Lab 1 – Refill.Me Product Description

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1.   Introduction

Modern grocery shopping is incredibly convenient, but it is often also very wasteful. Nearly everything on store shelves is surrounded with one or multiple layers of plastic and cardboard packaging, all of which is unceremoniously tossed away upon use. Whether we use plastic, paper, aluminum, or even glass packaging, all come with their own environmental toll. The manufacturing of all this packaging is a source of greenhouse gas emissions, harmful microplastics pollution, non-biodegradable landfill waste, and use of non-renewable resources. Even paper, when we choose to recycle it, can only be remanufactured around seven times before its fibers are too degraded for any productive reuse. Moreover, recycling rates are cataclysmically low – with just nine percent of plastic and twenty-five percent of glass being recycled.

Fortunately, today we are seeing the emergence of a new market force. Shoppers are starting to realize the wastefulness and environmental problems presented by frivolous packaging use, and some have successfully pushed for regulations regarding single-use plastics like shopping bags, takeout containers, and disposable drink containers. Some trailblazers are going a step further and avoiding all unnecessary packaging. This involves bringing reusable containers to grocery stores, and potentially more places like takeout restaurants, to stock up on fresh, unpackaged, or bulk goods, saving all the waste that would otherwise be intrinsically generated.

Presently, however, this is a tall task. Modern shopping culture makes the use of all this extra packaging something that is taken for granted, and even viewed as necessary. It follows that not many resources exist to break free of this modus operandi, to the point that even pricing and stocking information is often difficult to find. To successfully shop in this manner, shoppers need this information to plan and ensure they can get what they need. As a result, potential package-free shoppers are dissuaded and sucked back into a system that generates tens of

millions of tons of waste every year. These shoppers need an information hub to help them find the products and information they need.

    Refill.Me is that hub. Refill.Me is an app that has a wealth of information on stores, products, availability, and other relevant information, to help shoppers shrink their packaging waste. Using the app, shoppers can plan a successful shopping trip, and stores can market effectively to these eco-conscious customers.

2.   Refill.Me Product Description

2.1   Overview

Refill.Me aims to offer package-free shoppers a hub of information to make planning and

research simple. Existing options suffer from an assortment of various problems, like vague

product categories, out-of-date information, and limited store options. Refill.Me offers features

to fill this information void in an easy, accessible way that keeps shoppers engaged and

encouraged, and helps store owners boost sales and optimize their product offerings. Ultimately,

our goal is to provide relevant, detailed, and up-to-date information that helps connect our

shoppers with local and regional package-free stores while keeping packaging waste out of

landfills and incinerators.

2.2   Key Product Features and Capabilities

Refill.Me offers capable search tools, including a proper 'search by product' feature, a

barcode scan and search, and search by icon. We also provide a shopping list tool, a guide for

what containers to bring for that shopping list, a system to collect reviews and ratings from

shoppers, and a reward system to encourage continued use.

Refill.Me is a solution designed to work for store management as well. The cross-

platform app we develop will encourage tablet use for on-the-go use that store owners need,

while still offering more screen real estate. We offer a product and price dashboard, a rewards

hub, coupon dashboard, store rating information, shopping trends to help optimize product

offerings, and even the fundamental features that shoppers expect, like store and product search.

2.3   Major Components (Hardware / Software)

Refill.Me will be constructed with a three-tier architecture. This involves the front end

for shoppers and store owners, an application layer including the web server, algorithms, and

various APIs, and a data layer to handle tables for store, product, and user information, as well as analytics.

The web software for Refill.Me will be written in HTML with CSS and JavaScript, while databases will be programmed in MySQL. Libraries include Junit and XCTest for testing. Refill.Me also will leverage third-party software, including Amazon RDS for MySQL, and GitLab for version control and CI/CD. The team will use Trello, Discord, and Zoom to stay organized and coordinated.

3.   Identification of Case Study

3.1   Who is Refill.Me for?

Refill.Me is for eco-conscious shoppers, mainly women of all age groups, who are passionate about environmental responsibility. These are mostly highly educated shoppers on the east and west coasts in urban areas. These shoppers are from diverse income levels. The app will connect these shoppers with stores on the app. These stores sell loose products and have bulk sections. Examples include farmers markets and package-free stores.

3.2   What will Refill.Me be used for?

Shoppers will use Refill.Me for its capable search features, container guides, thorough product and store information, and rewards system. Store owners will use Refill.Me to communicate products and prices, increase their digital footprint, and get information on what customers are searching for in their area.

3.3   Who might use Refill.Me in the future?

Refill.Me could eventually be used by grocery shopping apps, and trucks selling package-free products on the go.

4 Refill.Me Prototype Description

4.1 Prototype Architecture (Hardware/Software)

4.1.1 Hardware

4.1.2 Software

4.2 Prototype Features and Capabilities

4.3 Prototype Development Challenges

5.   Glossary

Biodegrade: to decompose and become incorporated back into the environment

Bulk section: an aisle where products are available in dispensers or bins, and the shoppers can buy the exact amount they desire

BYOC (Bring Your Own Container): an initiative to encourage shoppers to bring their own containers with them to the store in order to avoid creating packaging waste

Compostable: breaks down into organic matter and does not produce any chemicals during that process

Container: tote bags, produce bags, glass or plastic jars, glass or plastic boxes, glass or plastic bottles that can be used for package-free shopping

Container Guide: a small lexicon providing an overview of different types of containers and the types of products that could be stored in them

Container Recommendation Feature: a feature of Refill.Me that suggests specific containers for products based on the type of product such as liquid or solid.

Experienced package-free shopper: a shopper who has experience, and thus, knowledge of package-free shopping

Farmers' market: a market where local farmers sell their products directly to consumers.

Greenhouse gas emissions: gasses that trap heat in the earth's atmosphere such as carbon dioxide and methane, and thus directly contributing to climate change, predominantly emitted through human activities

Loose product: product sold without any packaging

Mainstream grocery shopping: grocery shopping that does not follow sustainable practices, thus, it entails buying packaged items, using plastic, not considering environmental aspects

Microplastics: tiny plastic particles that are less than five millimeters long and are created when larger plastic pieces breaks down

Novice package-free shopper: a shopper who has no experience, and thus, no knowledge of package-free shopping

Package-free: without any packaging materials such as plastic, paper, cardboard, aluminum, or glass

Package-free store (in the context of our application): supermarkets with a bulk section, stores exclusively selling loose products, and vendors at farmers' markets.

Package-free shopper: a shopper who prefers to buy loose products by filling them into their own containers

Package-free shopping: shopping using one's own containers, thus, shopping without creating packaging waste

Packaging: material used to protect a product from any damage during transportation

Produce bag: a reusable bag usually with a window and tare weight label that is used for buying fruits / vegetables

Single-use: designed to be used only once, and then to be discarded

Tare weight: the weight of an empty container that should not be included when the price of the product is calculated

Tote bag: a large bag, often made of cotton, used to carry many items

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