Department of Computer Science & Engineering
The University of Texas at Arlington

Project Charter
CSE 4317: Senior Design II
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Bin Buddy

Clean Team
Garbage Truck Route

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Revision History

Revision	Date	Author(s)	Description
0.1	21.03.2022	MA , AK , SS , NS	Document creation
0.2	04.04.2022	MA , AK , SS , NS	Complete Draft
0.3	24.04.2022	MA , AK , SS , NS	Version 2
0.4	14.08.2022	MA , AK , SS , NS	Version 3

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1 Product Concept

This section describes the purpose, use and intended user audience for the cross-platform app that the Clean Team develops.

1.1 Purpose and Use

The application will help track a garbage truck and inform the user if the truck has passed their home or they still have time to move their trash bins to the curb for the garbage truck to pick up. Additionally, the app will also be able to send reminder notification on a day prior to the scheduled garbage collection day.

1.2 Intended Audience

This application will be used by waste management companies, specifically the homeowners that utilize their services and drivers of the garbage trucks

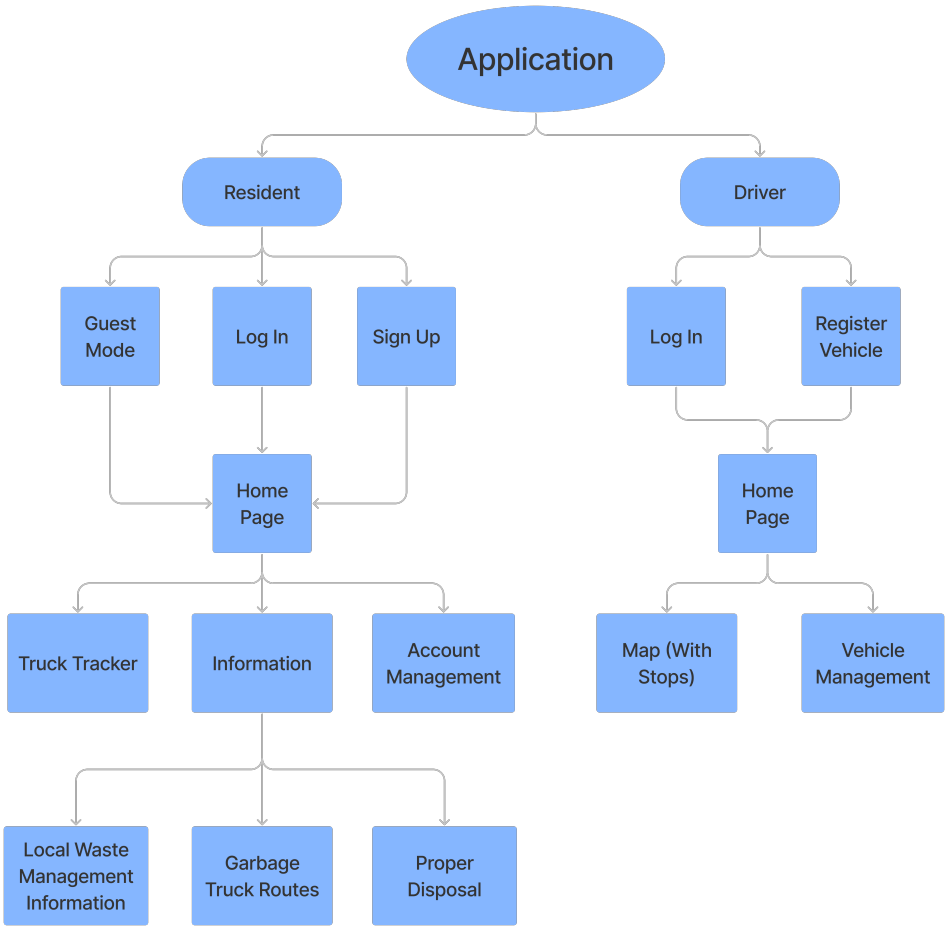

Figure 1: System Diagram

2 Product Description

This section provides the reader with an overview of the garbage route application. The primary operational aspects of the product, from the perspective of end users, maintainers and administrators, are defined here. The key features and functions found in the product, as well as critical user interactions and user interfaces are described in detail.

2.1 Features & Functions

The application is a personal assistant application made to provide the user with an all in one tool for those days in the week where garbage is collected. The application will provide the user with the ability to create alarms and reminders to make sure waste is taken out in time, and for any other reason the user would want to be reminded to take an action, such as bring in the bins.

The application will provide up to the minute information on the location of a garbage truck on route to the users home, this information will be fetched from a GPS tracking device installed on the phones of participating fleet vehicles. Times can be estimated so the user knows how much time they have should they have been unable to bring their bins out beforehand.

Participating fleet vehicles will additionally be able to provide updated statuses about their truck and also update information about their route and timing to their organization through this application.

2.2 External Inputs & Outputs

User Inputs	**Produced Outputs**
Home Address	Route that services the address
Alarm time and Description	Device defined alarm sound at time with informational tag
Picture of garbage	Proper disposal method
Truck Maintenance request	Report to organization of needed repair on that truck
Request time until truck passes	To the minute tracker of truck on the route servicing their address

Table 2: Overview of critical external data flows

2.3 Product Interfaces

The figure below shows the mock-up for what the application will look like on a users' mobile device with basic anticipated functionality.

The figures below shows the current UI development status of the application.

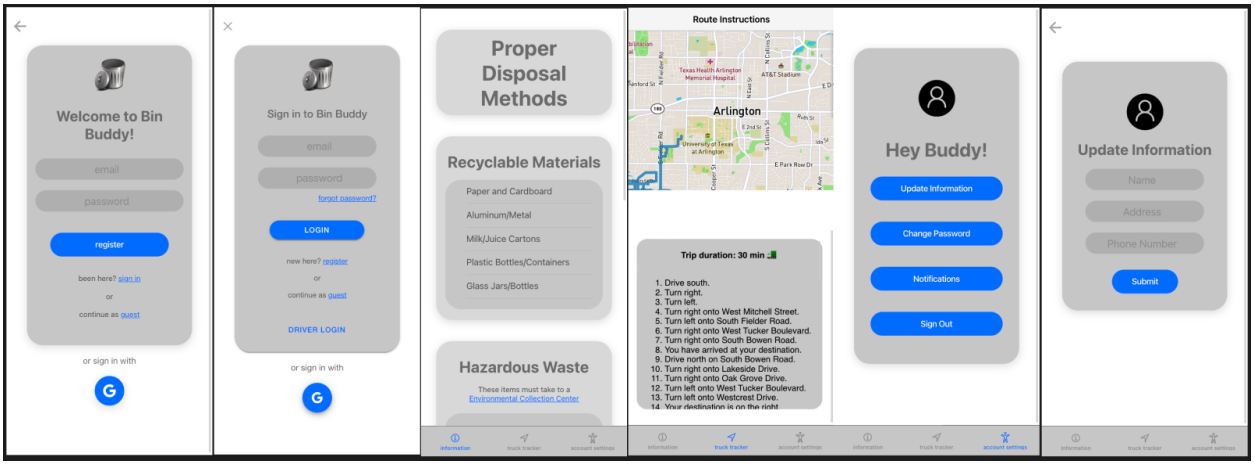

Figure 2: Resident Side UI

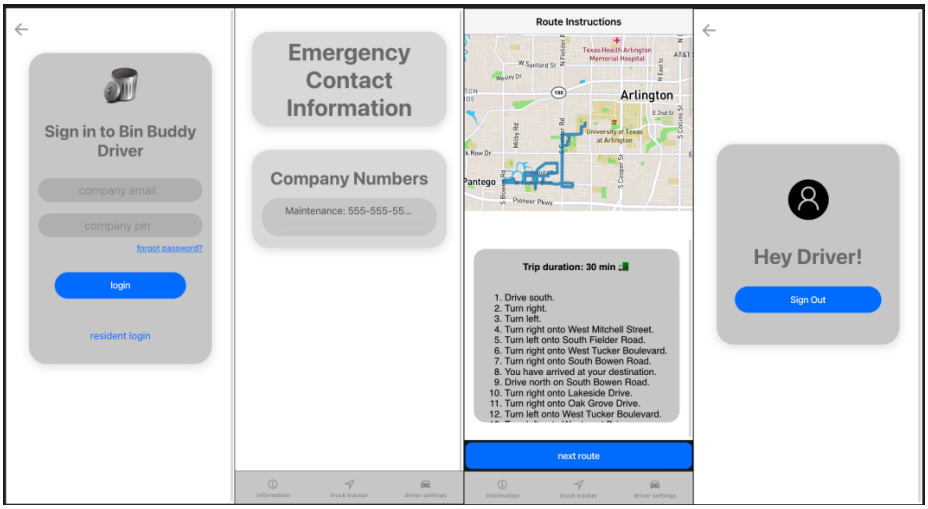

Figure 3: Driver Side UI

3 Customer Requirements

This application is created with the focus of easing stress on residents. Many residents face the issue with not realizing it was trash day and are stuck scurrying to collect their house's garbage. This application will provide the ability to look at a device (ie: phone, tablet, computer) and see if you have time to throw away trash. The main requirements for this application will be having a driver login and a resident login.

3.1 Resident portal

3.1.1 Description

The Resident portal of our application will consists of a homepage that would display the current location of the garbage truck, provide information about local waste management company, garbage truck routes and proper-disposal methods. Additionally, will also lead to an account management page that would let the user create customized notifications about when the garbage truck would arrive.

3.1.2 Source

The source for this requirement is Dr. Shawn Gieser.

3.1.3 Constraints

The major constrains that the Clean Team can face during the development of this project is time. From a user point of view, one of the constraints is that the user will require a cell phone with a working internet connection. Additionally, the Clean Team needs to make sure that there are no vulnerabilities in the software that could lead to a data leak.

3.1.4 Standards

The application will follow basic software industry standards to ensure consistency across platforms.

3.1.5 Priority

This requirement is critical as it is essential to the application's purpose.

- Critical (must have or product is a failure)

3.2 Driver Portal

3.2.1 Description

The driver shall be greeted with two options, login an register vehicle. For register vehicle, companies can add their vehicles to their fleet. If pressing log in, the driver shall be able to log in to their account using their valid credentials. After logging in, the driver will be greeted with a homepage with two subpages, one with a map and another with vehicle management. In the vehicle management page, the driver can select what vehicle they are driving and add notes as to if there is maintenance needed. This page will also have emergency contact information in case of a vehicle breakdown. In the Map page, it will include the route that the drivers will take, and in this page, this is where the driver will begin and end their route.

3.2.2 Source

The source of this requirement is Dr. Shawn Gieser.

3.2.3 Constraints

The Clean Team will need to ensure that there are not any vulnerabilities in software that could lead to a data leak. Furthermore, the driver will need to be provided a cellular device in which they can operate the application (ie: begin route, access maps/route, vehicle management, view emergency contacts).

3.2.4 Standards

The application will follow basic software industry standards to ensure consistency across platforms.

3.2.5 Priority

This requirement is critical as it is essential to the application's purpose.

4 Packaging Requirements

The application will be available for download on the Google Play Store as well as available online as a website. To use the service as a mobile application the user will need to download the application from the Google Play store and maintain connectivity to the internet. GPS tracking is also required to provide correct and timely data to the user.

4.1 Acquirement

4.1.1 Description

Requirements for the obtaining of the application as follows:

4.1.2 Source

Google Play Store and Online web page service.

4.1.3 Constraints

Internet service and Geo-location information are required.

4.1.4 Standards

N/A

4.1.5 Priority

High

5 Performance Requirements

The application must meet certain time constraints in order to be useful to the end-user. These requirements are captured here.

5.1 One Minute Rule

5.1.1 Description

The application will provide current truck location data with a maximum lag time of 60 seconds. This is to ensure the application can still be useful to the end-user.

5.1.2 Source

Clean Team application development personnel

5.1.3 Constraints

N/A

5.1.4 Standards

N/A

5.1.5 Priority

High

6 Safety Requirements

One of the major Safety requirements is to make sure there are no data leaks from out application.

6.1 Laboratory equipment lockout/tagout (LOTO) procedures

6.1.1 Description

Any fabrication equipment provided used in the development of the project shall be used in accordance with OSHA standard LOTO procedures. Locks and tags are installed on all equipment items that present use hazards, and ONLY the course instructor or designated teaching assistants may remove a lock. All locks will be immediately replaced once the equipment is no longer in use.

6.1.2 Source

CSE Senior Design laboratory policy

6.1.3 Constraints

Equipment usage, due to lock removal policies, will be limited to availability of the course instructor and designed teaching assistants.

6.1.4 Standards

Occupational Safety and Health Standards 1910.147 - The control of hazardous energy (lockout/tagout).

6.1.5 Priority

Critical

7 Security Requirements

The security of user information is a top priority within our application. Measures will be taken to ensure that user and driver information is secure.

7.1 Requirement Name

7.1.1 Description

Users of the application will log in with their username and password, and we will use a third-party tool like Google Firebase in order to provide secure authentication within our app. The driver will log in with their Organization ID, Vehicle ID, and unique PIN number.

7.1.2 Source

Team members

7.1.3 Constraints

N/A

7.1.4 Standards

N/A

7.1.5 Priority

High Priority

8 Maintenance & Support Requirements

Maintenance of the mobile app will be carried out regularly. This includes updating and implementing new features.

8.1 Requirement Name

8.1.1 Description

There are certain parts of the app that need to be maintained, such as information about specific city regulations

8.1.2 Source

Team members

8.1.3 Constraints

N/A

8.1.4 Standards

N/A

8.1.5 Priority

Medium

9 Other Requirements

9.1 Requirement Name

Other requirements that are specific to our application involve what tools the application will be built with, and how the customer will access our application.

9.1.1 Description

Our current plan is to build a progressive web app (PWA) using React. This will allow the user to access the application on both desktop and mobile, directly from their web browser.

9.1.2 Source

N/A

9.1.3 Constraints

N/A

9.1.4 Standards

N/A

9.1.5 Priority

High Priority

10 Future Items

Considering time constraints and lack of understanding with the development process with Angular, the following items will be considered for future revisions.

10.1 Notifications - Resident

10.1.1 Description

Residents will be able to set notifications for garbage tracking

10.1.2 Source

Team Members - Use Angular

10.1.3 Constraints

- Skills: Set up UI for this part of the application
- Time: Our team has to balance time as a member in our team is working a full time job and we are all completing over 15 credit hours.

10.1.4 Standards

N/A

10.1.5 Priority

High

10.2 Password Management - Resident

10.2.1 Description

Residents will be able to change their password and choose the forgot password feature to change their password.

10.2.2 Source

Team Members - Use Angular

10.2.3 Constraints

- Skills: Set up UI for this part of the application and connect to Google Firebase
- Time: Our team has to balance time as a member in our team is working a full time job and we are all completing over 15 credit hours.

10.2.4 Standards

N/A

10.2.5 Priority

High

10.3 Implement Geolocation Tracking

10.3.1 Description

Users will be able to track pinpoint locations of vehicles.

10.3.2 Source

Team Members - Use Angular

10.3.3 Constraints

- Skills: Set up Geolocation API for this and set it up with Google Firebase.
- Time: Our team has to balance time as a member in our team is working a full time job and we are all completing over 15 credit hours.

10.3.4 Standards

N/A

10.3.5 Priority

Medium

10.4 Vehicle Management - Company

10.4.1 Description

Company will be able to manage their vehicle fleet

10.4.2 Source

Team Members - Use Angular

10.4.3 Constraints

- Skills: Set up UI for this part of the application and connect to Google Firebase with Google Firestore
- Time: Our team has to balance time as a member in our team is working a full time job and we are all completing over 15 credit hours.

10.4.4 Standards

N/A

10.4.5 Priority

Medium

10.5 Request Vehicle Maintenance - Company

10.5.1 Description

Drivers will be able to request maintenance on their vehicles if it is required

10.5.2 Source

Team Members - Use Angular

10.5.3 Constraints

- Skills: Set up UI for this part of the application and connect to Google Firebase with Google Firestore
- Time: Our team has to balance time as a member in our team is working a full time job and we are all completing over 15 credit hours.

10.5.4 Standards

N/A

10.5.5 Priority

Medium

10.6 Image Recognition

10.6.1 Description

Users will be able to take a picture of an item and see how to properly dispose of it

10.6.2 Source

Team Members - Use Angular

10.6.3 Constraints

- Skills: Research how to do this and implement it within our application
- Time: Our team has to balance time as a member in our team is working a full time job and we are all completing over 15 credit hours.

10.6.4 Standards

N/A

10.6.5 Priority

Medium