

David, the retiree

Background Profile:

David was a sale executive in a marketing firm. He retired from the job recently. He was successful and has been an inspiration for others in the company. After his retirement, David brought up the interest he had for quite some time to renovate his house. He wants to give a personal touch to the house and lead the rest of his life happily in his way. Now he is spending all his time taking care of the process under his supervision and making a beautiful house for himself

How can Squander help?

Squander can be helpful for David, as he is looking after the construction works for his house. The waste can generate a lot, with all the accumulated waste, he can recognize the waste under categories within the app and send it to his nearest garbage station. That’s make David being responsible for his waste and keeping the environment at a better position.

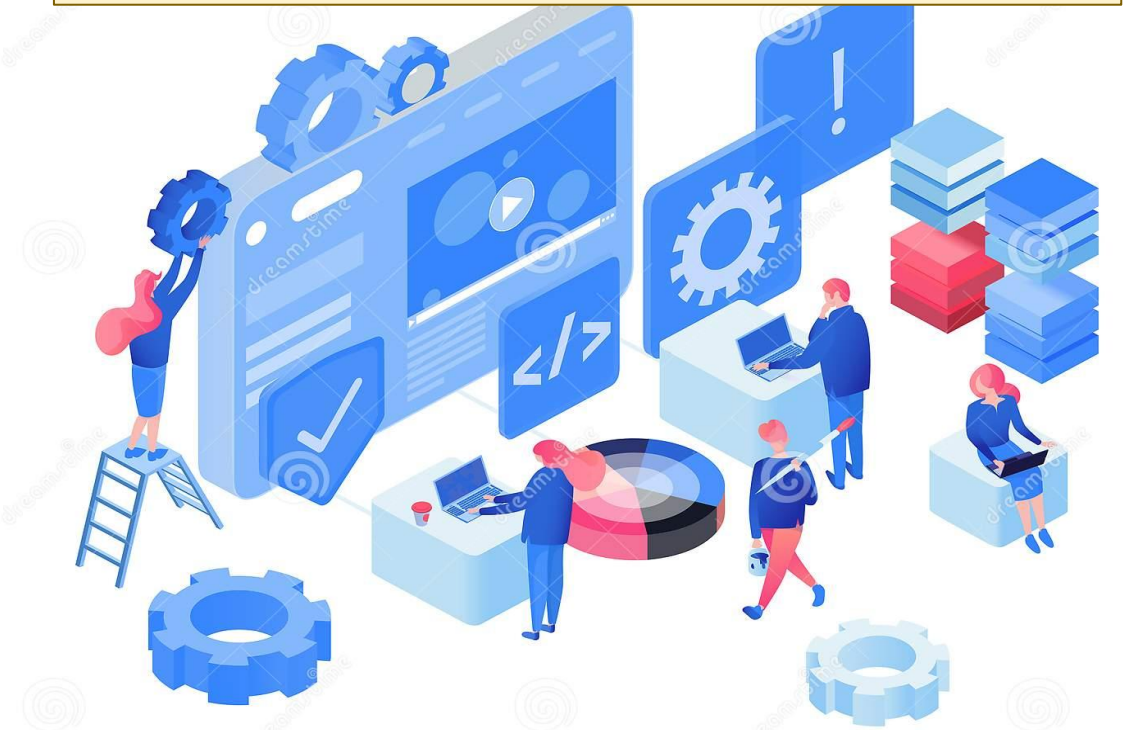
MINIMAL VIABLE PRODUCT

MINIMAL VIABLE PRODUCT (MVP)

Features:

- Scheduling the pick up of recycling waste by the factory
- Creation of a User Profile for each user who uses the application
- Showing the History of a pickup that is scheduled by a user
- Showing the recycling statistics for each user

TECHNOLOGIES



TECHNOLOGIES USED

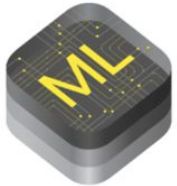
Machine Learning API

Backend

Integrated Map API

Machine Learning Library

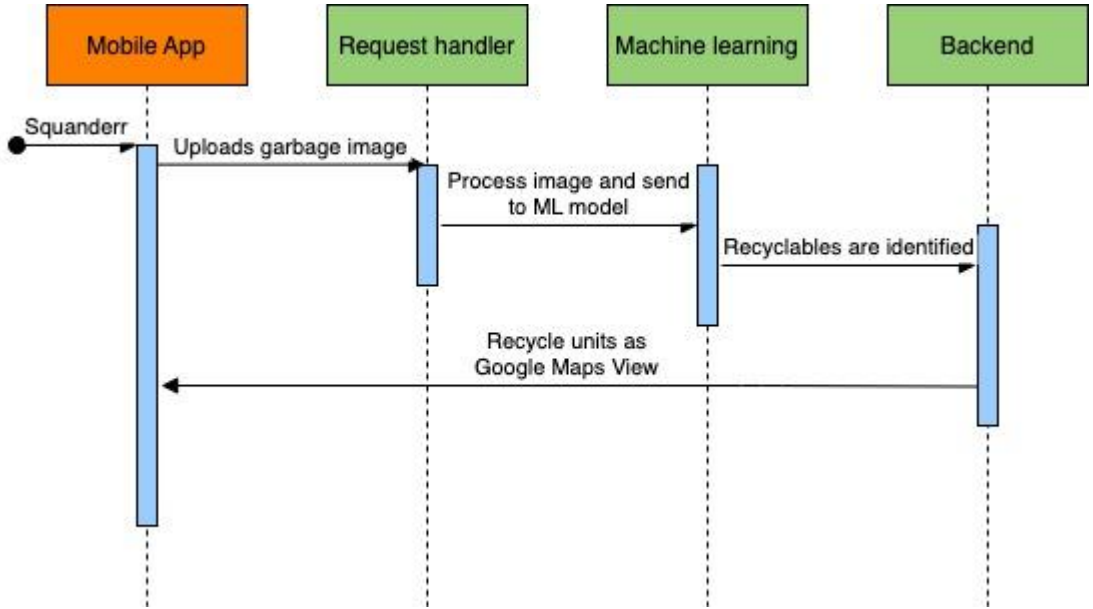
AWS Cloudformation



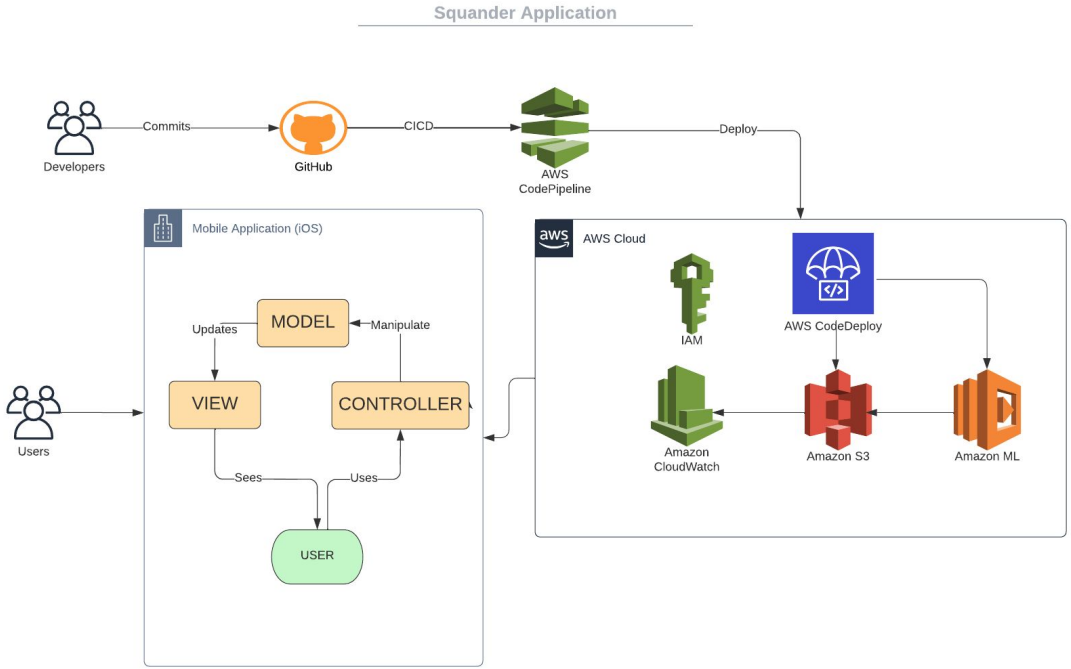
iOS Development Toolkit

ARCHITECTURE DESIGN

SQUANDER SEQUENCE DIAGRAM

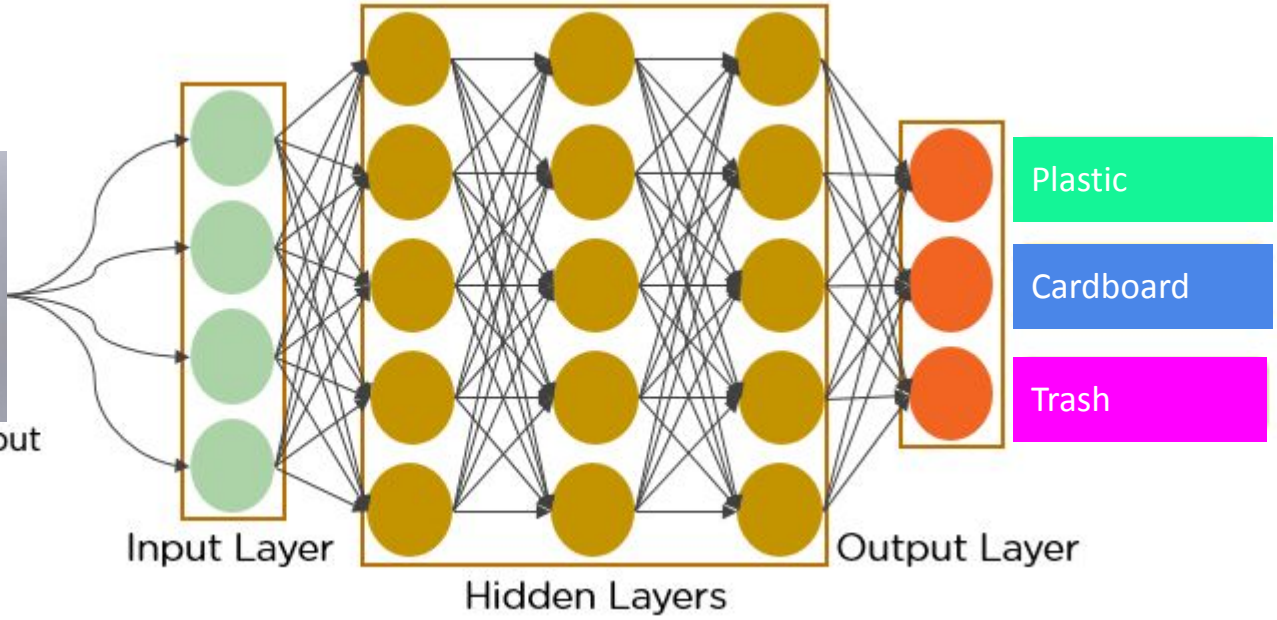


SQUANDER ARCHITECTURE



MACHINE LEARNING ALGORITHM

Pixels of image fed as input



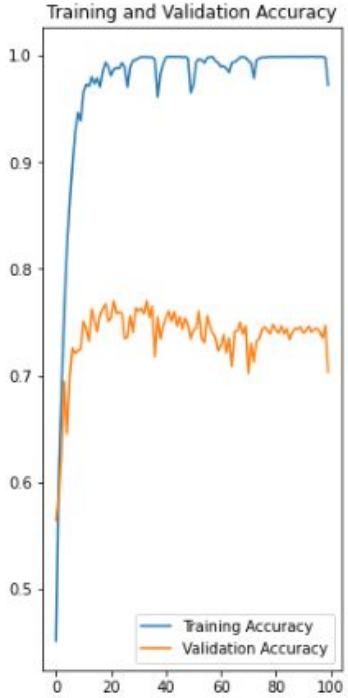
MODEL CLASSIFICATION

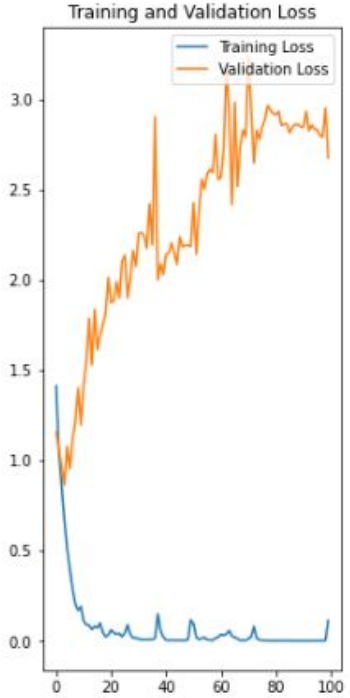
The model is able to classify trash into the following categories:

- Cardboard
- Glass
- Metal
- Paper
- Plastic
- Miscellaneous Trash

MODEL EVALUATION

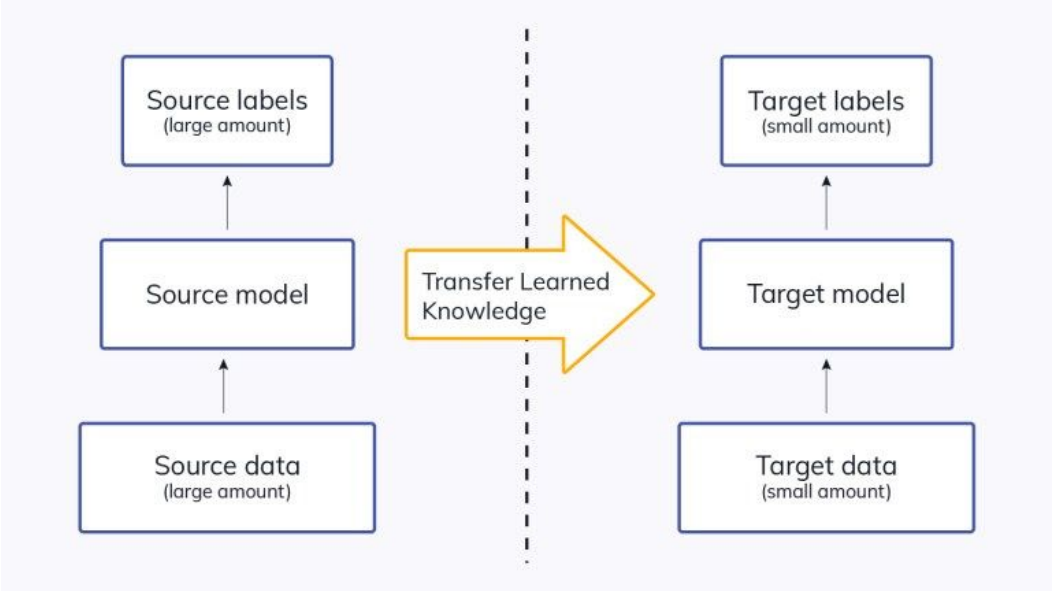
This image most likely belongs to glass with a 100.00 percent confidence.





TRANSFER LEARNING

- To alleviate the need for more images due to lack of public resources
- Leverage a pre - trained model with a large amount of training data.
- Fine tune the existing model.

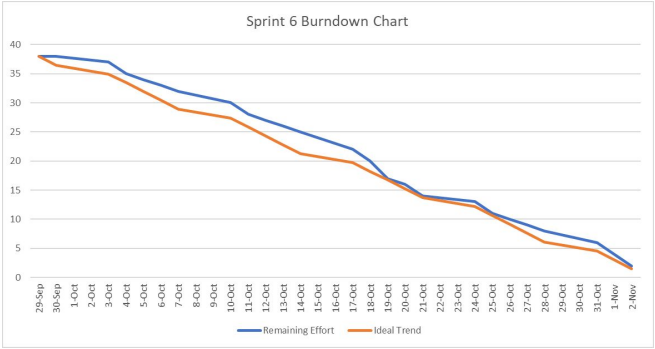


SPRINT OVERVIEW

SPRINT VI RECAP

SPRINT 6 (09/29 - 11/2)

KEY	SUMMARY	PRIORITY	STATUS
SQD 61	Improving the model accuracy	Medium	DONE
SQD 64	As a retiree, David wants to Automatically load locations so that he can have a better user experience and easy to use application.	High	DONE
SQD 67	As an engineer, John wants to view multiple recycling locations so that he can choose to navigate to one most accessible	HIgh	DONE
SQD 74	As a mechanic, Simon wants to support a map view so that he can plan his route more intuitively	High	DONE
SQD 85	Update GitHub and Wiki Page	Medium	DONE
SQD 86	Update Technical Paper	Medium	DONE
SQD 87	Create Deliverable 6 Presentation	Medium	DONE
SQD 88	Create Deliverable 6 Pre-Recorded Video and Edit	Low	DONE
SQD 89	Update Installation Manual and User Manual	Low	DONE
SQD 91	Test Cases for Sprint 6	Low	DONE
SQD 65	As a homeowner, Mark wants to view details of the recycling location so that he can have a conversation with the company with any queries and know all the details of the working hour	High	In - Progress



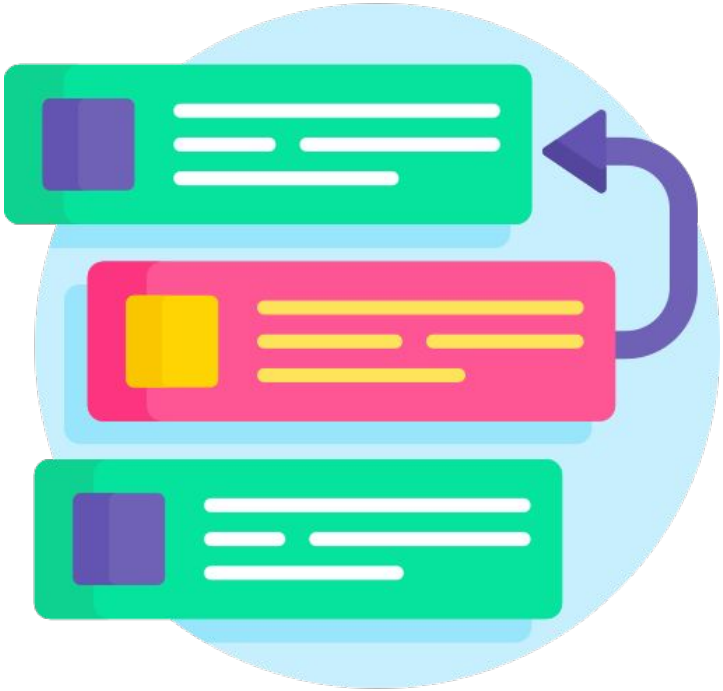
SPRINT VI vs SPRINT VII

SPRINT VI	SPRINT VII
Recycling Location Feature is added	User Profiling
Map View of Recycling Location is added	UI/UX
Model confidence value improved from Sprint 6	Multiple entity recognition
Automatically load all relevant recycling locations once the image is selected based on it waste type	FAQ Screen

IMPROVEMENT FROM PROF FEEDBACK

- Update the architectural design, like which component will work with which component. This architecture looks great, but needs one more in generic format. Professor showed us a diagram for that as well.
  - Updated it to be in more generic format
- Can include Sequence Diagrams as well.
  - Included the sequence diagram
- Retrospective: What went well can be still better. List all positive things into more simpler words.
  - Update the What went well part with the last sprint Future Action
- Project Demo: Can have a separate video for Project Demo Link in our GitHub for easier use
  - A separate demo video is linked in our GitHub as well as provided the link in our presentation

BACKLOG



PRODUCT BACKLOG

KEY	SUMMARY	PRIORITY	SPRINT	STATUS
SQD 62	Working on Deploying and building the AWS Resource for Squander	Medium	Sprint 8	TO DO
SQD 65	As a homeowner, Mark wants to view details of the recycling location so that he can have a conversation with the company with any queries and know all the details of the working hour	High	Sprint6, Sprint 7	DONE
SQD 66	Design and Deploy AWS API Endpoint	Medium	Sprint 8	TO DO
SQD 68	Work on UI/UX and add more feature on Navigation Bar	Medium	Sprint 7	DONE
SQD 72	As a homeowner, Mark wants to know about the Frequently Ask Question screen so that he can get answers to some of the commonly ask question.	High	Sprint 7	DONE
SQD 73	As an engineer, John wants to schedule the pickup with the company so that he can be assured that his trash will be picked up.	High	Sprint 8	TO DO
SQD 74	As a mechanic, Simon wants to create his own account(User Profile) on Squander so that he can save his personal information like address, phone number, etc into the app for later use.	High	Sprint 7	DONE
SQD 75	Redesign the UI/UX	Low	Sprint 7	DONE
SQD 76	As a retiree, David wants to know his recycling statistics so that he knows how much he has contribution to saving the world from global warming	High	Sprint 8	TO DO
SQD 80	Optimize Squander Code	Medium	Sprint 8	TO DO

SPRINT BACKLOG

SPRINT 7 (11/3 - 11/30)

KEY	SUMMARY	PRIORITY	STATUS
SQD 65	As a homeowner, Mark wants to view details of the recycling location so that he can have a conversation with the company with any queries and know all the details of the working hour	High	DONE
SQD 68	Work on UI/UX and add more feature on Navigation Bar	Medium	DONE
SQD 72	As a homeowner, Mark wants to know about the Frequently Ask Question screen so that he can get answers to some of the commonly ask question.	High	DONE
SQD 74	As a mechanic, Simon wants to create his own account(User Profile) on Squander so that he can save his personal information like address, phone number, etc into the app for later use.	High	DONE
SQD 75	Redesign the UI/UX	Medium	DONE
SQD 99	Update GitHub and Wiki Page and Technical Paper	Low	DONE
SQD 100	Create Deliverable 7 Presentation	Medium	DONE
SQD 101	Create Deliverable 7 Pre-Recorded Video and Edit	Medium	DONE
SQD 102	Update Installation Manual and User Manual	Low	DONE
SQD 103	Test Cases for Sprint 7	Medium	DONE

USER STORIES & ACCEPTANCE CRITERIA

ID	AS A	I WANT TO	SO THAT	ACCEPTANCE CRITERIA
SQ 65	Mark, the homeowner	View details of the recycling location	I could have a conversation with the location and form relations.	Given: Mark is able to view basic details of recycling location, When: He click on the Location, Then: He can have all the details of the company like address, working hours, etc.
SQ 72	Mark, Home owner	FAQ Board	I easily get answered on common questions	Given: Mark have a common question When: Open the FAQ Page Then: Be able to view questions and answers.
SQ 74	Simon, Mechanic	Have a profile Creation Page	I could save basic informations	Given: Simon needs to create a profile When: He updates information on Profile Page, Then: Be able to save the information for later use.

TEST CASES

TEST CASES

Test Case Name	User Story	Test Case ID	Test Action	Expected Results	Test Result	Pass/Fail
User Profiling	SQD-74	SQD-109	Locate the Splash Screen	User should be able to see the Splash Screen when you open the Squander application	Once the user opens the Squander app they are able to see the Splash screen	PASS
		SQD-110	Locate Proceed Button	User should be able to see the Proceed Button on the Splash Screen and it should be clickable	Once the user is on the Splash screen they are able to see the Proceed Button and it's clickable.	PASS
		SQD-111	Locate the Login Page	User should be able to see the login Page with details for existing user as well as New User	Once the user click on Proceed Button, it takes us to the Login Page where existing as well as new users can login	PASS
		SQD-112	Locate SignUp Link	User should be able to click on the SignUp Link and a new Page should pop up where all details can be entered	Once the user click on SignUp Link, a new page pops up and all relevant data can be entered	PASS
		SQD-113	Locate Login Button	User should be able to see and click the Login Button	Once the user enter all the correct information and click on the Login Button its takes us to new page.	PASS
		SQD-114	Login the SIgnUp Button	User should be able to registered as a new user with all relevant details and click on SignUp Button	Once the user enter all the data for the new user and click on SignUp Button it is register as a user	PASS
		SQD-115	Locate the email and Password field	User should be able to locate the Email and Password field on Login Page	Once the user click on the Login Page and their we can see the email and password field	PASS
		SQD-116	Locate the Forgot Password Link	User should be able to view and click Forgot Password Link on Login Page	Once the user is on the Login Page there they can see the Forgot Password Link and when clicked it sends and email registered mail.	PASS

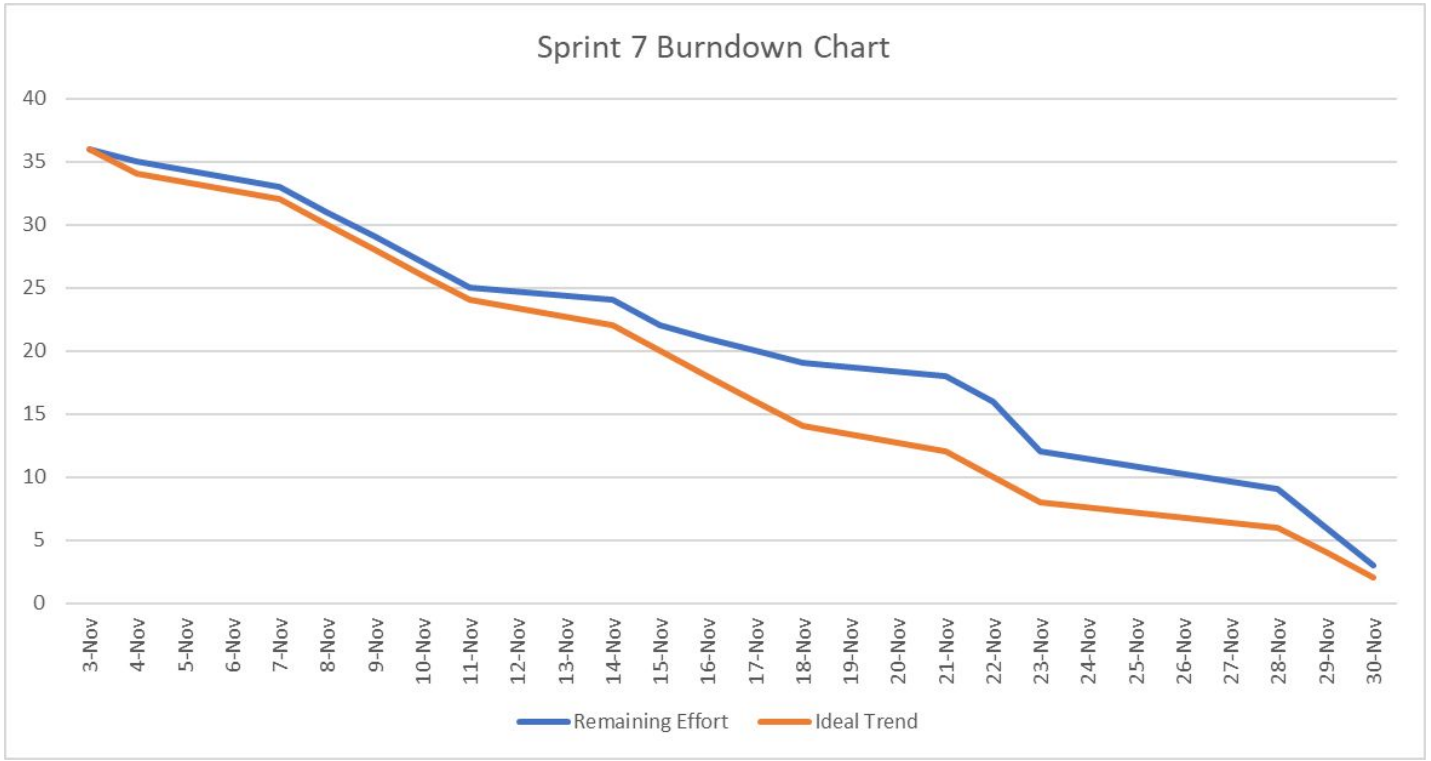
TEST CASES (Continued)

Test Case Name	User Story	Test Case ID	Test Action	Expected Results	Test Result	Pass/Fail
Recycling details	SQD-65	SQD-117	Locate the Recycle Location Link	Users should be able to see the Recycle Location link and it should be clickable	Once the user is on the About Us Screen, the recycle location link is visible, and once clicked on the button it redirects to the recycle location	PASS
		SQD-118	Locate the Recycling Company	User should be able to view the details of the recycling company	Once the user is on the recycling page and it click on a company it will pop the details of the company.	PASS
		SQD-119	Nearby Recycling Location List	User should be able to see a list of recycling location in the screen	Once the user click on the Recycle button, users can see a list if nearby recycling Location	PASS
		SQD-120	Locate the Back Button	User should be able to see the Back Button in the result screen	Once the user is on the Result Screen, the back button is visible, and once clicked on the button it redirects to the home screen	PASS
FAQ Screen	SQD-72	SQD-121	Locate the FAQ on Nav Bar	User should be able to view the FAQ Link in the Nav Bar	Once the user click on the Nav bar a FAQ Link is visible and Clickable	PASS
		SQD-122	Click the FAQ Link	User should be able to click the FAQ Link and a new page should open	Once the user click on the FAQ Link a new page Open up	PASS
		SQD-123	Locate all FAQ on the PAge	User should be able to view the all frequently asked question on the page	Once the user is on th FAQ Page all the frequently and most asked question are already answered and can help the user to get a resolution quickly	PASS

STORIES COMPLETED

ID	AS A	I WANT TO	SO THAT	ACCEPTANCE CRITERIA
SQ 65	Mark, the homeowner	View details of the recycling location	I could have a conversation with the location and form relations.	Given: Mark is able to view basic details of recycling location, When: He click on the Location, Then: He can have all the details of the company like address, working hours, etc.
SQ 72	Mark, Home owner	FAQ Board	I easily get answered on common questions	Given: Mark have a common question When: Open the FAQ Page Then: Be able to view questions and answers.
SQ 74	Simon, Mechanic	Have a profile Creation Page	I could save basic informations	Given: Simon needs to create a profile When: He updates information on Profile Page, Then: Be able to save the information for later use.

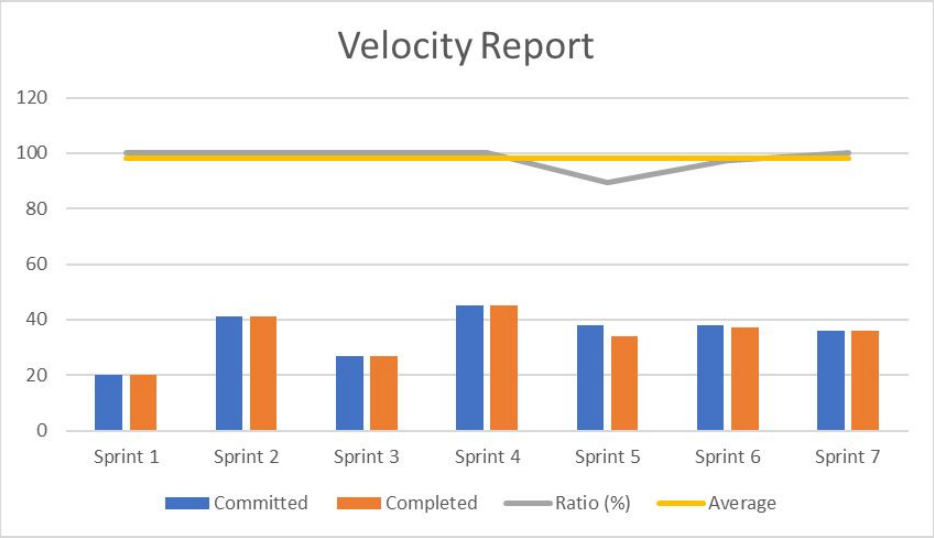
BURNDOWN CHART



COMMITTED/COMPLETED RATIO

SPRINT	Committed	Completed	Ratio (%)	Average
Sprint 1	20	20	100	98.12
Sprint 2	41	41	100	
Sprint 3	27	27	100	
Sprint 4	45	45	100	
Sprint 5	38	34	89.47368421	
Sprint 6	38	37	97.36842105	
Sprint 7	36	36	100	

Current Committed Completed Ratio (Sprint 7) = 100%



RETROSPECTIVE

RETROSPECTIVE

01 What went well

- Regular Sprint Meeting
- Sprint Estimation

02 What needs improvement

- Buffer Time Estimation
- Support team involvement

03 Future Actions

- Estimate the Buffer Time into the Sprint Velocity
- Encourage team involvement by helping each other

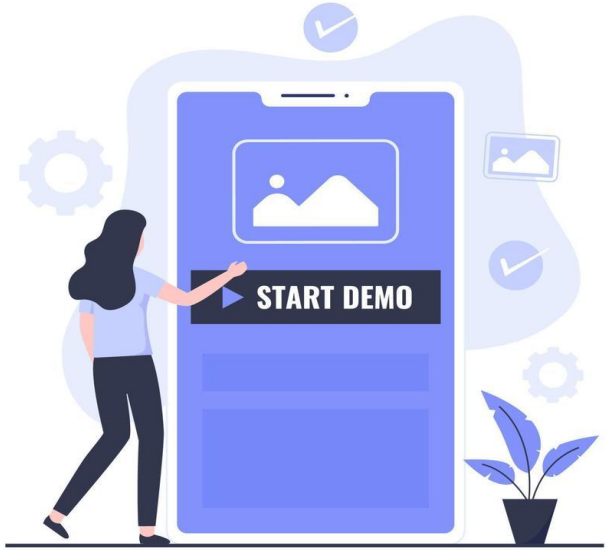
FUTURE SPRINT

SPRINT VIII(LAST SPRINT)

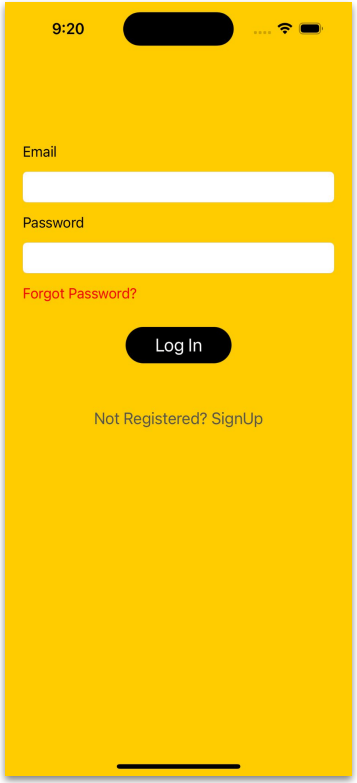
SPRINT 8 (12/1 - 12/15)

KEY	SUMMARY	PRIORITY	STATUS
SQD 65	Working on Deploying and building the AWS Resource for Squander	High	TO DO
SQD 68	Design and Deploy AWS API Endpoint	Medium	TO DO
SQD 72	As an engineer, John wants to schedule the pickup with the company so that he can be assured that his trash will be picked up.	High	TO DO
SQD 74	As a retiree, David wants to know his recycling statistics so that he knows how much he has contribution to saving the world from global warming	High	TO DO
SQD 75	Optimize Squander Code	Low	TO DO
SQD 104	Update GitHub and Wiki Page and Technical Paper	Medium	TO DO
SQD 105	Create Deliverable 8 Presentation	Medium	TO DO
SQD 106	Create Deliverable 8 Pre-Recorded Video and Edit	Medium	TO DO
SQD 107	Update Installation Manual and User Manual	Medium	TO DO
SQD 108	Test Cases for Sprint 8	Medium	TO DO

PROJECT DEMO

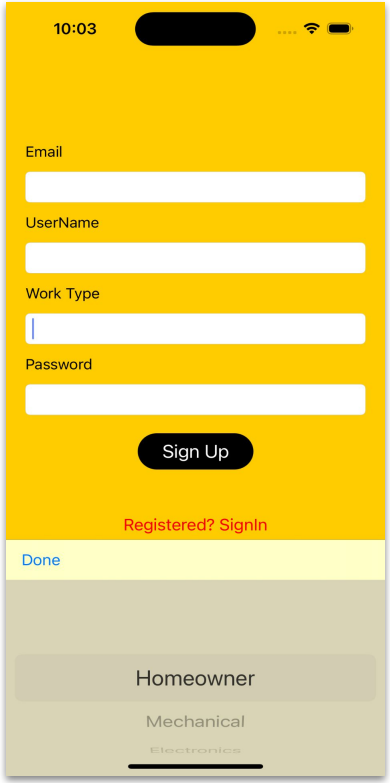


APP SCREENSHOTS

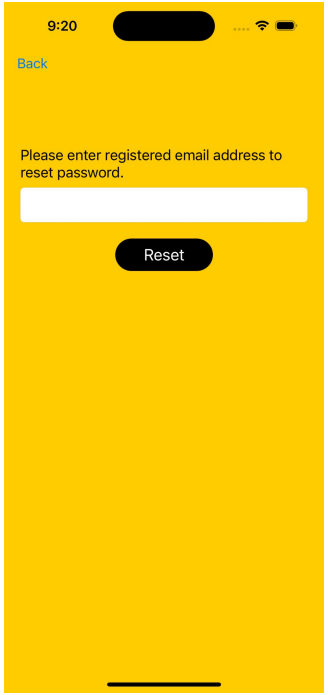


Login and Signup

- For registered user it allows to logIn with username and password.
- If it is new user it allows to register via signUp with email,username,worktype, password.

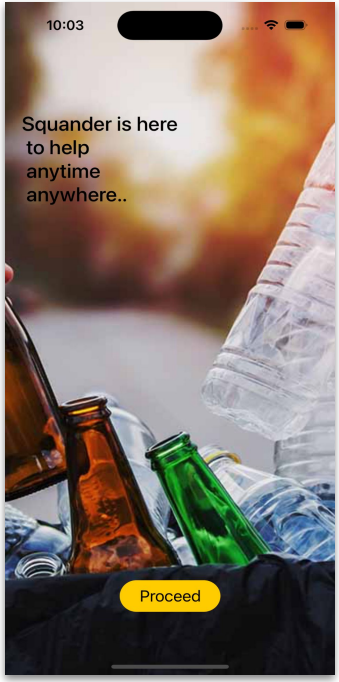


APP SCREENSHOTS (Continued)

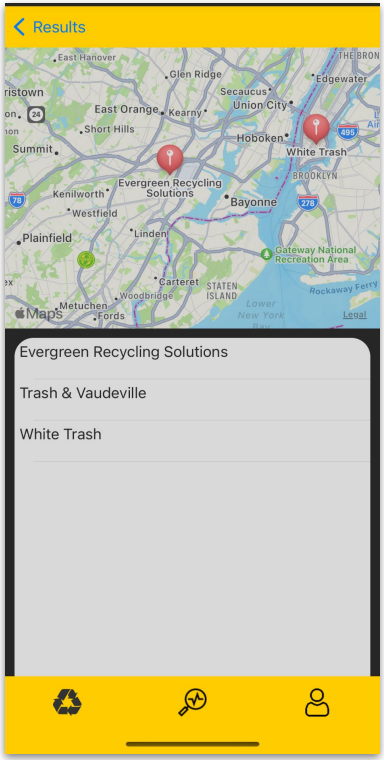


Reset Password and Splash Screen

- If user wants to reset his password he can type email address so that password reset link is sent.
- When a new user opens app for the first time user is navigated to splash Screen.
- Once Proceed is clicked user is navigated to login screen.

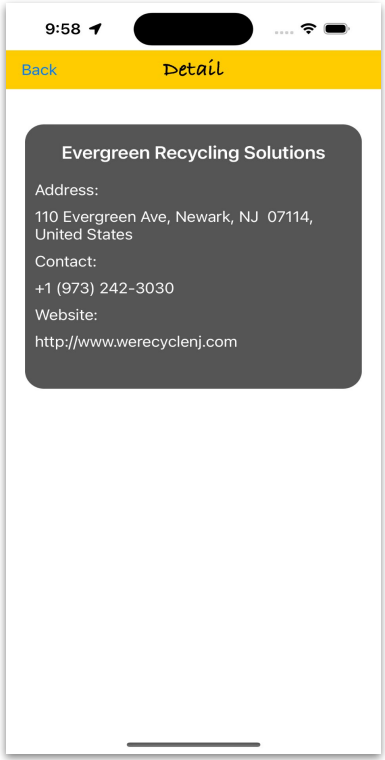


APP SCREENSHOTS (Continued)

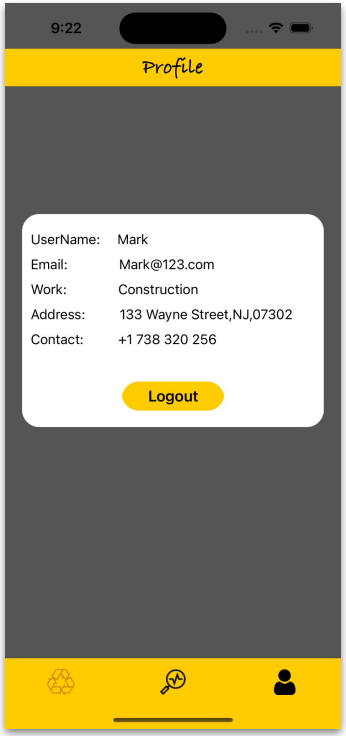


Detail Screen

- On the recycling Location Screen user gets list of recycling locations for particular item.
- If user clicks on any location then he is navigated to detail screen which shows name,address, contact and website of recycling company.



APP SCREENSHOTS (Continued)



Profile and FAQ

- On the profile screen user can see name,email,work address and contact.
- FAQ screen shows list of frequently asked questions about how to use app.

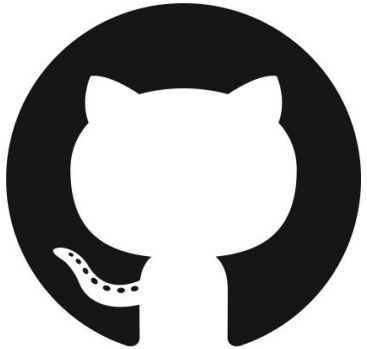
API

MapKit API

Core Location API

GITHUB LINK

GitHub:
https://github.com/anku518/Squander/wiki



THANK YOU!!!