

EE461L Project Proposal

Our Green Routine

Team Puma

Alan Penichet-Paul \\ penichet@utexas.edu \\ <https://github.com/Penichet>

Kan Vanthanasuksan \\ kanvan@utexas.edu \\ <https://github.com/kanvan>

Donovan Mccray \\ donovan.mccray@utexas.edu \\ <https://github.com/DoMarsAccount/>

Lauren Jones \\ laurenEjones@utexas.edu \\ <https://github.com/lej656>

Indy Vermeersch \\ indy.vermeersch@utexas.edu \\ <https://github.com/IndyVermeersch>

Janvi Pandya \\ janvipandya@utexas.edu \\ <https://github.com/jpandya1>

URL

Github team repo: <https://github.com/DoMarsAccount/OurGreenRoutine.git>

Google doc:

https://docs.google.com/document/d/1u_3BWxLnXKHtSgZJL85_7ipYfko8ayhD9Fw62KVUF4I/edit?usp=sharing

Vision

Waste management facilities across the country are struggling to process recyclable material. Many Americans are not properly sorting their recyclables in the correct bins. For example, many Americans tend to not be discriminant enough when deciding what can or cannot be recycled, partly because there is a lot of uncertainty among the general public about what items are recyclable. This has caused the cost of processing recyclable material to increase and, as a result, many municipalities have decided that recycling is cost-prohibitive compared to cheaper alternatives. The recyclables market is being saturated with improperly sorted recyclables that are eventually disposed of in landfills or incinerators. These alternative methods of disposal have negative environmental externalities that could be mitigated by increased recycling. Although the recycling rate in America has historically been low in recent years, the quality of recyclable trash is becoming a more pressing issue in the recycling market. Countries such as China are rejecting imports due to the lack of adequate sorting of imported recyclables. Sorting waste is very labor intensive and rising wages globally are resulting in fewer affordable options for sorting recyclable materials.

Our goal is to develop a service that can assist Americans in understanding which products are recyclable, in what condition products can become recycle-friendly, and at what facilities they can properly sort the appropriate trash.

Understanding which trash is recyclable and where to dispose of it can be difficult. If more Americans were to properly sort their trash, then the cost of recycling could be lowered to a more competitive price point compared to more environmentally harmful alternatives. Making recycling information easier to access for environmentally conscious Americans can help garner societal awareness about some of the recycling habits that are causing the cost of recycling to increase.

Currently, much of the relevant recycling information is scattered online as many municipalities and waste management facilities often have different procedures and regulations. Hence, a source that consolidates relevant recycling information would assist in resolving the issues related to ease of information accessibility. Our web page application would aggregate all pertinent information regarding waste reduction for individuals or organizations that are invested in recycling. Users will be able to identify if an item is recyclable, and where they should dispose of their item properly.

Data Sources, Scraping, and Database

The primary source of data for this app would be Earth911's API. This API provides access to information about local recycling regulations and centers. Data.gov also has various databases for recycling information, such as recycling routes and centers for Austin and other cities. This data is also available in JSON format, which would be easy for us to access. Our team will manually input information about the steps necessary to prepare items for recycling, such as removing excess materials prior to dropping them off at a recycling center. This information is available on Earth911's website, although it is not accessible through the API.

Requirements

1. Increase ease of recycling
 - a. Typically, I have to go out of my way to recycle products. I want the process of recycling to be easy and require as minimal effort as possible.
2. Save user's time
 - a. It is time-consuming to find out which materials are recyclable and where recycling areas are. As a recycler, I want to save time by having all this information centralized.
3. Track carbon footprint
 - a. I want to help the environment and to see the impact of my efforts. A carbon footprint tracker will provide a way for me to visualize how much recycling I've done over time and the statistical impact of my good deeds.
4. Educate users on recyclability of products
 - a. As a recycler, I am sometimes unsure which trash is recyclable. Mixing non-recyclable and recyclable products together is problematic for waste management facilities. I want an easy way to identify recyclable products.
5. Educate users on methods of recycling
 - a. As a recycler, I want to be informed about the methods and procedures that go into recycling. For example, soiled or wet materials can contaminate an entire truckload. I will be more confident to recycle.
6. Show users a map of where recycling areas and centers are

- a. Recycling bins and centers are sometimes difficult to locate. I want an easy and visual way of finding these areas, which will increase the ease of recycling.
- 7. Financial Calculator
 - a. When recycling, I want a way to keep track of the total value of items that I have recycled. A financial calculator would give me a financial perspective of actions and provides an incentive for them to recycle even more.

Formal Use Case 1:

Goal: Users want to see the recycling centers and locations

Primary actor: User

Precondition: User is at the map page

Success end condition: Blue areas indicated on Google Maps

Failure end condition: No recycling centers are found nearby

Trigger: User opens the maps tab

1. User enters username and password
2. User navigates to the home page
3. User clicks on the 'Recycling locations' tab
4. User selects 'Recycling centers near you' or enters a specific location
5. Users receive a map with labels of recycling areas

Extensions:

- a. User login failed
 - i. System notifies user 'Incorrect username or password'
 - ii. User redirected back to re-enter login details
- b. Searched location entered not found
 - i. System notifies user that 'location entered does not exist'
 - ii. Users enters new location or selects 'Recycling centers near you'
- c. User location inaccessible
 - i. System notifies users that user location is inaccessible when using 'Recycling centers near you' function
 - ii. Users have to allow permission to access location or use the location search function
- d. Recycling centers not found
 - i. System notifies users that there are no recycling centers within a specific radius
 - ii. User is redirected to the location search page

Formal Use Case 2:

Goal: Users want to search if their items are recyclable

Primary actor: User

Precondition: User is at the Recyclable Items search page

Success end condition: User finds their searched item in database

Failure end condition: User is unable to find their item or any similar item in database

Trigger: User enters item name into the search box and press search

1. User enters username and password
2. User navigates to the home page
3. User clicks on the 'Search Recyclable Items' tab
4. User types the desired item into the search field and clicks search
5. Users finds a list of items in the database that matches his query

Extensions:

- a. User login failed
 - i. System notifies user 'Incorrect username or password'
 - ii. User redirected back to re-enter login details
- b. Searched item not found
 - i. System notifies user that 'Item does not exist'
 - ii. User is redirected to the search page
- c. Sort items by type
 - i. User checks desired field to sort items by desired category

Use Case Diagram

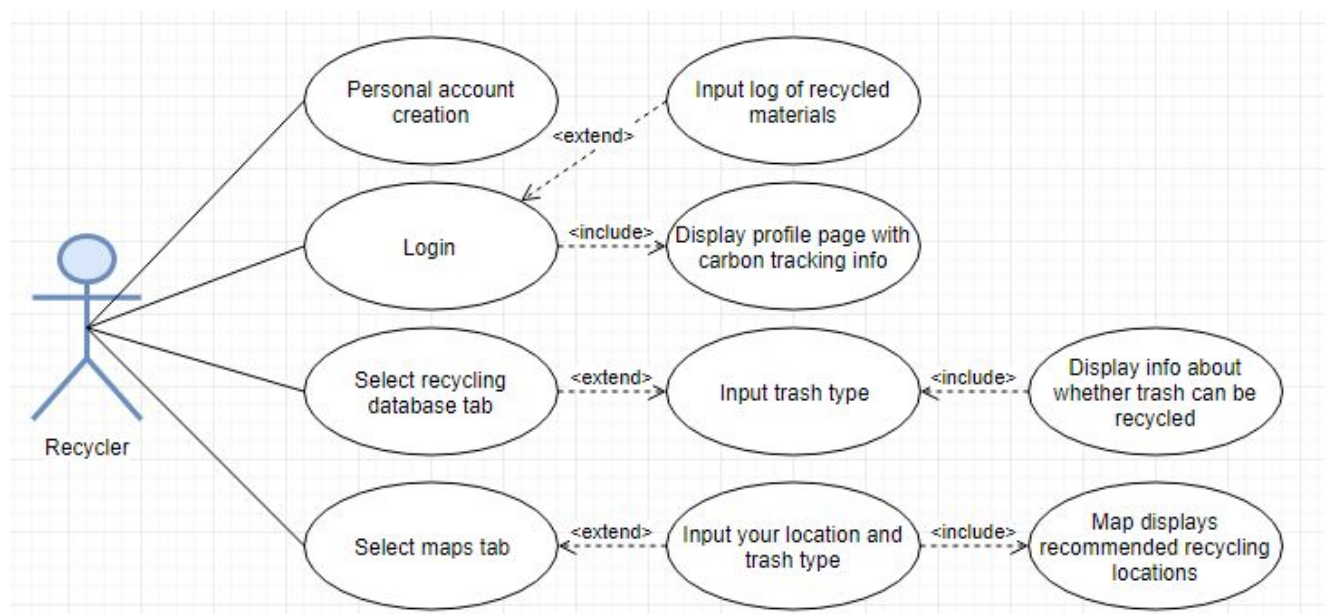


Figure 1. Use Case Diagram for Our Green Routine

Interface



Figure 2. Webpage mockup for Our Green Routine (Khanna and Ning, 2019)

Planning and Scheduling

Phase	Date	Overview	Details
1	10/11/19	Get working model with limited capabilities (~22 hours overall)	<ul style="list-style-type: none"> Create five user stories placed on our issue boards (~4 hours) Successfully register the application and website on GCP and obtain the address for it Create splash page that will include links to: <ul style="list-style-type: none"> The About page The Recycle Database The Financial calculator The Carbon Footprint The Maps page The Recycle Guide page Create an About Page that includes a description of the site, team goals, information about group members, data, tools, and link to Github repository A static recyclable database page, reachable from splash page, with a grid of 6 recyclable items, including links to the 6 items <ul style="list-style-type: none"> Create 6 static web pages for the 6 recyclable items. For some of the examples listed below, we

			<p>will hardcode specific data to test their design before it is actually implemented.</p> <ul style="list-style-type: none"> • Static webpage for the financial calculator that will store a list of items in a table and store the values that are entered by the user. For this phase, we will hardcode the table and store test info in them. For Phase I, this page will show the look and feel of what the financial calculator will become. • A static webpage for the Carbon footprint - your carbon footprint will be stored here. For this phase, we will hardcode some data in the database and pull from that. Information will be displayed via text box in the middle of page. For Phase I, this page will show the look and feel of what the carbon footprint page will become. • The Maps webpage will be implemented and accessed from the splash page. We will not scrape location data from Earth 911 yet but we will just display a Google maps box in the middle of the screen when linked to the page <ul style="list-style-type: none"> ○ We will implement a search bar for users to input the location, which will then be shown on the map, similar to Tutorial 1 • The Recycle guide page is a static webpage that will collect 'recycling tips' for 5 items to be manually added to app (~4 hours) <ul style="list-style-type: none"> ○ These tips are basically information that there are no APIs for and that we will have to collect manually ○ For this phase, we will simply manually enter this data on the guide page • Receive approved access to Earth911 API • We will be building this web application using basic HTML5, CSS, and JavaScript. • Document codes and changes on a public group GitHub Repository • Submit a phase I report (~6 hours)
2	10/21/19	Data scraping from API resources and importing to database	<ul style="list-style-type: none"> • Create 5 additional user stories placed on our issue boards • Create way to add information for arbitrary recycling items based on JSON query results to database <ul style="list-style-type: none"> ○ Respond to users based on JSON query results whether the searched 'recycle item' is recyclable or not ○ Redirect user to search page if "item does not exist" • Create functional login webpage to allow users to log into existing account, or create a new account <ul style="list-style-type: none"> ○ Direct to Home webpage, and store user data in a customized profile

			<ul style="list-style-type: none"> ○ Profiles will include pictures as well as history of recycling. The profile will be linked to the financial calculator and carbon footprint. ● Expand Map function to display the location of nearby recycling centers using a blue “area indicators”, and notify user when no centers are available nearby. We will also implement these functions on the map. <ul style="list-style-type: none"> ○ Finding materials by proximity to current location ○ Search for locations that accept a particular set of materials ○ Locating through postal code ● Add 6 more recyclable items to the recycling database, and create individual static webpages for each item, reachable from the Recycle Database page ● Use testing software such as Mocha and Selenium to verify functionality of new features <ul style="list-style-type: none"> ○ Verify that the locations of recycling centers correspond with the correct address and correct google maps location. ● Submit an updated phase II report
3	11/11/19	Continue testing and finalize development	<ul style="list-style-type: none"> ● Create 5 additional user stories placed on our issue boards ● Finalize data collection and storage <ul style="list-style-type: none"> ○ Make sure that we have a wide span of recyclable materials ○ Ensure that each recyclable material have the necessary information about how to recycle and recycle locations ● Finalize Map function to filter recycling centers based on items to be recycled ● Use testing software such as Mocha and Selenium to verify functionality of final features ● Wrap up project development ● Submit an updated phase III report
4	11/25/19	Refactoring and documentation	<ul style="list-style-type: none"> ● Refactor the software ● Optimize performance ● Complete a final report ● Create a presentation

Tools, Software, Frameworks

The Earth911 Search API provides access to the largest and most accurate recycling directory in the U.S., Earth911. This API provides an easy way to find locations that accept particular materials in a given area using either a latitude and longitude or a ZIP/ postal code. Aside from

locating recycling centers by proximity, the Earth911 API also offers a way for users to find locations based on the material they want to recycle. The Earth911 Search API uses a simple JSON structure which allows for easy integration using a variety of languages.

Earth911: <https://api.earth911.com/>

Java: <https://www.oracle.com/java/>

Github: <https://github.com/>

Domain name: <https://domains.google/>

Government recycling data: <https://catalog.data.gov/dataset?tags=recycling>

Postman: <https://www.getpostman.com/>

Feasibility

Using the Earth911 API requires an API key from the Earth911.com team. We are currently working on getting this key from them. As long as they are willing to provide us a key for this project, getting relevant recycling information will not be an issue. Having one data source may prove to be a challenge, so we intend to also use government recycling data provided at Data.gov. Donovan will be focusing on JSON integration. Alan will focus on testing. Kan and Janvi will focus on web development. Lauren and Indy will focus on automation. These roles may overlap depending on the complexity of the tasks at hand. All members will be expected to learn new skills.

Feedback

We contacted the previous group who received feedback on their pitch regarding a lack of information for their data scraping. Therefore, we must include more data scraping sources as well as a general elaboration on data.