CA400 Functional Specification

Irish Sneakers Application

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1. Introduction

1.1 Overview

The aim of this project is to develop an Android application for Irish sneakerheads. Nowadays the sneaker industry is growing every year with the resale industry alone worth over €1bn. Due to the vast growth and spread of the internet it can be somewhat difficult to find the products you are searching for with retailers stocking different products. E-commerce is extremely popular in today's society. Consumers can conveniently purchase products online and receive them next day.

This application will be beneficial to Irish sneakerheads that purchase products both online and offline. As a sneakerhead it is an area that I'm very passionate about. I am constantly getting messages off people I know and people off Instagram wondering where to get certain pairs of sneakers. I want to create an app that offers consumers a place to find their sneakers without having to search through multiple sites.

The application will use web scraping on Irish retailers. This data will be used to create a catalog for the product. This interactive app will provide an intuitive experience for consumers allowing filtering of product and displaying the best deals for the user. I also intend to include a section for sneaker raffles and limited product. Sneaker collaborations and extremely limited runs of sneakers are becoming increasingly popular. This section will push a notification to users about a limited release that is happening in Ireland.

1.2 Business Context

The sneaker market is quite niche but it growing hugely every year. Creating an app that will allow customers to find everything in one place will save people time and money while supporting Irish businesses.This application could be used by pure sneakerheads which seek the latest sneakers for the best price. It would allow users to filter sneakers and find the best option and colourway for them. The limited releases section would ensure that they won't miss out on a chance at purchasing the highly sought after sneakers.

I also think this application would be useful for a broad market of people who are looking to purchase gifts. They may know a particular brand or model that someone is looking for and by using our application they will be easily able to select the correct sneaker for the best price. I plan on adding student options too as certain retailers will apply student discounts which will affect where has the best price for students across the country.

1.3 Glossary

Data Mining
Data Mining is the process of analyzing and evaluating large datasets in order to identify patterns and useful information in the data to solve problems. It has a goal to extract information from a dataset and transform it into understandable insights that can be further used e.g. to predict future trends and allow enterprises to make better decisions.

Web Scraping
Web scraping, web harvesting, or web data extraction is data scraping used for extracting data from websites.

Algorithm
An algorithm is a set of rules, procedure or formula used for solving a problem.

UI
The user interface (UI) is everything designed into an information device with which a person may interact.

Sneakerhead
A sneakerhead is a person who collects trades and/or admires sneakers as a form of hobby. Sneakerheads, like most collectors, are passionate and dedicated to their subject. Many are very knowledgeable about the origins and history of sneakers.

E-commerce
E-commerce is the process by which business and consumers buy and sell goods online.

API
Application Program Interface - is a set of subroutine definitions, protocols for building applications. It manages how two pieces of software interact and communicate with each other.

GUI
Graphical User Interface - It the user interface that allows the use of icons or other visual elements to interact with electronic devices other than using textual information.

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2. General Description

2.1 Product / System Functions

For my project, I am developing a user-friendly, intuitive Android application that provides Irish consumers with the best sneaker shopping experience. The application will act as a shopping platform where users will initially register with their email. After a successful registration the user can explore the application. The application will use web scraping to provide a catalog of footwear for the consumer. In addition to this catalog, users will be able to filter the catalog based on preferred brands, retailers, sizes, colours, etc. The functionality of the system allows the user to effectively manage their shopping experience, save time and money.

The application will need to use web scraping on 5-6 Irish retailers to build the catalog required by the user. This involves gathering data from different locations, cleaning it or transforming it into useful and understandable data before being displayed to the user. Organising the data is going to be extremely important here so that the user is getting the relevant information without anything unnecessary. Once the user finds the product they are looking for they will be able to click into the product page where they will be directed to the retailer of their choice (cheapest or prefered).

One of the key functions of the application I would like to implement is a seperate section for highly sought after releases e.g designer collaborations. I plan on scraping Instagram and retailer websites to find information on these releases to automate the process for users and notify them about these drops. Generally these releases are raffle based on the retailers website or Instagram. The application will direct users to location of the raffle and provide instructions on how to get the sneakers.

2.2 User Characteristics and Objectives

This sneakers application has a broad target audience as outlined in my business context. For the purpose of this final year project I will target the sneakerheads and students. The majority of these people are between the age of 16-25, however, there is a quite a large older audience of people that have been collecting sneakers for years that must be taken into account. People in this age range generally should not have problems with using technology and are familiar with online shopping. The objective of this application is for the user to save time and money.

From the user's perspective, the application would have be intuitive and have easy navigational access. Students lead a busy lifestyle and the main characteristics they want in an application is quick, responsive and reliable applications. They do not want to spend a lot of time clicking through different websites trying to find the best deal. The application should have a clean material design that not only looks great but is accessible too.

I would love to add improved functionality to this system as the application grows and develops in the future. For example I would love to add a potential "Wish List" that the users could add to while shopping. This could allow users to share the list with others for gift ideas and to have products to save for. The "Wish List" could also be used to receive notifications when an item from your list drops in price so the student can get a great deal. Another feature I would like to add would be student discount integration. In Ireland there are two main student sites used for discounts which is UniDays and StudentBeans. These allow users to verify there student status through university and college logins and then provide discounts to various sites.

2.3 Operational Scenarios

Registration

Goal in context: A user must register before using the application
Scope & Level: Low Level
Actors: User, Database
Trigger: User selects the 'Register' button
Preconditions: The user has never registered before and has a valid email account.
Description: The user clicks 'Register'. They input their name, age, student number, email, course code and password. The database stores the user's details. User is then brought to the Login page.
Postconditions: The user becomes registered and successfully logs in.

Login

Goal in context: A user logs into the web application
Scope & Level: Low level
Actors: User, Database
Trigger: User selects the 'login' button
Preconditions: The user has registered with the application before attempting to login.
Description: The user selects 'Login'. The user inputs the valid email address and password they registered with. The Database will validate the user. User gets brought to the web application home page.
Postconditions: User successfully logs in to the application.

Search Product

Goal in context: The user submits a product they wish to purchase.
Scope & Level: Primary task, High Level
Actors: User, Database
Trigger: A "Search" button is selected.
Preconditions: The user has successfully registered and logged into the application. A valid search is submitted.
Description: The user selects the "Search" button. The user submits a query by selecting the search button. The query will search the database for the product. Results will be then outputted.
Postconditions: The user will be displayed results found in the database.

View recent activity

Goal in context: Recent searches are displayed
Scope & Level: Primary task, High Level
Actors: User, Database
Trigger: User selects the 'Search' box.
Preconditions: A user has successfully registered and logged into the application. The User has made 1 or more search submissions.
Description: The User selects the 'Search' tab. Previous searches are displayed along with their results generated from classification.
Postconditions: User receives a list of past or recent submissions

Purchase

Goal in context: User is directed to retailer to purchase product.
Scope & Level: Primary task, High Level
Actors: User, Database
Trigger: User selects "Buy Now" button.
Preconditions: A user has successfully registered and logged into the application.
Description: The User selects "Buy Now" button and is directed to retailers to purchase the selected item.
Postconditions: User directed to retailer to complete purchase.

2.4 Constraints

Time Constraints

The final year project must be finished by Sunday 19th May which is a hard deadline. While I am confident I can complete the application, the time constraints will have an impact on the scope of the project. Testing is going to play a huge part in producing a functioning product as pointed out in my approval process so I must respect this time constraint in order to allow testing and produce a fully functioning application within the timeline.

Security Constraints

Data Protection is a huge concern for users. By using this application, users must register with their email account which will be verified while signing up. In order keep the information of users safe and secure, security protocols must be implemented.

Hardware Limitations

Scraping retailers frequently will require significant power. In developing this final year project, I am hoping the power on my laptop or desktop will suffice for the 5-6 Irish Retailers I will be using. However to scale this application for European or Worldwide retailers would require much more processing power.

3. Functional Requirements

Android

Description - The application will require that the user's device is running an Android OS, as the app is developed using Android Studio. It will not function on iOS or Windows devices.
Criticality - Fundamental
Technical Issues - The user must be running an Android version of 4.2 or higher in order to function correctly.
Dependencies - None

Internet Connection

Description - The device must have an active internet connection (WiFi or Mobile Data).
Criticality - Fundamental
Technical Issues - Internet connection is fundamental for the app to be able to access the server/ database and send data back and forth for information regarding the catalog and news.
Dependencies - Requires a device with Android operating system and the application downloaded.

Adaptable UI

Description - With Android running on over 2 billion devices worldwide, screen sizes and ratios can vary. Applications that look good on large tablets may not look well on smaller screens. Positions and fonts may be broken or hindered. This must be accounted for.
Criticality - High
Technical Issues - I will have to design multiple different sized UIs to suit different screens and then android can apply whichever UI suits the device the best.
Dependencies - Android Operating System to retrieve the size of the devices screen and displaying the UI.

Application must distinguish between different models of the same product

Description - The application must be able to use the data scraped and be able to distinguish between the same footwear from different retailers and compile it into the one product.
Criticality - High
Technical Issues - Each retailer and brand uses different HTML and descriptions for each products, need to find a way to compile the same product.
Dependencies - None

Algorithm must be able to find the best value for products

Description - The algorithm within the application must find the best value taking different retailers, shipping and discounts into account.
Criticality - High
Technical Issues - Algorithm must be provided with users data e.g Status (Student), location etc and use calculations from data scraped.
Dependencies - User Information, Retailer Data

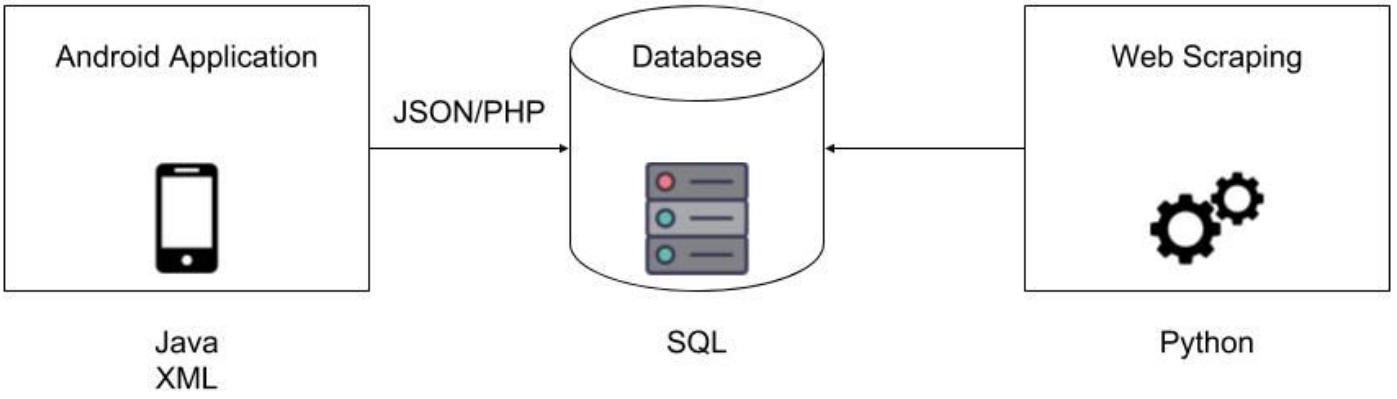
Limited Release Information

Description - The application must provide information about upcoming limited releases available in Ireland.
Criticality - Medium
Technical Issues - Automating web scrape to notify me when a limited release is occuring, I would then have to build a release page and information and send push notifications to users.
Dependencies - Requires a device with Android operating system and the application downloaded.

Registration and Login

Description - Database is required to store all of the users email addresses to register and log into the application.
Criticality - Fundamental
Technical Issues - The main issue is safely storing the user's information, passwords and emails and to make sure all login credentials are unique for every user.
Dependencies - Requires a device with Android operating system and the application downloaded. Database to access.

4. System Architecture



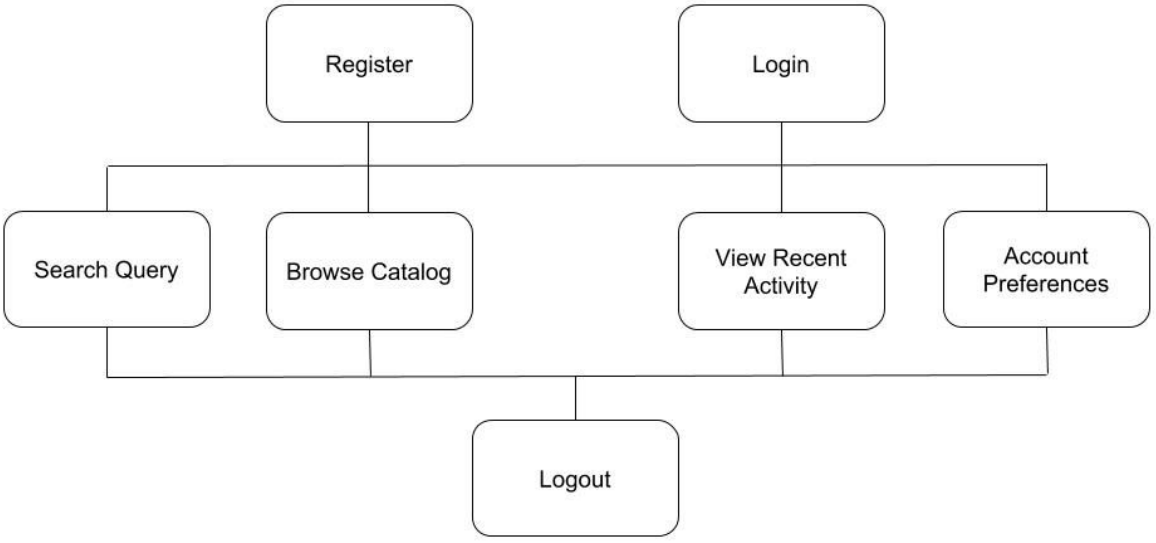
Above illustrates how I plan to structure the system architecture of my Android application. The user interface will be designed using XML in Android Studio. The core application will be written using Java.

Beautiful Soup is a Python library used for pulling data from HTML files. This going to be used to retrieve data for the SQL Database.

JSON/PHP will be used to manage the information between the Android application and the SQL Database.

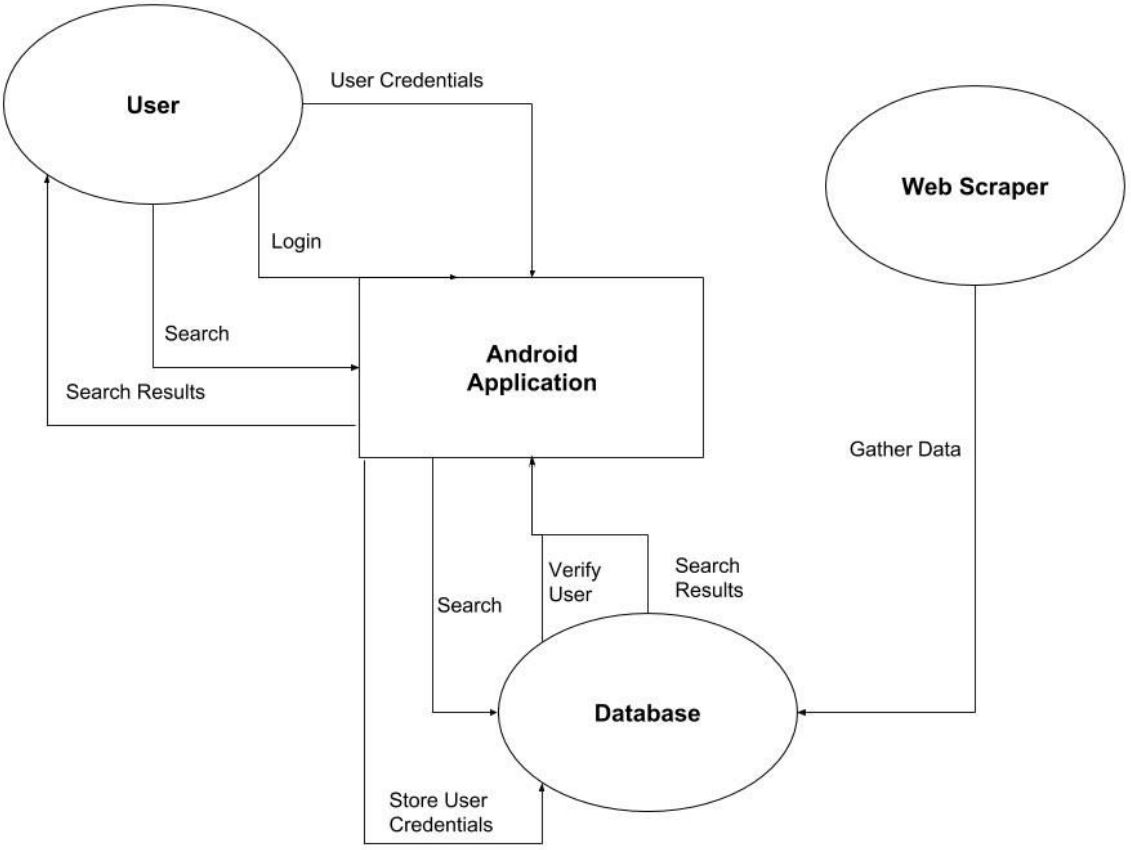
5. High-Level Design

HLD Diagram



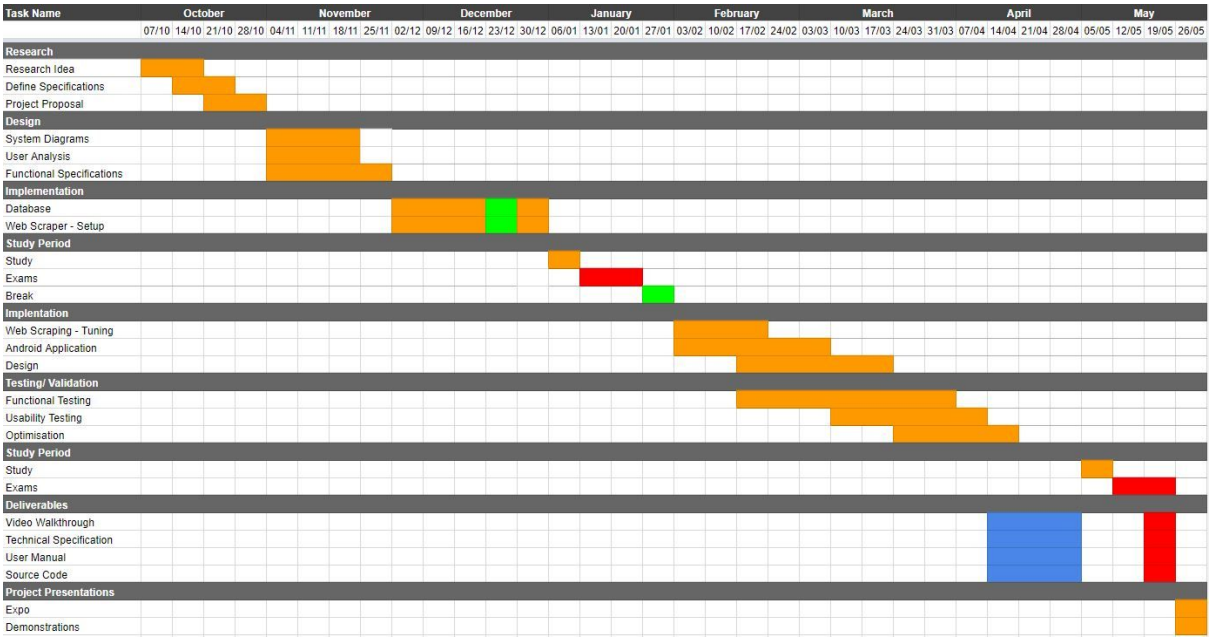
The high-level design of the systems functionality can be seen in the diagram above. The user will begin the application by registering with their information. Upon successful registration, they can proceed to login. Once logged in the user can navigate through the application by viewing the different sections in the application. Search for product, browse the catalog, view recent activity and view/edit account preferences. The user will be able to log out of the application too.

Context Diagram



In the context diagram above you can see how see how the web scraper, database and user interact with the application. The user will input their personal information when registering for the application. Once registered and logging in, the system can verify and authenticate the user. The user can then search the the database and receive relevant products. The web scraper will provide the data to build the database. The database will be used to store searches, products and user information.

6. Preliminary Schedule



On the GANNT Chart shown above you can see the current schedule for the project. The research period is completed and the design period is almost completed. I am now beginning to work on the system framework itself.

I aim to have a basic web scraping tool operating by January which can build the database and focus and transforming/ cleaning the data.

By the end of March I hope to have the majority of the application completed so I can put a lot of focus on testing the application as it is crucial to the operation of this application. I am hoping to test during a mid-season sale period to ensure it operates correctly during sales but if I do not meet this deadline I will have to create my own sale environment to test.

Upon satisfactory testing and development I can focus on the video walkthrough and documentation.

I will be utilising Google Calendar and Google Tasks for daily and weekly tasks.

7. Appendices

Sneaker Market
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