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BagItIreland.com

Technical Report

National
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Executive Summary

The main objective of BagIt was to develop a web application to help consumers get the right product at the best price. The average consumer will price check all major retailers when purchasing an electrical appliance. This includes checking retailers sites individually and calling into different stores one by one. Customers often struggle to get the correct advice from sales assistants due to high staff turnover in stores, commission and stores being out of stock on certain products but still wanting to make a sale. BagIt quickly retrieves product information with a quick scan of a QR Code. This takes the ease out of manually searching for products, and allows for ease of comparison of product specs.

I thought of the idea of BagIt while working part time as a rep for Dyson. I was placed in different stores and at different events most weeks and I quickly picked up on issues for consumers and retailers. In my case, I was only responsible for Dyson products in store. Dyson regulate their prices so all retailers will usually have the same price for Dyson. However consumers, including myself, usually have very little trust in sales staff. I regularly encountered customers falling in love with a product, spending on average 10 minutes asking everything they can think of and trying it out. They will then leave to check if the neighbouring stores have the product for cheaper, as they simply didn't believe all stores will have it for the same price. When they arrive at the last store and discover the price is the same they will usually purchase it there. While the customer has reasurance that they could not have gotten their product for cheaper it is a long process that can be shortened through the BagIt application. Ensuring the customer saves time and the retailer who spends the most time looking after the customer gets the sale.

In the case of products that are not regulated I noticed that all the major electronic retailers will price match their competitors if they have a lower price. Retailers would rather drop their price by a few euro than lose out on a sale.

However in most cases the prices were kept the same across all retailers. When one retailer lowers their prices, others usually follow the same day.

As well as price comparison, BagIt retrieves product specifications with a simple scan or search. Retailers locations are displayed at the bottom of the results page using Google Maps API. This gives the capability of checking both the best price and the closest retailer who stocks the product in the one place. BagIt can also be accessed on a mobile device and thus used in store. Before deciding to purchase an item, customers can very easily and conveniently check if another store nearby has the same product for a better price, All without leaving the first store or their home.

1 Introduction

The following document will explain the development process of BagIt Ireland, the backround supporting the concept of why BagIt was developed and the gap it aims to fill. The appendix at the end consists of monthly journals which explain BagIt's journey from start to finish. The technical aspects behind BagIt will be explained in far greater detail throughout the document.

1.1 Background

From working as a Dyson Expert I found customers either struggled to understand the products or did not trust me advising which product would suit them best. A lot of the customers seemed to be visual learners and unless I physically laid out what different attachments came with which product and demonstrated how they work differently the customer would be unable to understand and would forget everything by the end of the conversation. This method takes a very long time to complete and during busy periods it may be impossible to do this for every customer. In my case, Dyson Experts were only in stores on weekends and I wondered how customer's midweek were able to understand the products. I thought it may be likely that customers can't understand the price difference to competitors products and with no one to explain the difference to them they may give up and go elsewhere to buy from a cheaper competitor. In these cases the company is losing a sale and the customer may be missing out on what would have been the better product for them. Another possibility is that the customer falls victim to the companies marketing techniques, such as "Bulk Stacking". This involves stacking up boxes of products into a small tower to draw attention. It is usually only done with products that are over stocked and need to be moved. However even if the product is not of a high standard, having all the specifications available to read on the box wins customers over, as customers will believe what is printed on the box over sales assistants advice.

I began thinking of how I could develop something to assist customers in understanding products quicker while also winning over their trust faster. There are many videos available to demonstrate how, for example Dyson vacuums, differentiate from other brands but it is too time consuming to search for a video when with a customer. In addition, customers are unlikely to watch a video in a public place at all. By having all specifications readily available to customers on the products page on BagIt, Consumers can have all available information at their fingertips to help them understand the product they are researching.

Many customers will read up on products before purchasing one, however this research can take a lot of time and searching each different product for reviews or even on the shops website is tedious. The convenience of having one site to instantly bring up all this information along with prices will save customers a lot of time and allow them to quickly check competitor's prices while still in the store. Making it more likely that the customer will purchase the product the same day.

As a Business Information Systems student I hoped to create a useful system with as little coding as possible as this is not where my strenghts lie. I first planned on using NFC tags to call data, as I have experience with this in a previous project. However this method would be far too expensive to implement on a large scale when there are cheaper options available. For this reason the NFC tags were changed to QR codes which are more commonly recognised with consumers and free to produce. I also researched how the datebase could update itself as competitive retailers are constantly changing their prices. I began looking into web crawlers and found many tutorials in Python but not many in Java which is the only programming language I was comfortable with, and also my main programming language throughout my years in college. After many failed attempts in Java I began researching Python. The main element that made the web crawler easier to understand was the Django web framework. This was used throughout the development process however the web scraping of prices failed to be implemented sucessfully. Django is not included in the final upload as it didn't serve any purpose to the functionality. However the attempts to develop the web crawler are explained further in the document.

1.2 Aims

The aim of BagIt was to develop a convenient application to simplify and shorten the process of appliance shopping. By keeping all desired information in one place consumers can quickly chose where to purchase their product without having to log pricing information from each retailers site themselves. The process should be easily done in store from mobile devices. Using a Bootstrap template will allow the site to operate across all platforms. In preparation for this project I conducted a survey using SurveyMonkey. The survey confirmed that this system would be helpful for consumers and would need to work across mobile and desktop machines. The survey also confirmed that consumers would rather a mobile friendly site than an app which is why this was developed. The survey is covered in more detail towards the end of this document.

1.3 Technologies

BagIt uses a system called WebQR to scan QR codes. Each product logged with BagIt has its own OR code. When scanned it redirects the user to the results page, pulling the information for that product into the database to populate the results page. Each code was designed to hold the products name, the system retrieves the name from the QR code and then searches for a match in the database. When a user selects scan they will be prompted to give the system access to their devices camera through a pop up box. Once the system has permission the cameras view will appear on the screen, the User must hold the camera over the QR code and then the link to follow will appear in the results box below. This brings the user to the results page where they can view specifications, retailers prices and navigate to retailers sites. Web QR also includes an upload feature which allows users to upload a photo of a QR code from their photo gallery for scanning. This feature is not expected to be as widely used as the scanning option but it has been included.

BagIt also uses Bootstrap CSS, which makes it fully functional across desktop and mobile platforms. BagIt will ideally be used on mobile devices. However after conducting a poll, it was discovered that consumers are less likely to install an app on their devices that they only need for short term use. For example, to help customers with the purchase of a vacuum cleaner that they need to purchase in the next few days as their current vacuum just broke. However they are likely to visit a vast number of websites to help with the process. BagIt does not require any installation and shortens the research process down to just one website.

One of the aims of Bagit was to implement a web crawler to scrape prices from retailers sites and update the database automatically. This feature was not been completed at this stage in the development process but additional technologies were used in the development attempt of the web crawler. The Django web framework for Python was used but not uploaded as it didn't serve any purpose to the achieved functionality. I chose to use Django as there are multiple tutorials online covering how to code a web crawler which use Python and Django. After researching all possible options it was decided that Python and Django would give the best change of creating a fully functional web crawler. Further development will attempt to fix this issue.

1.4 Structure

Chapter two has been broken into seven sections exploring the BagIt system. Section one discusses the requirements of BagIt and how these requirements will be achieved. It explores the architecture and development in detail and includes screenshots of the current working front end template. This highlights exactly how the system will function in the backend and display results to consumers in the frontend. This chapter also covers testing of BagIt and an evaluation.

Chapter three concludes the requirements and technical details, explaining why BagIt will be successful, backing up the concepts and approaches discussed earlier in chapter two. Chapter four explores BagIts potential to further grow after

the planned development. Chapter five contains references and six contains additional documents such as the original Project Proposal and Requirements Specification.

2 System

2.1 Requirements

The original requirements of this project were to develop a product comparison system to compare product specifications and retailers prices. BagIt has further developed to include price comparison of products from different retailers. The system will also implement the Google Maps API, showing customers how far the nearest stockist is. This will focus on Dublin and further development will expand into other parts of Ireland. The system also plans to access mobile devices cameras, allowing customers to scan QR codes in store, This will display all specifications about the product that is rarely displayed in store. After extensive research and first hand experience I chose to include price comparison on the QR codes. Customers will insist on checking competitors before purchasing a product. Retailers go through great efforts monitoring competiton to keep their prices the same. If they occasionally don't have the same prices they would rather match their competitors price than lose out on a sale.

Based on customer feedback working as a Dyson Expert, I discovered that customers struggle to understand the differences between products and would rather go home to research specifications, retailers prices and customer reviews rather than standing in the store trying to do it from their phone. BagIt takes the hassle out of this task and makes it instant, allowing customers to make the right choice faster and at the best price.

2.1.1 Functional requirements

Searching – The user types in the product they wish to search for and the system will search for a match from the database. Each product is entered into the database multiple times for each retailer's price for that product. Each entry has a unique product ID. Each entry holds the description of that product, however

each one of these are the same and the description is only displayed once underneath the price results table.

Retailer – As each result will display all retailers prices, consumers can choose to redirect to that retailers website page for the product they have searched. These links are stored in the database and displayed in the results table.

Google Maps API – The Google Maps API will display all electrical retailers in Dublin on a map at the bottom of the results page. At the current stage of development, all retailers listed, sell all products that are stored in the database. If further expansion changes this, additional functionality will have to be added to the map to only display retailers that stock the searched product.

Web QR Scanner – The Web QR is an open source application available on GitHub, this will be implemented allowing customers to give BagIt permission to use their devices camera and use it as a scanner. The QR Code corresponds to a data entry in the database and calls this information for the User, redirecting them to the results page. Here they can view product specifications and retailers prices for that product.

2.1.2 Data requirements

The system requires that the user inputs the correct name and spelling of the product or it will not call the correct data entry from the database and display any information. The QR codes must return the same results page as if the product was searched manually. The code must correspond to all unique ID's with the same product name. Each unique ID is delegated manually to each data entry so extra care must be taken when any additional data entries are added to the database. Unique IDs are the primary key of the database and duplicate entries can interfere with Users results.

2.1.3 User requirements

The User is required to have some form of Internet device with an internet connection. This can be mobile or desktop. The User should already know the name of the product they are interested in as the website will not function as a catalogue. In order to scan the User must have a camera on their device.

2.1.4 Environmental requirements

The User requires a strong Internet connection in order to send requests to the site and receive results in a swift manner. Devices must be held steady during QR code scanning, the system will not recognize the QR code until it is held steadily in front of the code.
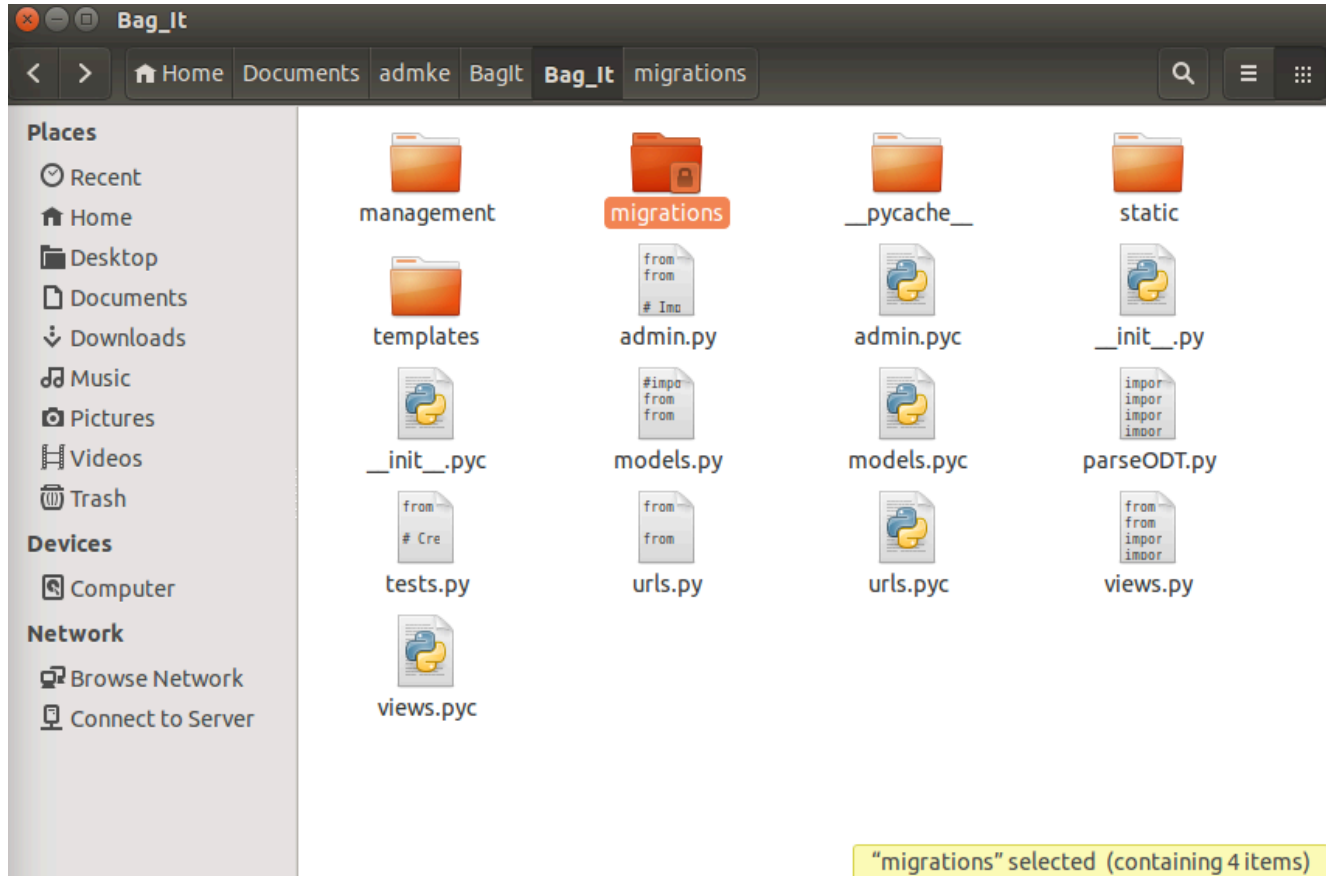
2.1.5 Usability requirements

The User should have basic knowledge of smart handheld devices or desktop computers. They should be comfortable with the internet but the site will have a simple User Interface and once they arrive at the BagIt site they will be guided through each step on screen.

2.2 Design and Architecture

2.2.1 Planned Architecture

For the development of this project I created a virtual development environment using VirtualBox. I installed VirtualBox and then Ubuntu into VirtualBox. I used Django as the development server and Ubuntu ran Django within VirtualBox. The purpose of using the Django framework was to assist in the development of a web crawler. This was never successfully completed so the django files were removed for the final upload as they added no additional functionality. The latest version of "Beautiful Soup" was downloaded into Ubuntu. Beautiful Soup is a thrid party Python library for web scraping. It parses any input.

The below displays the Python files that were present during development in Ubuntu. Only the "templates" and "static" folders were included in the final upload as these didn't include Python or Django.

One of the benefits of Django is the admin page to manage the database. Before the the removal of Django and Python this database was used during creation. The table fields had to first be created in the code, in the "admin.py" file.

```
admin.py (~/Documents/admke/BagIt/Bag_It) - gedit

admin.py ×

from django.contrib import admin
from django import forms

# Import your models here.
from .models import Product

class ProductsAdmin(admin.ModelAdmin):

    list_display = ('product_name','product_price',
                    'product_link')

    fieldsets = [
        ('Product Name' ,          {'fields': ['product_name']}),
        ('Product Price',          {'fields': ['product_price']}),
        ('Product Link' ,          {'fields': ['product_link']}),
    ]

#Register models here
admin.site.register(Product, ProductsAdmin)
```

After declaring the fields in admin.py, input restrictions are implemented in models.py.

```
models.py (~/Documents/admke/BagIt/Bag_It) - gedit

admin.py ×    models.py ×

#imports
from django.db import models
from django import forms

# Create your models here.as

#Models for Bag-It website
class Product(models.Model):
    def __str__(self):
        return self.product_name

    product_name = models.CharField(max_length = 100)
    product_price = models.DecimalField(max_digits=6, decimal_places=2)
    product_link = models.CharField(max_length = 300)
```

Once the tables were created with the code, data could be entered by logging into the admin page which is password protected. Multiple Users can be added and given login access and their privledges can be changed for each User.

2.2.2 Final Architecture

After it was decided that the Web Crawler would not be completed by the deadline. The working files were uploaded to the hosting site GoDaddy.com This consisted of the static and template files, which can be seen in the planned architecture. Included were the html files, the images throughout the site, the Bootstrap CSS and JavaScript and the WebQR files.

Once uploaded, a new table was created on the hosting site using MySQLDatabases and populated using PHPmyAdmin. Both of these applications were available online once a hosting account was created with GoDaddy. The search.html page was changed to search.php and PHP script was added to call the correct data from the database depending on what was inputted. An additional page "results.php" was created where the majority of the PHP script for calling from the database is kept. The following is taken from results.php and connects the page to the database. The page uses the same code to connect to the database twice. Once for each retailer's prices, for that product, displayed inside a table and again for the product description that will be displayed once outside the table.

```php
111 <?php
112
113 //Connect To Database
114
115 $hostname="localhost";
116 $username="suzzane";
117 $password="bagit";
118 $dbname="BagitProducts";
119 $usertable="Products";
120 mysql_connect($hostname,$username, $password);
121
122
123 $Fname = $_POST ["product"];
124 mysql_select_db($dbname);
125
```

The downloaded Webqr.js file had to be amended to allow the QR codes to call the information from the database. It changes the URL to add W1 plus what is read from the QR code onto results.php. The below creates variable "a" in webqr.js. The majority of this file was downloaded from Github.

```javascript
}
// takes variable "a" as data in QR code and adds it to the end of the url for result.php--//
function read(a)
{
    var html="<br>";
    //if(a.indexOf("http://") === 0 || a.indexOf("https://") === 0)
        html+="<a target='_blank' href='"+a+"'>"+a+"</a><br>";
    html+="<b>"+htmlEntities(a)+"</b><br><br>";
    document.getElementById("result").innerHTML=html;
        window.location.href = "result.php?w1=" +a;
}
```
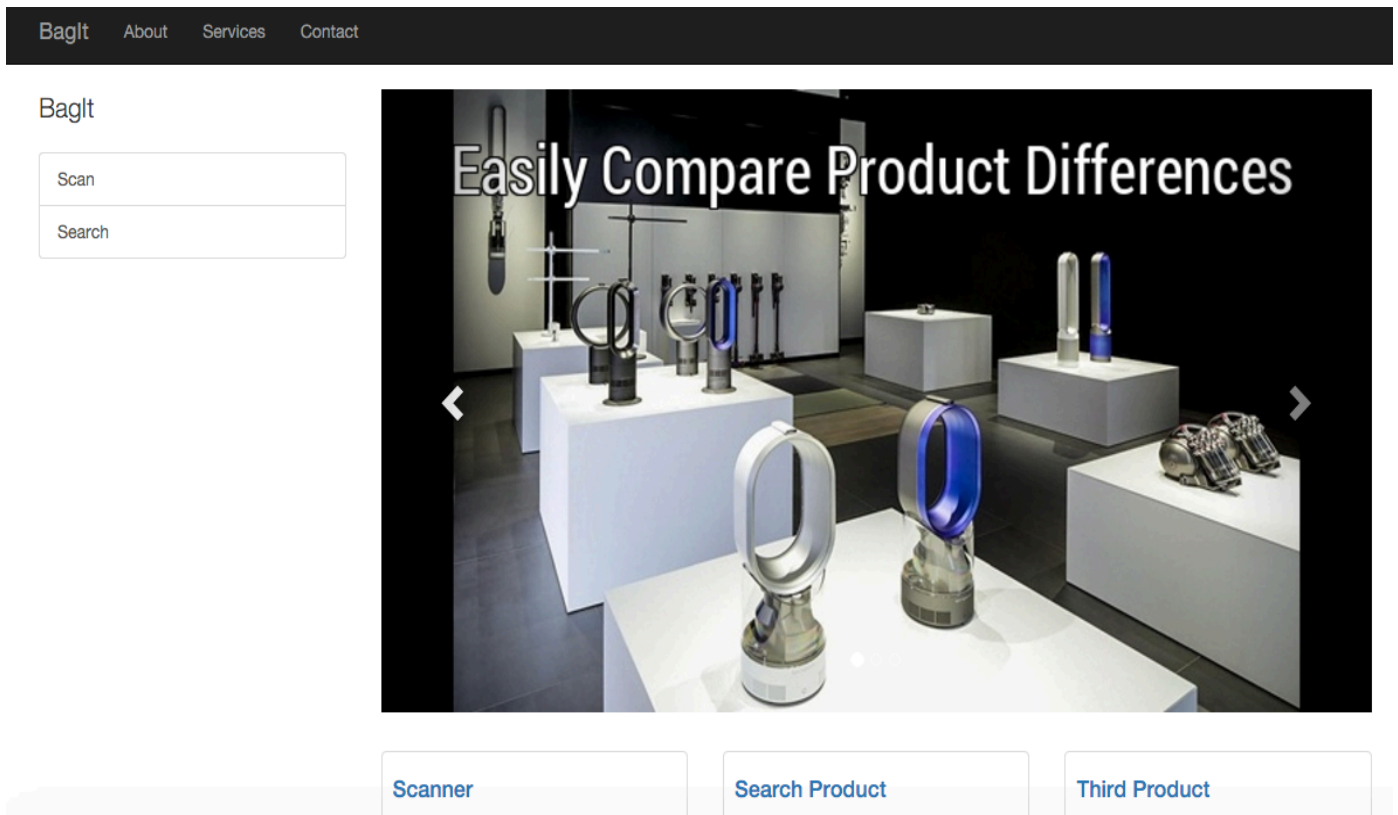
The following is from results.php and calls W1 from the JavaScript file.

```php
$Fname = $_POST ["product"];
mysql_select_db($dbname);

$hello='';
 if (isset($_GET["w1"])) {

        // check if variable exists and print out if it does
        $hello = $_GET["w1"] ;
        echo $hello;
        }
```

2.3 Testing

I have tested my QR codes in the field while at work on the Dyson display. I used my own mobile device to scan the codes and show potential customers the specifications and that the competitions prices were the same. The Web QR scanner will only run in Firefox at present. Therefore to be used on a mobile device Firefox much be installed. All functions work fine on desktop.
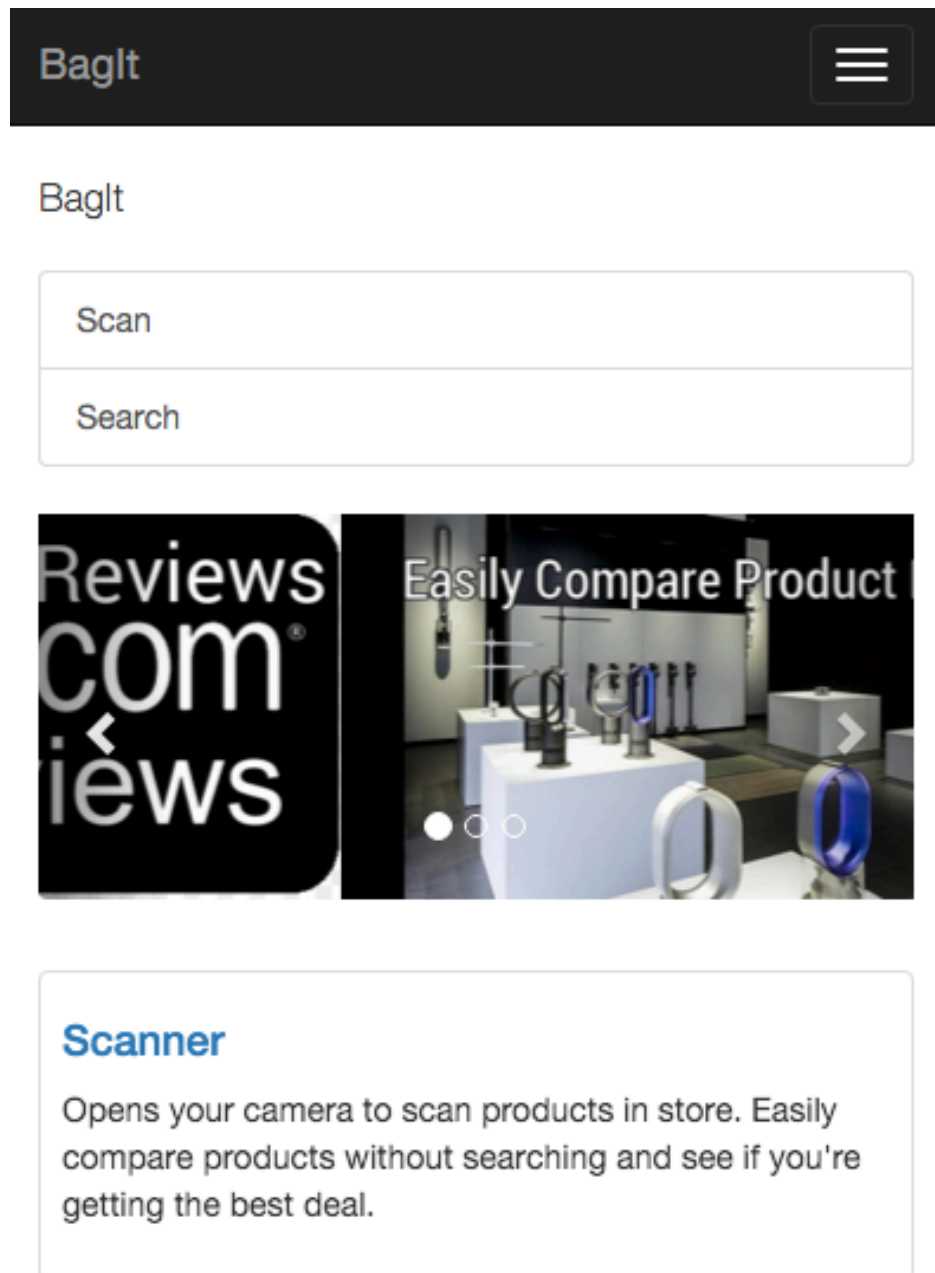
2.4 Graphical User Interface (GUI) Layout

On the homepage of BagIt, Users will be displayed with the options to scan or search along the left side. These options will also be displayed along the bottom of the screen. A slideshow in the center displays images of electrical products and an example of a QR scanner.

When on a mobile device the layout rearranges to optimise a smaller screen and become more user friendly. The image relocates under the scan and search options and the top banner options are moved into a drop down menu in the top right corner.

On the search page the User simply enters the product they are looking for and clicks submit.

BagIt   About   Services   Contact

Scan

Search

Use BagIt for comparison and reviews without having to leave your home. Find the best deal and closest stockist. Simply enter the name of the product you are looking for.

Product:

Submit

Scanner

Opens your camera to scan products in store. Easily compare products without searching and see if you are getting the best deal.

Search Product

Use BagIt for comparison and reviews without having to leave your home. Find the best deal and closest stockist

BagIt 2015

The system uses PHP to search the database for a match to the User's input. The User is relocated to results.php The relevant information for each retailers prices and a link to their site is displayed in a table as below. Below the table the product description is displayed.

BagIt   About   Services   Contact

Scan

Search

Use BagIt for comparison and reviews without having to leave your home. Find the best deal and closest stockist. Simply enter the name of the product you are looking for.

Results

Name	Price	Retailer	Link
Dyson V6	350	harvey norman	Not available online
Dyson V6	350	Currys	http://www.currys.ie/Product/dyson-v6-cordless-vacuum-cleaner-silver/332117/396.0.7
Dyson V6	350	D.I.D	http://www.did.ie/dyson-v6-wand-cordless-vacuum-v6-prd?referer=heystaks_search_results&position=3
Dyson V6	320	Power City	http://www.powercity.ie/index.php?par=40-53-208179&action=moreinfo

Run time: 20 minutes Capacity: 0.4 litres Charge time: 3.5 hours Power: 21.6 V Two-year manufacturer's guarantee Clean freely around your home without restrictions with the powerful Dyson V6 Cordless Vacuum Cleaner. With no cord and no hassle, you'll be able to easily clean all areas in your house, even the awkward spaces you previously avoided. Sucking up as much dust as a corded vacuum, the V6 uses a motorised cleaner head designed for all floor types.

2.5 Customer testing

I have tested BagIt in store when at work by using it on my own smartphone for customers to raise awareness. I have received permission from my employer to use this to help with product demonstartion and to increase sales. Most stores I am based in ensure their staff keep their phones on their person to demonstrate wireless audio devices etc. Therefore other members of staff will also be able to use this feature to close sales. Customers will get reliable customer service while also seeing a demonstration of BagIt.

BagIts scanning feature works perfectly in Firefox and therefore can only scan OR codes on a device running firefox. I downloaded firefox to my smartphone for demonstration purposes, however firefox does not come pre installed on any smartphone to date. Also because all smartphones come with a browser installed, there is usually no need for a user to install an additional browser. This issue will be addressed during further development to make using BagIt as little trouble as possible for Users. The search features work perfectly across all browsers.

2.6 Evaluation

The system was tested in the field and feedback was gathered from customers responses. The main issues customers found have already been addressed and further development will have to resolve them. The main issue is that the scanning feature will only work when used in Firefox. Most people would not have this browser installed on their phones therefore it is a setback. A survey conducted before development began confirmed that consumers would prefer a site rather than having to download an app. Having consumers download Firefox to avail of the scanning feature contradicts the benefit of BagIt not being an app.

Another feature that needs further development is the database. As the number of products featured grows the database will have to update prices by itself. Another option to improve functionality that was raised was to write reviews for products.

3 Conclusions

BagIt's purpose has received excellent feedback in surveys. There is definitely a need for this application. A web based application has proven to be the best method, as consumers would use it on both mobile and desktop PCs, according to the survey.

Retailers may be against encouraging an application that allows consumers to view their competitors prices. However from my experience the main retailers which BagIt will cover generally keep their prices the same. These stores are usually located in large retail parks and are within walking distance of each other. From working in these stores I have noticed that customers who make a purchase usually quickly check the price and then make their purchase. These customers already know about the product and seem confident that the price is ok. However a customer who spends a few minutes listening to information about the product and asking questions will usually go and check other stores prices and don't usually return to make their purchase. In the case of Dyson, the product prices are regulated so I am assured that the customer did not get the product cheaper from another retailer. Consumers seem to buy from the last store they check, provided it is not more expensive. Therefore the customer is wasting their time and the store who deserves the sale does not receive it.

4 Further development or research

With access to the right information the system could use products own barcodes as input with scanning. Therefore getting retailers to display QR codes would not be a problem. Consumers would have the freedom to use BagIt the most convenient way whether retailers comply or not. BagIt also has room to expand to become an online catalogue. Allowing User's to search all items in a category and still use the benefits of Bagit in one place. Customers could use BagIt just as they currenty use retailers sites to browse products. But customers will be able to pick their product and then instantly view all retailers in the area and their price for that product.

BagIt's scanning feature currently only works in Firefox, further development will ensure this works across all platforms, in particular mobile platforms. The scanning also requires the device to be held steady for a few seconds before it can acquire a reading. Further development will explore methods of speeding up the scanning system.

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6 Appendix

6.1 Project Proposal

BagIt

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Date 29/09/2015

Objectives

The purpose of BagIt is to allow customers to better understand technical products and easily compare them. Customers are often required to buy appliances they do not fully understand (Dishwasher, washing machine etc.) and they can become even more confused trying to pick which one they need. It can also be near impossible to understand if you're getting the best value for what you need when the sales assistant will try to make you buy the most expensive one within your budget. The stores usually can only display minimal information on each product, with some stores only displaying energy ratings and price.

A lot of companies also want their customers to know more about their products and want the customer to get the best product for them. For example Dyson place Dyson Experts in all stores that sell Dyson products. Dyson employs the Dyson Experts and thus the store gets a free member of staff who specialises in a number of products. Even with specialised staff it can be difficult to explain to customers the differences in products when a lot of the differences are extremely technical.

By listing features of the products and allowing customers to compare products easily and see what features some products have over others, it is more likely the customer will choose the correct product for them and be happy with their purpose. It also takes out the risk of human error if the sales assistant says anything incorrect about the product

A customer simply has to go to the BagIt site and give BagIt permission to access their devices camera. They then use their camera to scan the QR code in front of the product they are interested in to see all the information about that product. They can easily compare items side by side and have the differences highlighted to them.

Background

From working as a Dyson Expert I found customers either struggled to understand the products or did not trust me advising which product would suit them best. A lot of the customers seemed to be visual learners and unless I physically laid out what different attachments came with which product and demonstrated how they work differently the customer would be unable to understand and would forget everything by the end of the conversation. This method takes a very long time to complete and during busy periods it may be impossible to do this for every customer. In my case, Dyson Experts were only in stores on weekends and I wondered how customer's midweek were able to understand the products. I thought it may be likely that customers can't understand the higher prices than competitors and with no one to explain the difference to them they may give up go elsewhere and buy from a cheaper competitor. In these cases the company is losing a sale and the customer may be missing out on what would have been the better product for them.

I began thinking of how I could develop something to assist customers in understanding products quicker or when a member of staff was not available to help them. There are many videos available to demonstrate how, for example Dyson vacuums, differentiate from other brands but it is too time consuming to search for a video when with a customer. A QR Code to scan that will instantly bring up the video when required will solve this problem. QR Codes for the purpose of explaining what's different about a brand can be placed in front of the brands products while codes to demonstrate each product will be placed with the product.

Some customers will read up on products before purchasing one, however this research can take a lot of time and searching each different product for reviews or even on the shops website is tedious. The convenience of having a QR Code to instantly bring up all this information will save customers a lot of time and allow

them to quickly check reviews or information while still in the store. Making it more likely that the customer will purchase the product the same day.

When reading reviews on appliances it can be difficult to remember the details of the previous product viewed to compare them. The web application will have a function to assist this by displaying products side by side in a table to highlight differences.

Technical Approach

I will first gather information on my sample products and QR Codes. I will write the necessary information to the QR Codes, gathering reviews and product specifications from retailer's sites, including links. Once this is done I will begin creating the website frontend. This will ensure I have something to demonstrate during development. I will then focus on the backend, which will be coded in Python with the Django Framework. A web crawler will gather retailer's prices to keep them up to date. Google Maps API will also be implemented to show consumers how close they are to the different retailers. Another API will allow the User to give BagIt permission to access their devices camera and use it as a scanner for the QR codes.

Following extensive research on QR codes and shopping apps I discovered there are no apps that incorporate QR codes to assist customers in choosing a product in Ireland. There is a company with an app called "Think and Go" who had a similar idea of placing NFC tags with products in shops. However they use the tags as a way of monitoring what's in your basket and calculating the price and are, at the moment, only in certain supermarkets, none of which are in Ireland.

Currently my app will only be used in the technology retail sector. It also won't monitor what is in your basket as there would be little demand for this function in technology retail. Unlike Think and Go, the app will assist the customer in understanding the product and help them in choosing the correct product. The app will act as a virtual shop assistant, assisting the customer in knowing the differences between the products and understanding the technology behind them.

Special resources required

The QR codes must be generated online. The User must have a smartphone or portable Internet device with a camera in order to be able to avail of the QR code service. Consumers can still search for products with any Internet device, mobile or not.

Technical Details

The system will pull and display information from different retailers. The User will input a search item and the system will amend this input onto the end of a URL to call the correct page. The relevant information will then be pulled from the page by calling the relevant tags in the source code of the page in the back end. The pulled information will be displayed in a table on BagIt's site.

The corresponding information to each QR code will be stored in the database and will be pulled in when the QR code is scanned.

Evaluation

I plan on testing the app and QR Codes by first using it myself with customers at work to show them information and videos on screen. As a sales assistant for Dyson I feel having my facts backed up in writing will help me gain customers trust. It will also help me test the customer's reaction to the idea and raise questions on the app. As with most electrical products the prices with the major electrical retailers are generally the same. Showing customers this will save them time and make them more likely to purchase in the store they are in rather than going to another store for the same price. Showing consumers positive reviews on products they are interested in will also help to close sales.

Suzanne Fagan 29/09/2015

6.2 *Requirements Specification*

Table of Contents

6.3 Introduction

6.3.1 Purpose

The purpose of this document is to set out the requirements for the development of a product comparison system. "BagIt" will compare complex products such as electronic appliances. The system will allow customers to scan products QR codes with their phones in store and search products from home. The system will allow easier comparison of products by highlighting the differences between products. The system will display reviews gathered from RSS feeds and also different retailers prices and how far the retailer is from the customer.

When buying a new appliance, customers usually spend a lot of time researching which product they want, then looking for reviews for that product and then checking the best price for that product. All of these different aspects can make it difficult to decide which product is best. Remembering the model numbers for different products and having to search each model separately is time consuming, BagIt allows customers to view all of these aspects in one place with one simple scan without having to search by model numbers.

The intended customers are people shopping for appliances who want the best deal but don't fully understand what they need from their appliance. BagIt will speed up the process of researching products and allow customers to do it from their phones quickly in store. Allowing customers to make their purchase the same day with piece of mind that they have gotten the right product at the best price.

Customers can also search products from the site at home and benefit from Bagit by manually searching products. The system will still compare products, provide reviews and display different retailers prices and the nearest retailer. Once customers know which product they want they can go straight to the nearest retailer with the best price for that product.

6.3.2 Project Scope

The scope of the project is to develop a product comparison system to compare product specifications and retailers prices. The system will also implement location detection, showing customers how far the nearest stockist is. The system will access the mobile devices camera when available. This allows customers to scan QR codes in store, view specifications and check reviews and other stockists prices.

Based on customer feedback working as a Dyson Expert, it was discovered that customers struggle to understand the differences between products and would rather go home to research specifications, retailers prices and customer reviews rather than standing in the store trying to do it from their phone. BagIt takes the hassle out of this task and makes it instant, allowing customers to make the right choice faster and at the best price.

The system was originally ment to implement NFC tags rather than QR codes but it was decided that QR codes would be easier to implement and customers would be more familiar with them. NFC tags would also be more expensive to implement.

6.3.3 Definitions, Acronyms, and Abbreviations

GUI   Graphical User Interface

HTML   Hyper Text Mark-up Language

PC   Personal Computer

QR Code   Quick Response Code

UID   Unique Identification

6.4 User Requirements Definition

Following extensive in field research, it was discovered that customers want all product information available to them straight away and find it frustrating that only the product name and price is displayed in store.

- Scanning – Once on the site customers can select the option to scan, which will open their devices camera, allowing them to scan the selected product. Rather than searching multiple times for different elements, customers will only have to scan once to retrieve specifications, reviews and different retailers prices.

- Compare – If a customer is still struggling to make their decision they can select compare to scan multiple items and display them together, highlighting the difference between the products.

- Best Price / Nearest Retailer – With a products specifications, the system will also gather all nearby retailers that stock the product and their prices. The system will implement location detection, and will use Google Maps to show how far each retailer is. This allows the customer to easily see how far they have to go to get the best price.

- Search – If a customer is not in store, they can still benefit from the app by manually searching items rather than scanning. Customers can still view and compare products and see which retailer has the best price and how far each retailer is.

6.5 Requirements Specification

The site will be easy to navigate through with all options clearly labeled to help the customer. Customers will find the site address on the label with all QR codes in the store. Once they have opened the site on their phone they can select to search or scan products. If a store does not have the QR codes or a customer is at home, they can select the search option where they will be prompted to enter the product they are looking for. Everything will then be displayed to the customer and they will have the option to scan or search again.

The scanning functionality will be beneficial to any user with a smartphone. The searching option can be used by anyone with access to a PC and can also be used on a phone if a store does not have QR Codes. Both options are easily operated by anyone comfortable with a smartphone or PC.

6.6 Functional requirements

Scanning - The system must open the camera of the device it is on and scan a QR code to take as input. This QR code will correspond to a unique I.D, which will be specific to each product.

Searching – When a User is unable to scan a QR code they must also be able to search products by name. Once they have selected their product (the system selects the unique I.D) the user will be brought to the same page as if they have scanned the products barcode.

Product – Following searching or scanning the user will be displayed all product specifications, reviews and all prices for the retailers in the area.
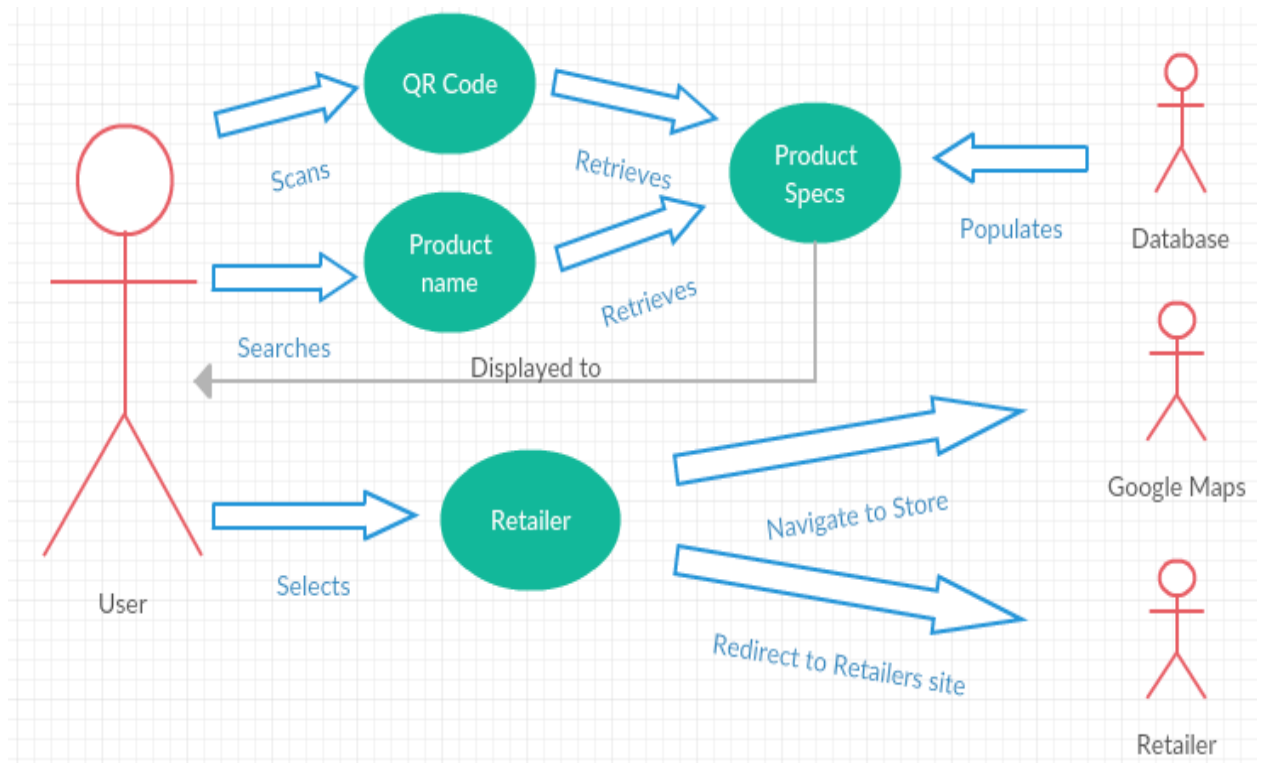
Retailer – As all products will display all retailers prices, consumers can choose to redirect to that retailers website.

Navigation – Once a consumer has chosen a retailer they can also choose to launch Google maps to navigate to the store.

6.6.1 Use Case Diagram

Each requirement should be uniquely identified with a sequence number or a meaningful tag of some kind.

The Use Case Diagram provides an overview of all functional requirements.

6.6.2 Requirement 1: User Scans QR Code

6.6.2.1 Description & Priority

Scanning the QR code is the main benefit of BagIt, taking the time and hassle out manually searching for products. Once a User selects scan they will be prompted to give BagIt permission to access their devices camera. Once the camera is open the User will scan the products QR code. The code gathers the products Unique ID which will gather all specifications for that product from the database. The QR code also gathers retailers prices for that product and with location detection and google maps, will tell the User how far they are from each retailer. From here Users can choose to scan again, redirect to a retailers site or launch Google Maps and navigate to the store.
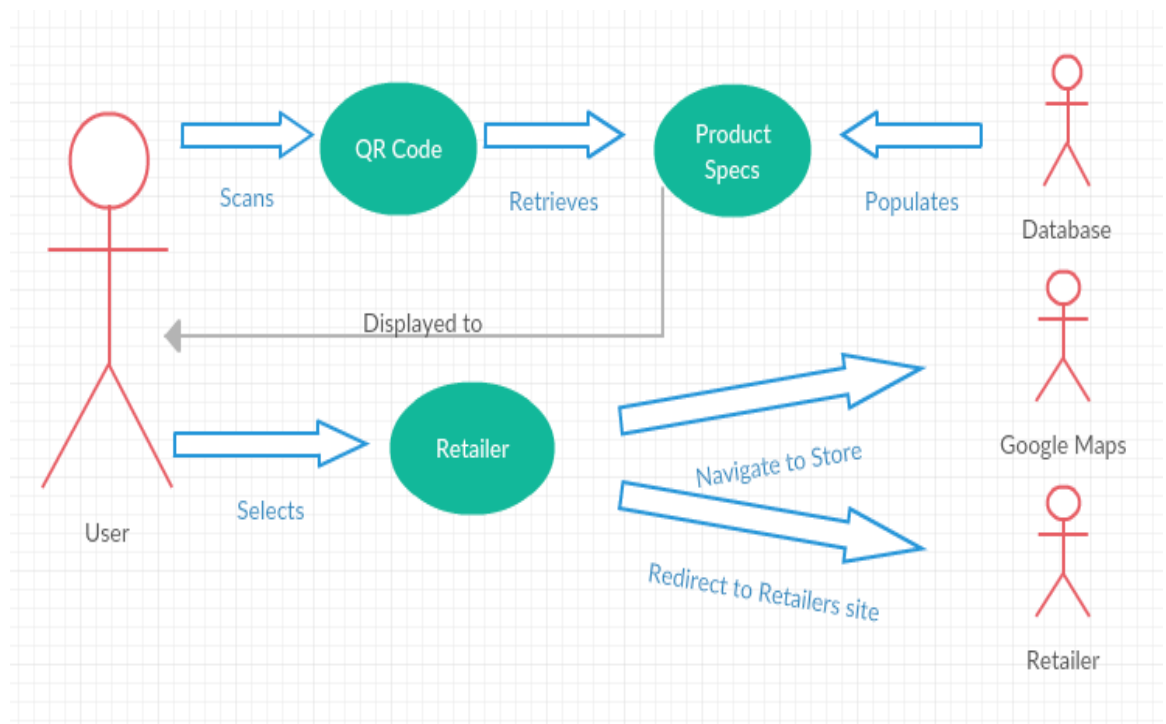
Scope

The scope of this use case is to scan QR Codes and take the Unique ID as input to retrieve the correct data from the database.

Description

This use case describes the flow of events when a User scans a QR code of a product. The User enters the BagIt site and selects scan on the homepage. Once the system has been given permission to access the devices camera the system will wait fir a QR code to be scanned. The unique ID from the QR Code will gather the relevant information from the database.

Use Case Diagram

Flow Description

Precondition

Once the User is on the site, the system awaits for the user to select the scan option. Once selected the system must ask the Users permission to access their devices camera. Once permission has been granted the system can begin to scan.

Activation

This use case starts when the User gives the system permission to access their camera and they scan the first QR tag.

Main flow

1. The system identifies the that a device is accessing the site
2. The User selects that they want to scan a QR Code (see A1 for alternative)
3. The system requests permission to access the camera on the Users device.
4. The User grants permission and scans a QR Code.
5. The system takes the unique ID from the QR code to retrieve the correct data from the database.

Alternate flow

A1: Search
1. The User goes to the site and selects search rather than scan
2. The system prompts the User to enter the item they are looking for in a search box.
3. The User enters the product and selects the correct one.
4. The system displays the same information as if they have scanned the QR code.

Exceptional flow

E1 : No access to Camera
1. The system requests access to the devices camera to scan.
2. The User refuses access.
3. The system prompts the User the search for product manually

Termination

The system gives the User the option to redirect to retailers website or Google maps for navigation to the retailers store. The User can also close out of the site at any time, terminating the system.

Post condition

The system goes into a wait state for a User to search or scan again.

6.6.3 Requirement 2: User Searches Product

6.6.3.1 Description & Priority

There are many cases when a QR code will not be available to scan. For example if a store has not put them up, if the site cannot access the User's camera or if the User is searching products from home. The site needs an alternate approach so it is not useless in these cases. Users will be redirected to the search option if their camera cannot be opened. Users can also select the search option from the homepage. Searching will take slightly longer than scanning but Users from home can greatly benefit by choosing their product online and going straight to the retailer with the best price. They can also view how far they are from each retailer and redirect to Google maps to be navigated to the store. They can also choose to redirect to the retailers website.
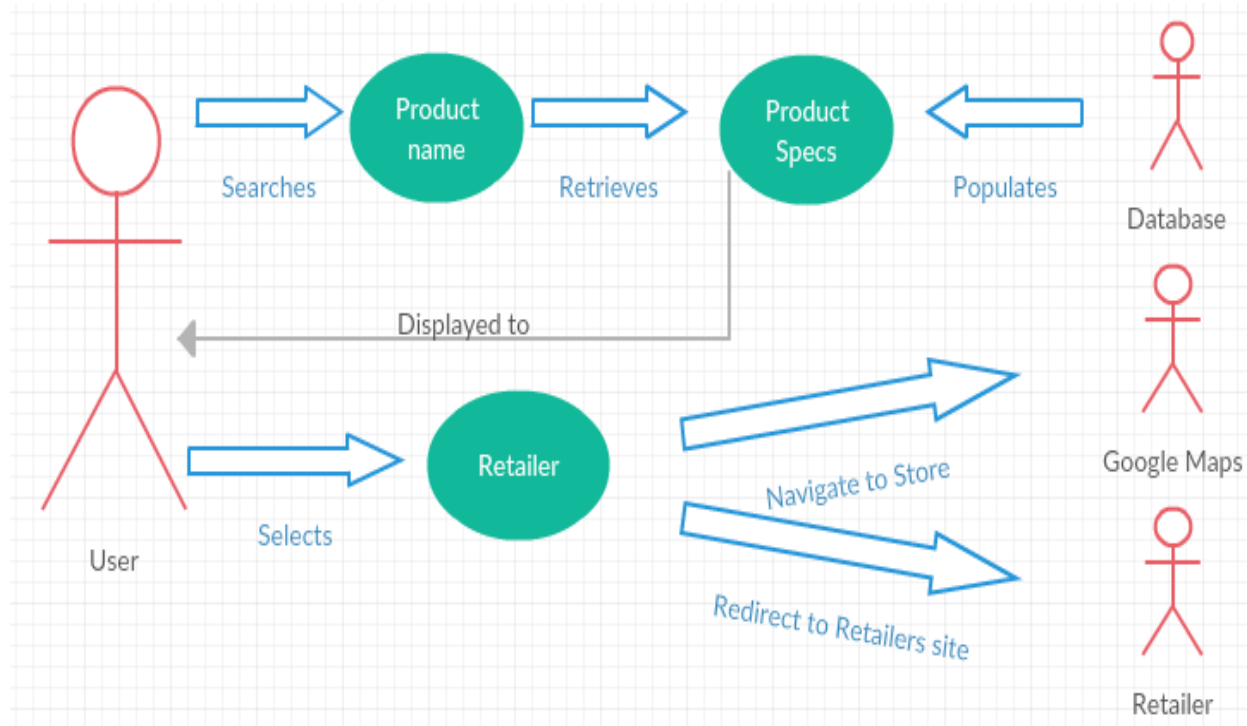
6.6.3.2 Use Case

Scope

The scope of this use case is to manually search for products rather than scanning. The User should have the same outcome as if they have scanned their product once they have searched and selected the product.

Description

This use case describes the events that occur when a User is searching products on BagIt.

Use Case Diagram

Flow Description

Precondition

The system is awaiting the User to enter a search item.

Activation

This use case starts when the User enters the item to search. The User then selects the correct product from the results. By selecting this the User calls the Unique ID similar to scanning with a QR Code. This calls the relevant information from the database.

Main flow

1. The User enters an item they want to search.
2. The System displays relevant results from the database
3. The User selects desired result
4. The system retrieves Unique ID from Users selection and displays product information as if the User had scanned the product.

Exceptional flow

E1 : No Search Results
1. The User enters an item they want to search.
2. The System cannot find any relevant results, informs the user and prompts them to search again.
3. The User re-enters a different item.

Termination

The system gives the User the option to redirect to retailers website or Google maps for navigation to the retailers store. The User can also close out of the site at any time, terminating the system.

Post condition

The system waits for the User to enter an item to search

6.7 Non-Functional Requirements

6.7.1 Maintainability requirement

The system must maintain and update all relevant data about products as necessary. When retailer's prices change, an admin of BagIt must update these prices on the database.

6.7.2 Portability requirement

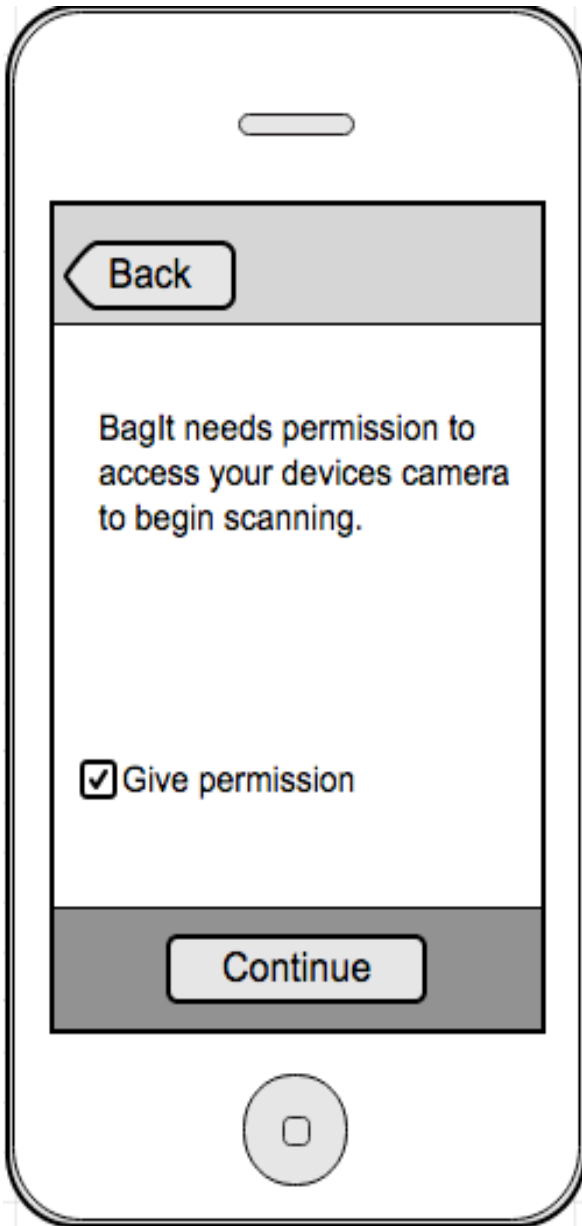The system must work across both desktop and mobile platforms.

6.8 Interface requirements

This section describes how the software interfaces with other software products or users for input or output. Examples of such interfaces include APIs, web services, shared memory, data streams, and so forth. Most systems would have a GUI. Add more subsections for other interfaces as reuired.

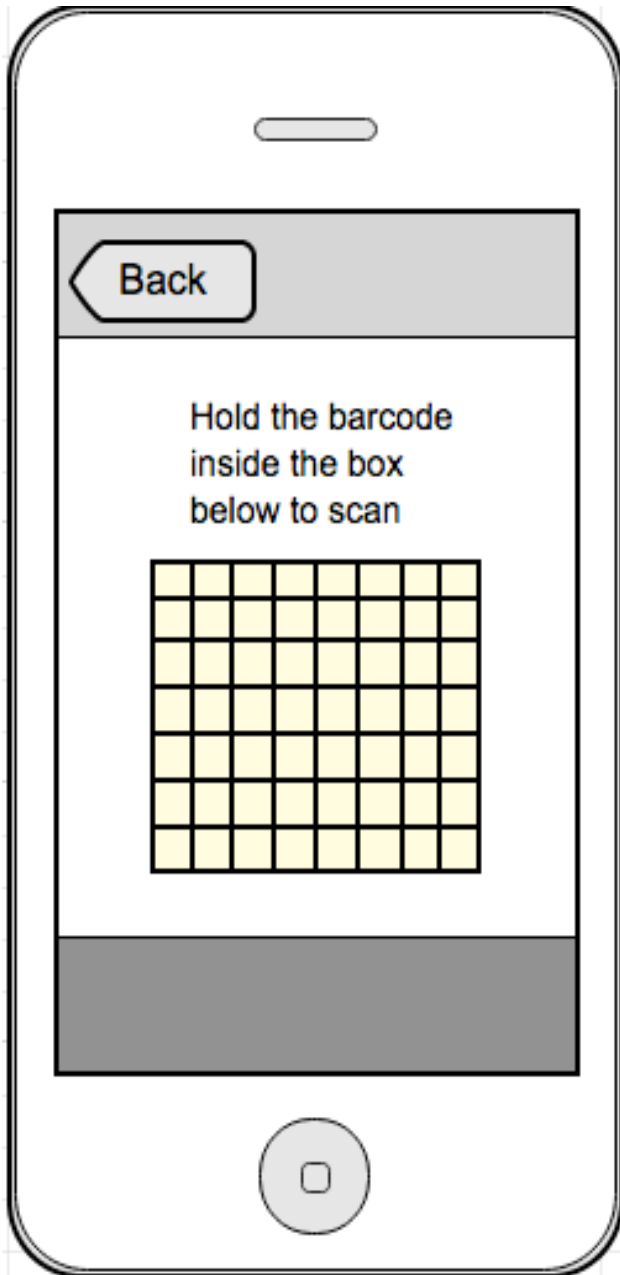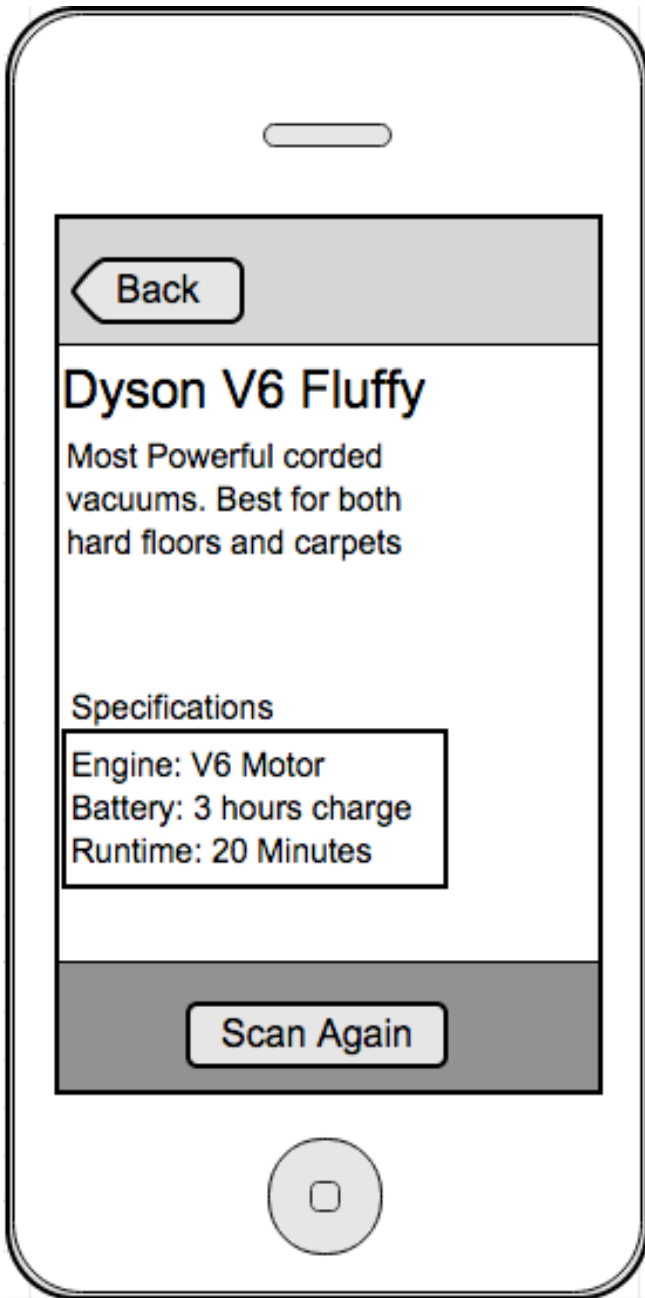## 6.9 GUI

From the home page the User can select to scan a QR code in store or select search and manually search for a product.

Back

BagIt

BagIt compares complex electrical appliances from multiple retailers quickly and easily. Ensuring you get the right product at the best price. Select scan to scan a QR code in store or search to search

Scan

Search

Back

BagIt needs permission to access your devices camera to begin scanning.
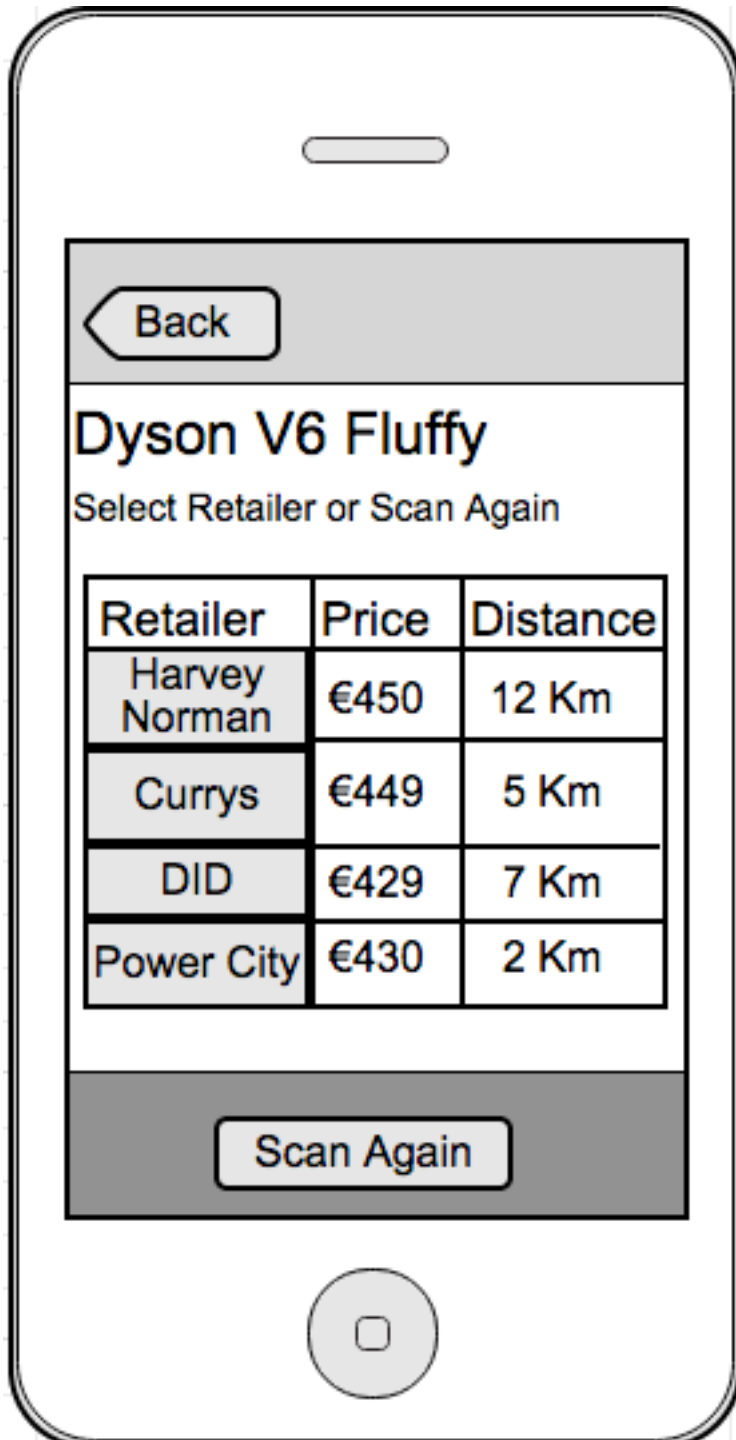
☑ Give permission

Continue

Once a User has selected scan they will be prompted to give BagIt access to their devices camera to begin scanning.

Once permission has been granted the Users camera will open on the next page with instructions to tell the User to hold the barcode inside the frame. Once the barcode is captured the system will redirect to the relevant page.

Back

Dyson V6 Fluffy

Most Powerful corded vacuums. Best for both hard floors and carpets

Specifications

Engine: V6 Motor
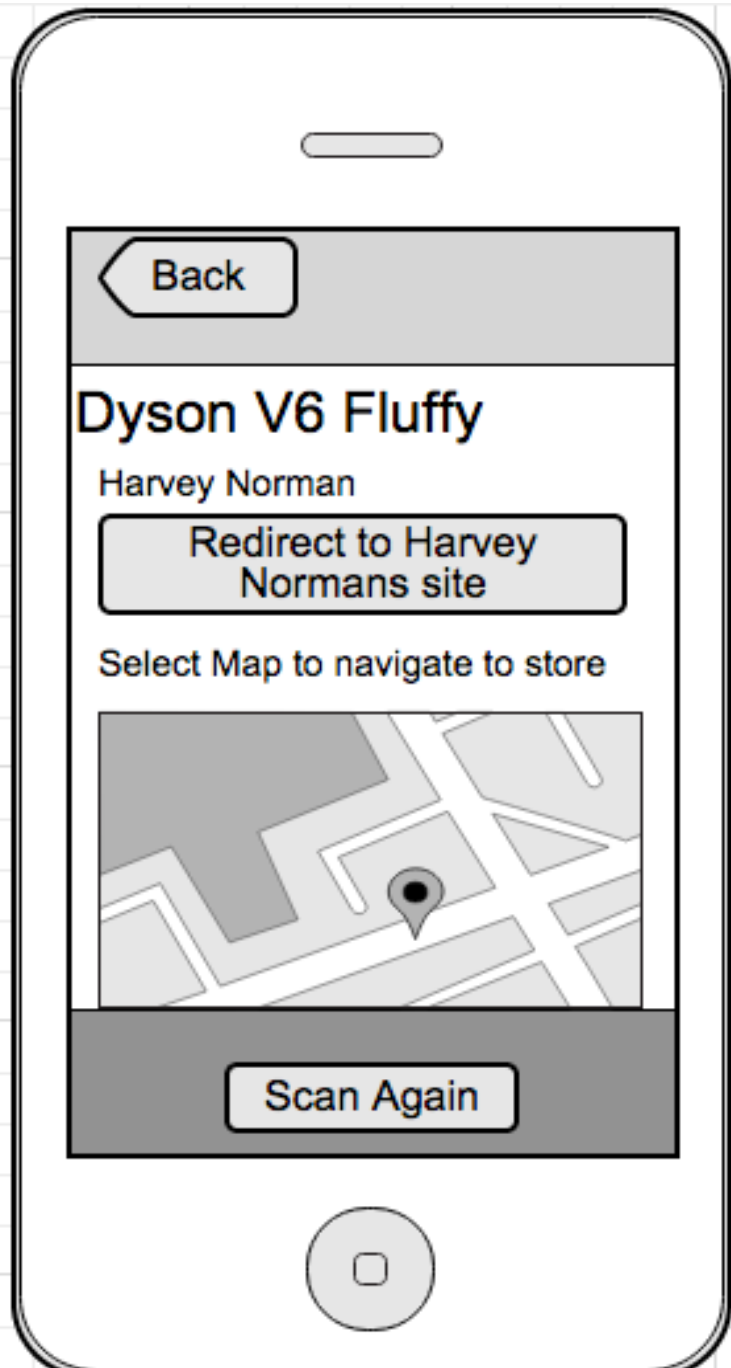Battery: 3 hours charge
Runtime: 20 Minutes

Scan Again

The Barcode retrieves the UID and gets the relevant information from the databse. This displays the page for the product scanned. The page starts with a short description of the product then goes into detailed specifications. The User will have to scroll down for the rest of the information.

The User can scroll down the page to view User reviews which will be implements from the amazon RSS feed.

After reviews Users can further scroll down to view all stockists, the stockists prices and how far away they are. Users can select a stockist from this table by clicking on it.

Once the User has selected a retailer they will be given the retailers details, with the option to redirect to the retailers site or launch google maps and start navigation to the store.

Alternatively if a User selects search on the homepage they will be prompted with a search box to enter the item they are looking for. The User enters the item in the search box and presses search.

Back

BagIt

BagIt compares complex electrical appliances from multiple retailers quickly and easily. Ensuring you get the right product at the best price. Select scan to scan a QR code in store or search to search

Scan

Search

Back

Search

Enter the product you are looking for in the search box below

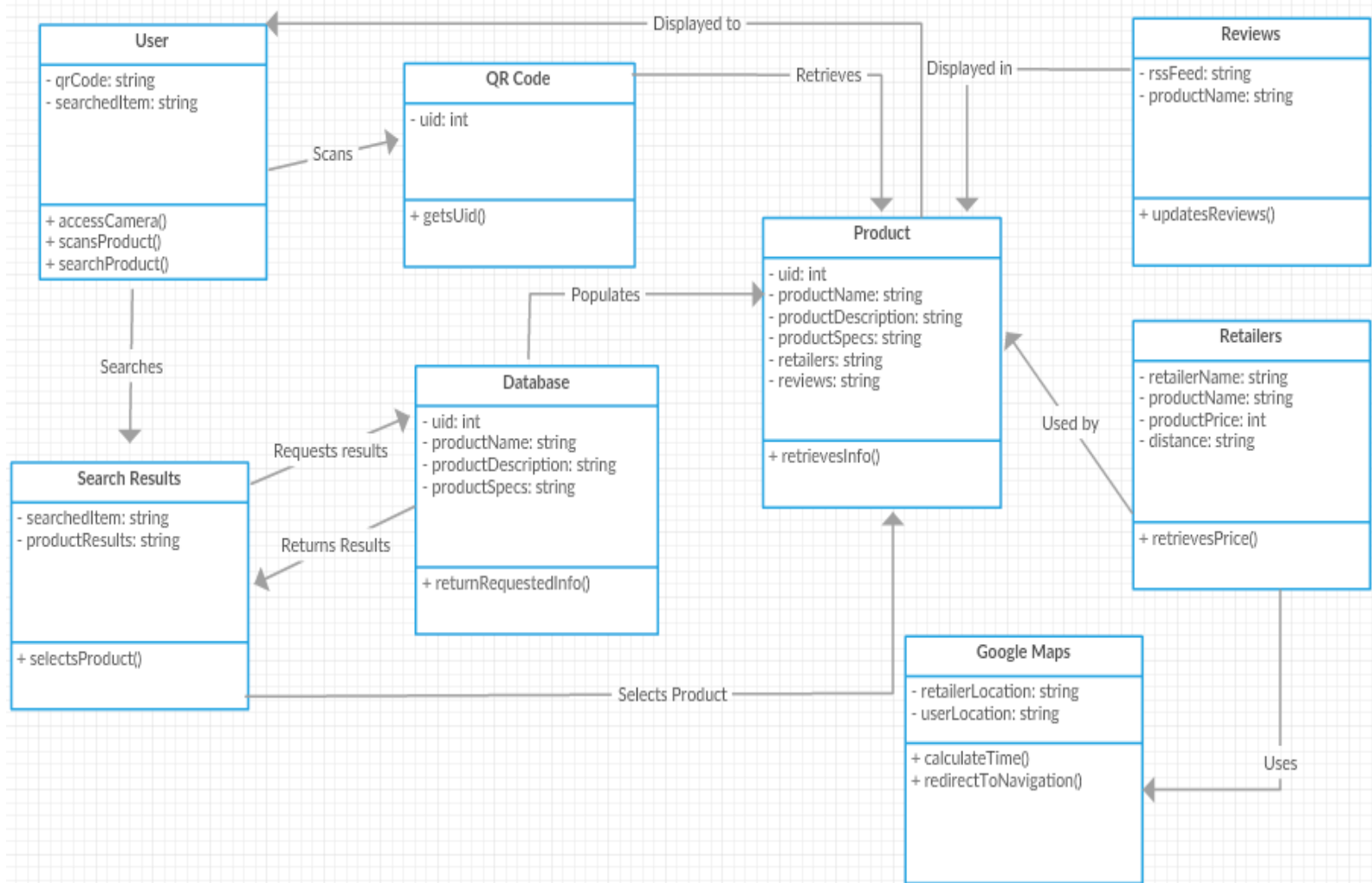Q *Enter Item*   ⊗

Search

6.10 Application Programming Interfaces (API)

BagIt will implement a Google Maps API in order to determine how far customers are from stores and to allow them to navigate to stores. This will be particularly useful for customers in store that are in a retail park and are unsure of what other stores are only a short distance away. The retailers locations are set with their latitude and longitude coordinates in the code below. The map is set to center over Dublin with the coordinates below the listed stores. A counter is then created, going through each coordinate and plotting it on the map, displaying the store name when the User clicks on the icon.

```php
search.php

232        <!-- Bootstrap Core JavaScript -->
233        <script src="js/bootstrap.min.js"></script>
234    <div id="map"></div>
235    <script>
236
237        var map;
238
239
240    function initMap() {
241      var locations = [
242        ['Harvey Norman Blanchardstown', 53.395180, -6.392954],
243        ['Currys Blanchardstown', 53.394687,-6.388674],
244        ['Harvey Norman Rathfarnam', 53.292010, -6.265995],
245        ['Harvey Norman Swords', 53.446504, -6.225719],
246        ['Currys Swords', 53.447076, -6.223724],
247        ['DID Swords', 53.446908, -6.224351],
248        ['DID Crumlin', 53.329712, -6.298452],
249        ['DID Stillorgan', 53.288783, -6.204603],
250        ['DID Malahide', 53.382168, -6.207755],
251        ['Power City Coolock', 53.391356, -6.192761],
252
253      ];
254
255        var map = new google.maps.Map(document.getElementById('map'), {
256          zoom: 10,
257          center: new google.maps.LatLng(53.3478, -6.2597),
258          mapTypeId: google.maps.MapTypeId.ROADMAP
259        });
260
261        var infowindow = new google.maps.InfoWindow();
262
263        var marker, i;
264
265        for (i = 0; i < locations.length; i++) {
266          marker = new google.maps.Marker({
267            position: new google.maps.LatLng(locations[i][1], locations[i][2]),
268            map: map,
269          title:locations[i][0]
```

7 System Architecture

8 System Evolution

The System can further evolve by expanding the range of products in the database. The system can also expand into different sectors such as furniture and food. Additional functionality can be added such as a review system and a web scraping functionality to keep the database up to date.

9 Monthly Journals

9.1 September

Reflective Journal

Student name: Suzanne Fagan

Programme BSc in Business Information Systems

Month: September

My Achievements

This month I decided on my project idea and completed my project proposal. I decided on a Sales Assistant app to assist customers in picking the right appliance for them. I came up with the idea from watching customers struggle to understand the difference between products in my part time job as a Dyson Expert.

I discovered that customers often have no idea why different products are priced differently and cannot figure it out if a sales assistant is not available. I've also found that customers are hesitant to trust sales assistant's advice as they feel they are only working for commission. The app should highlight the differences in products so they know what they are paying for.

I have previously worked on a project with NFC technology and decided to implement this new technology into the app. Customers can simply touch their phone off the tags of products they want to know more about or want to compare.

I conducted a lot of research into my idea and discovered there is nothing on the market that will compare products as effortlessly as mine will and there are no apps that take the same approach that I plan on taking with my app.

My Reflection

I am very happy with my project idea and I feel I will be able to complete the project with the time allocated to me. I think that there is a market for my product and that both consumers and retailers will benefit from it. I decided on my project idea very close to the proposal deadline and as a result I feel that my proposal document is rushed and my Gantt chart timeline may be unrealistic. I feel that my project idea isn't as specific as it needs to be yet and I may need to make further changes to i.t

Intended Changes

Next month I plan to further specialize my app into what exactly it will do and how exactly it will achieve it. I plan to have better time management as this month I left my proposal until the last minute as I struggled with my idea.

9.2 October

Reflective Journal

Student name: Suzanne Fagan X12395906

Programme BSc in Business Information Systems

Month: October

My Achievements

This month I met with my project supervisor and made a few improvements to my project proposal. My supervisor suggested using QR codes rather than NFC tags and after further research I changed my proposal to read QR codes rather than NFC tags. The main reasons for this were QR codes would be a lot cheaper to implement and there are also a lot more available resources online to assist with programming QR code functions. She also suggested additional functionality I can implement into the site such as reviews and price comparison for all stores nearby. The product reviews seem straight forward to implement and I am still researching a solution for price comparison so that the prices will update themselves when the price is changed on a retailers site.

This month I also completed the template for my site. The site can be navigated through and it is clear to see how it will look as a finished product. The specific functions for each page are not completed but I have been watching tutorials online to better equip myself for this when I begin programming the more complex sections.

My Reflection

I felt, it worked well to fully complete the site template without any of the specific functionality. Being able to navigate through the site and see which pages will gather and display information makes it easier to understand how the program will work and I feel more confident to take on the more complex programming.

However, I was not successful in time management. I feel I spent too much time researching and watching tutorials rather than working on my requirements specification and trying to implement more functionality.

Intended Changes

Next month, I will try to organize my time better and try to research one thing at a time and then act upon my findings before researching something else.

Supervisor Meetings

Date of Meeting: 11/10/2015

Items discussed: Changed NFC tags to QR codes. Additional functionality that can be added to the current plan. What next steps to take and what to have complete before next meeting.

Action Items: Completed layout and researched additional functionality such as customer reviews.

9.3 November

Reflective Journal

Student name: Suzanne Fagan

Programme BSH in Business Information Systems

Month: November

My Achievements

This month I completed both my Requirements Specification document and my Project analysis design document. I further worked on my site layout and being working on the back end functionality. I extensively researched web crawlers and web scraping. So far I have made several attempts at scraping data from other sites in java and using java script. There are several tutorials online of web scraping using Python and Django. I have never used Python before but as I am really struggling to make it in java and there are more tutorials in Python I am going to start learning how to make the web crawler in Python.

In addition to this I created a database using PHP My Admin. I created the necessary tables and input data on products manually. As I haven't created the web crawler yet and I hope for the web crawler to write to the database the information in the database may all not be used. At present it is a back up if the web crawler is not working by the halfway presentation. Once I can get the web crawler working I will know exactly what I have to do with the database and what the web crawler will do for me.

My Reflection

I felt I worked well with time management regarding completing documentation but not with coding. I feel my content was not perfect but I am happy with it and I completed it on time. I feel I spent too much time researching web crawlers and web scraping and feel as if I am getting nowhere with it. I have now decided to take a different approach by following Python tutorials instead but I think I should have made this decision sooner rather than wasting so much time trying to make it in java. If I struggle to make it in Python I will scrap it for the moment and come back to it when everything else is complete if I have time. At the moment a lot of the functionality is based around if scraping the data in is going to work or not, so it has been difficult to go forward without knowing the answer.

Intended Changes

Next month, I will try to get the web scraping working and if I can't I will put it aside and work on the QR scanning API to ensure I have some functionality for the midpoint presentation.

Supervisor Meetings

Date of Meeting: 25/11/2015

Items discussed: We discussed the documentation, the sites layout and Lisa assisted me with where to look for help with creating a web crawler.

Action Items: I have since taken her advice on tutorials for web crawlers however that is where I came across the Python tutorials and I will discuss this with Lisa in my next meeting.

9.4 December

Reflective Journal

Student name: Suzanne Fagan

Programme BSH in Business Information Systems

Month: December

My Achievements

This month, I further attempted to code the web scraping section of the project. Although it is not yet fully functioning I feel I have made a lot of progress with it and I have learned a lot about the technique along the way. I have been teaching myself Python with tutorials online as coding the scraper in Java was extremely difficult and there were plenty of tutorials on how to web scrape in Python. So far I have been successful with web scraping by following a tutorial step by step but I have not yet been able to implement this approach in my own project. Although I have been contributing to my project this month, it has not been my priority with exams approaching. I have been spending most of my time working on my final assignments of the semester and studying for exams in January.

In addition to the web scraping I have been making changes to the interface. I am trying to finalise the layout before the halfway presentation in February. My project will definitely not have full functionality but I hope have at least one function working perfectly and to have the interface complete to demonstrate how the finished project will work.

My Reflection

I feel I did not contribute as much as I should have to the project this month although I spent a huge amount of my time on college work. I found it extremely difficult to focus on my project when I tried to work on it as I was anxious about exams. Any time I sat down to work on my project I couldn't focus on it and began looking over past exam papers instead. However I do consider my exams more important this month and with that in mind, I am happy with my progress.

Intended Changes

Next month, I will continue to focus on my exams until the 12th of January, which is the date of my last exam. I then intend to work solely on the project after this until classes resume. I hope to get a huge percentage of the project working during this time. I also plan to tidy up the layout as best as possible and finalize the interface for the halfway presentation in February. I plan to have at least one feature fully functioning for the presentation in February and to have the interface finalized.

Supervisor Meetings

Date of Meeting: 16/12/2015

Items discussed: We discussed some tasks that I should complete over Christmas that won't involve much work or distract me from exams. Lisa suggested I complete my survey over Christmas.

9.5 January

Reflective Journal

Student name: Suzanne Fagan X12395906

Programme BSc in Business Information Systems

Month: January

My Achievements

This month I had my Examinations for semester one. Having exams meant that I had to put my project on hold for the beginning of January but towards the end I feel I made some progress. I created a development environment for my project by installing VirtualBox. I ran Ubuntu on VirtualBox and then installed Django.

My Reflection

I feel that I do not have enough to show for the amount of progress I made this month. As I am a Business Information's Systems student, I enjoy front end development far more than the back end. This month I focused on the back end and although the application does not have intended functionality yet, I have taken a big step towards full functionality. I found it extremely helpful having time off after exams to fully focus on the project and no other modules.

However, I feel that my time management was far more successful this month as I could devote two full weeks to the project. Unfortunately I didn't manage to meet my supervisor until the very end of the month. Next month I will have to ensure to stay on top of all aspects of the project and not get carried away with one particular aspect.

Intended Changes

Next month, I intend to stay on top of progress and meetings. I plan on giving up my part time job outside of college within the next month or two to ensure I have sufficient time to complete all aspects of my final semester to my full capability

Supervisor Meetings

Date of Meeting: 04/02/2016

Items discussed: Progress over Christmas. Discussed project documentation and Presentation for Mid Point Presentation. Went through sample presentation and ensured I had all appropriate headings in.

Action Items: Began coding back end and created virtual development environment

9.6 February

Reflective Journal

Student name: Suzanne Fagan X12395906

Programme BSc in Business Information Systems

Month: February

My Achievements

This month I ran into a few difficulties with getting my CSS to work in the new Django framework I am using. After a lot of researching and editing various different files I got the pages linked up again. I also implemented the Google maps API and began creating the maps by creating markers for each retailer. The map will be displayed with the results table in the final project. I also began inputting data into the database manually. I plan on continuing on getting the web scraping to work once everything else is finished and all the information is inputted manually so that I have a backup. I have still to implement the GO QR API. I completed my mid point presentation at the beginning of February which I felt went well. I received 80% for my mid point presentation and documentation which I am very happy with.

My Reflection

I am very happy with my Mid Point grade. I felt that the amount of writing up I had to do for the mid point report has really held me back with my time to work on coding and I'm worried about getting all functions of my project working. I originally wanted to use web scraping on my project but was willing to give it up if I ran out of time. For my Artificial Intelligence module I have been tasked with implementing some AI into my project. I am submitting my proposal of using web scraping as AI so I am more determined but also a lot more nervous about getting it to work.

Intended Changes

Next month I plan to finish the Google maps API and at least start the GO QR API. I hope to have both API's and the database completely finished to allow myself to focus on the web scraping with the remaining time.

Supervisor Meetings

Date of Meeting: 02/03/2016

Items discussed: Lisa put me in contact with a member of staff who has a lot of experience coding in Python to help with my last few issues.

9.7 March

Reflective Journal

Student name: Suzanne Fagan X12395906

Programme BSc in Business Information Systems

Month: March

My Achievements

This month I completed the Google maps API, and almost completed the Web QR scanner. The scanner is open source code available on Github and I implemented this code into my search button. The scanner now works but the presentation is not tidy. I will need to work on the CSS and layout to fix this issue. I also purchased my domain, which will be BagitIreland.com, I had originally planned to purchase BagIt.ie but unfortunately this was not available. The domain was included in a package with a years hosting with GoDaddy.com

My Reflection

A lot of the elements of my project came together this month. However I am still worried about the amount of work left to do before the deadline. I still have to connect the database to call the correct data to the frontend. Fix the layout and CSS and upload my files to the hosting site. However I am happy with how the elements are starting to come together, and plan to keep up the progress.

Intended Changes

Next month I plan to focus on exams for the beginning of the month. Once these are out of the way I will have almost a full month of no classes to complete my site, documentation and upload my site to the hosting site.

Supervisor Meetings

Date: 20/04/2016

Items Discussed: Everything required for final presentation and upload and all final touches. Lisa cleared up any final questions I had about submission.
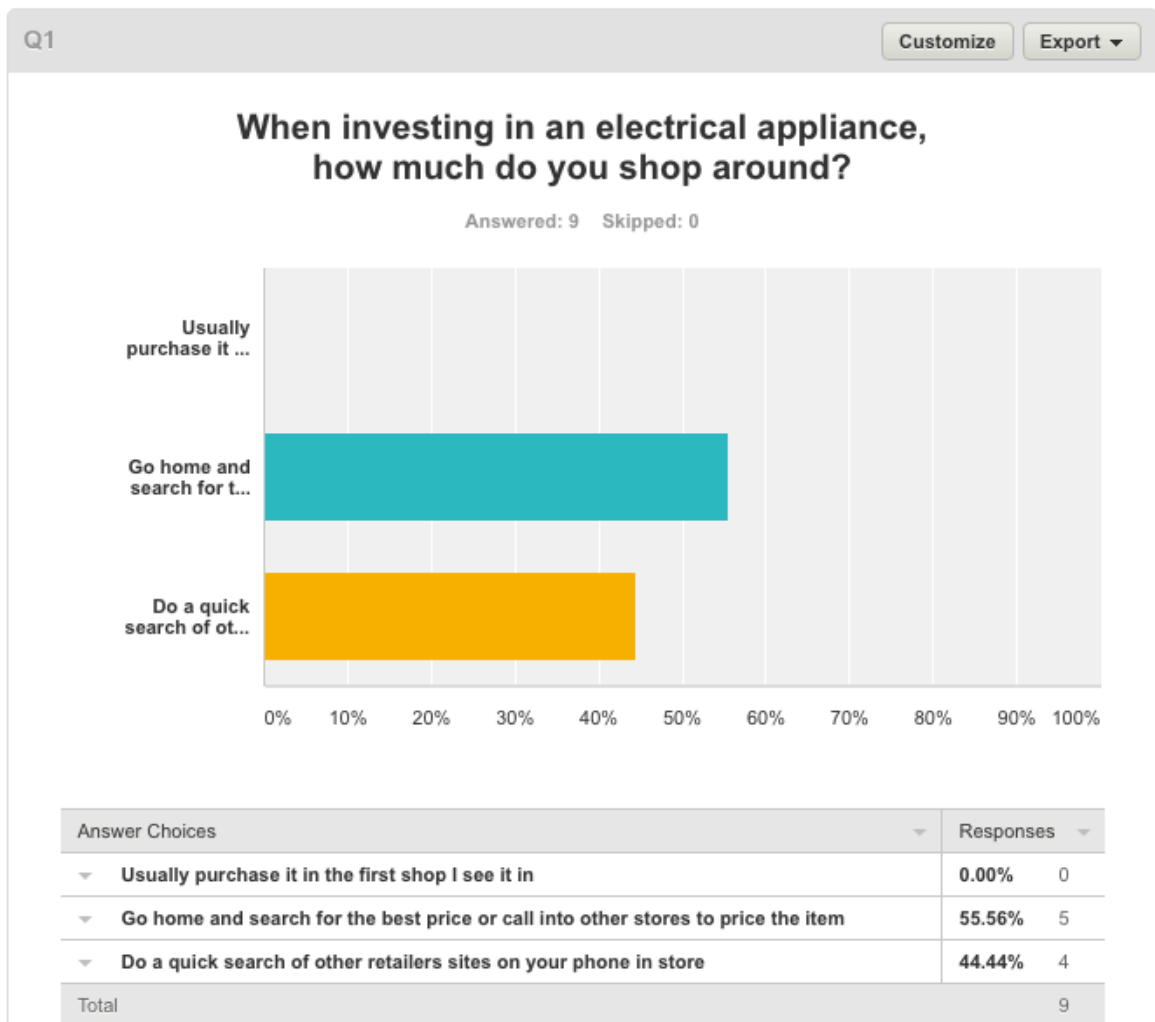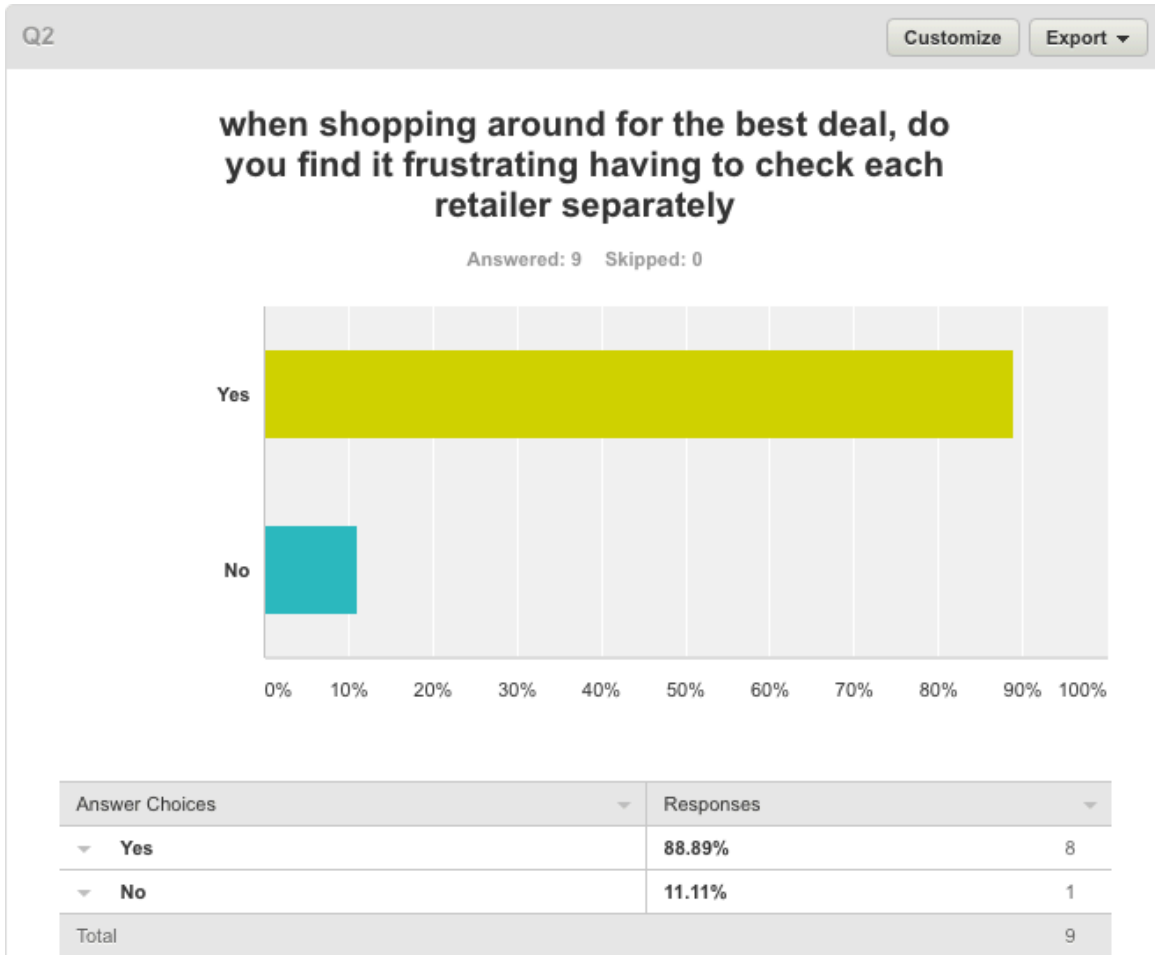
10 Other Material Used

10.1 Survey

I created a survey using Survey Monkey which is available at https://www.surveymonkey.com/r/XLTGK9X

The questions were strategically chosen to ensure BagIt took the correct path during development.
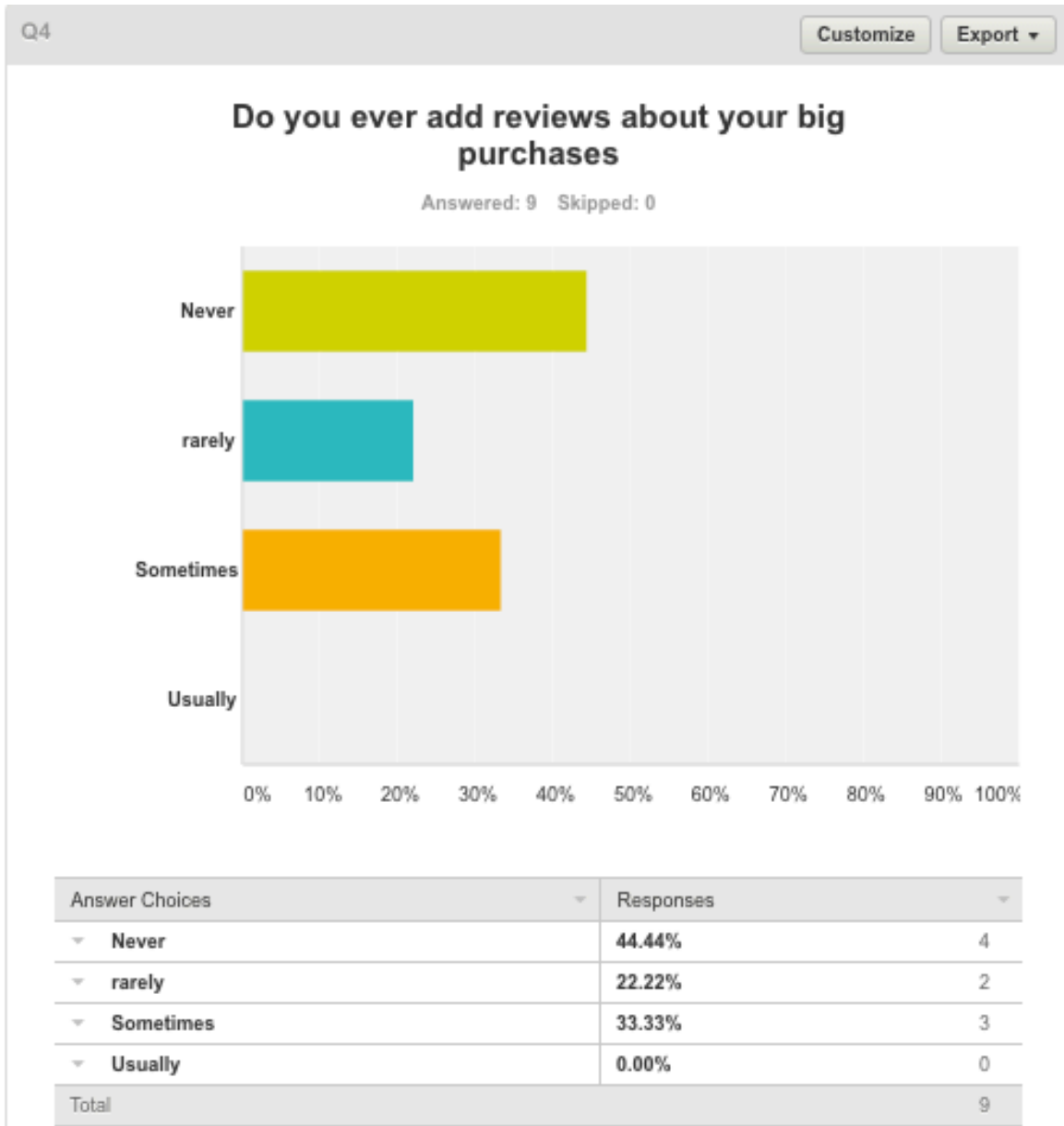
Question 1.

Question 2.

when shopping around for the best deal, do you find it frustrating having to check each retailer separately

Answered: 9   Skipped: 0

Answer Choices	Responses	
Yes	88.89%	8
No	11.11%	1
Total		9

Question 3.

Q3	Customize	Export ▾

Do you research reviews on a product before making a purchase

Answered: 9   Skipped: 0

Answer Choices	▾	Responses	▾
▾ Yes		100.00%	9
▾ No		0.00%	0
Total			9

Question 4.

Q4   Customize Export ▾

Do you ever add reviews about your big purchases

Answered: 9   Skipped: 0

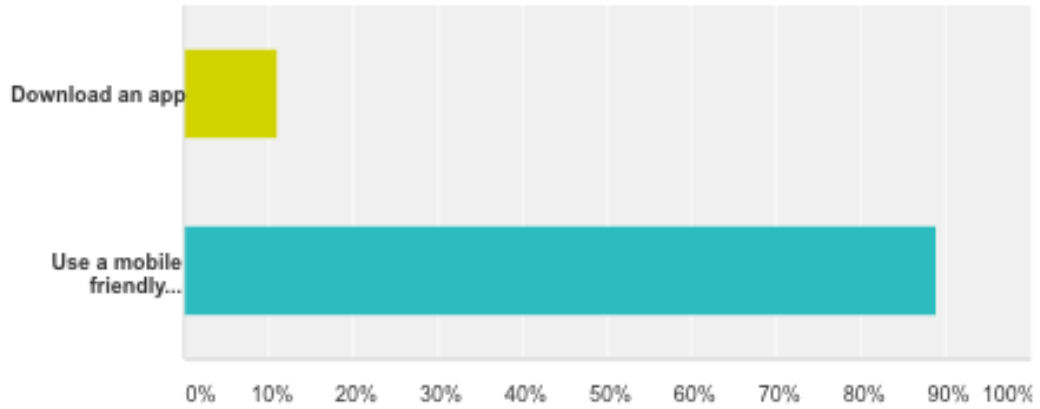| Answer Choices		Responses	
▾	Never	44.44%	4
▾	rarely	22.22%	2
▾	Sometimes	33.33%	3
▾	Usually	0.00%	0
Total			9

Question 5.

If there was a system to help you view reviews and all retailers prices in one place, how would you prefer to access it?
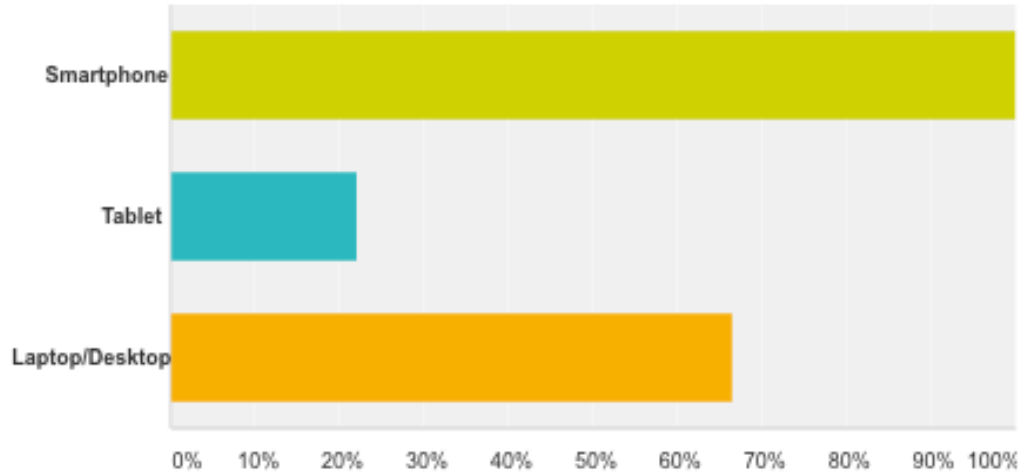
Answered: 9   Skipped: 0

Answer Choices	Responses	
▾ Download an app	11.11%	1
▾ Use a mobile friendly website	88.89%	8
Total		9

Question 6.

Q6   Customize   Export ▾

When researching products and reviews which kind of device do you usually use? Select all applicable

Answered: 9   Skipped: 0

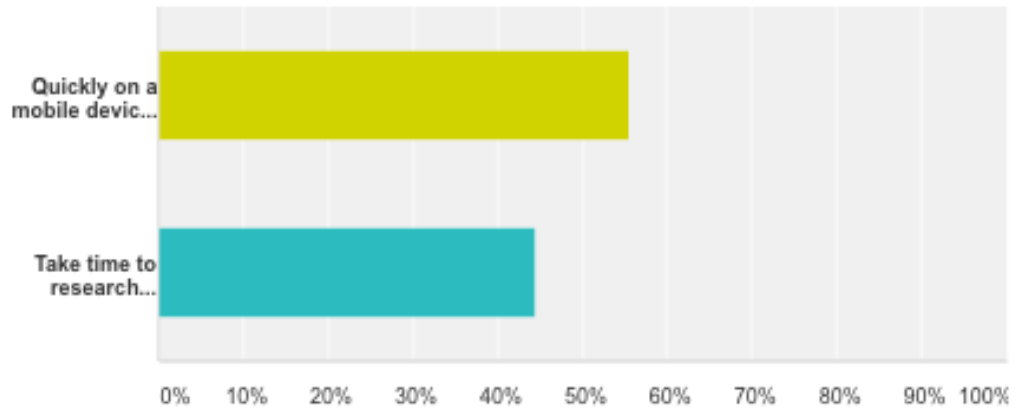| Answer Choices	Responses	
Smartphone	100.00%	9
Tablet	22.22%	2
Laptop/Desktop	66.67%	6
Total Respondents: 9		

Question 7.

Q7 Customize Export ▾

Do you prefer to research and check prices on a mobile device in store or at home?
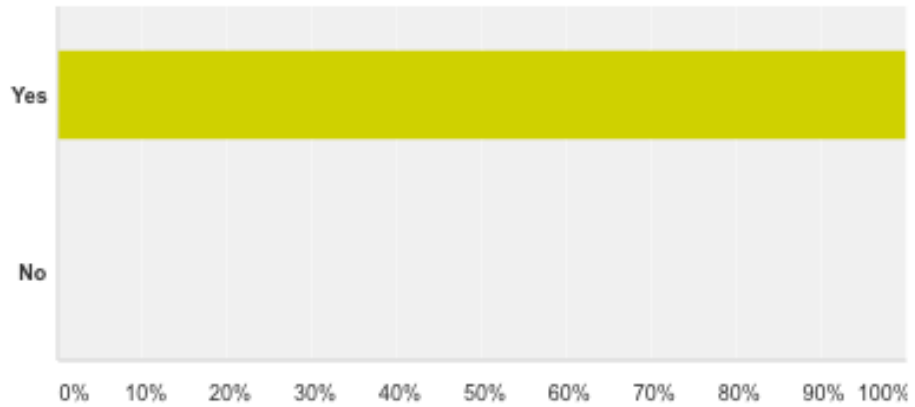
Answered: 9   Skipped: 0

Answer Choices	Responses	
Quickly on a mobile device in store	55.56%	5
Take time to research throughly at home	44.44%	4
Total		9

Question 8.

Q8   Customize   Export ▾

**If there was a mobile friendly site to give
you all relevant information on one page,
would you be more likely to use your phone
to make up your mind in store?**
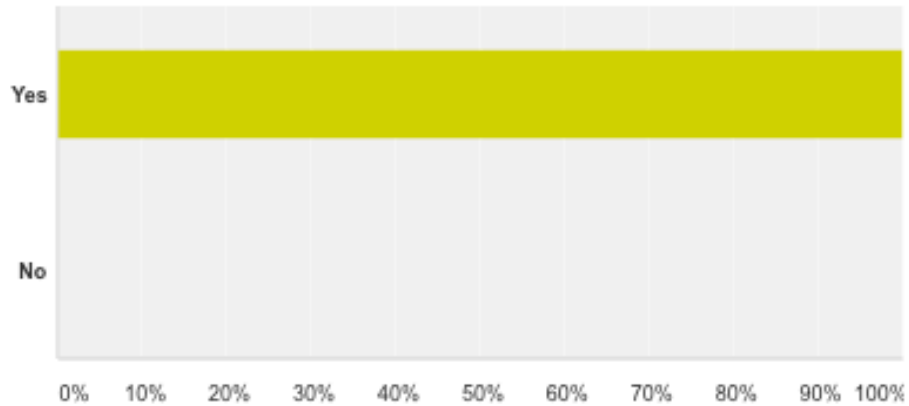
Answered: 9   Skipped: 0

Answer Choices	Responses	
▾ Yes	100.00%	9
▾ No	0.00%	0
Total		9

Question 9.

Q9   Customize   Export ▾

**If you are in a store and saw another store
nearby have the same product for a
cheaper price would you go to purchase it
from the different retailer?**

Answered: 9   Skipped: 0

Answer Choices	Responses	
Yes	100.00%	9
No	0.00%	0
Total		9

The results from the survey indicate that this application would be positively accepted by consumers providing development goes to plan.