System Requirement Specifications Document

YouRecommend

Group Number: 02

Lab Section: L01

Course: SE 2XB3

Team Members	Student Emails
Kabishan Suvendran	suvendrk@mcmaster.ca
Franklin Tian	tiany38@mcmaster.ca
Jiawei Yu	yuj130@mcmaster.ca
Bowen Zhang	zhangb82@mcmaster.ca

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1. Introduction

Nowadays, when using YouTube, users are usually recommended many undesired videos and this causes inconvenience. YouTube's recommended category is completely based on previous channel searches and videos watched, and some of these recommended channels are unfulfilling of the user's desires. When two or more people are using the same account to watch videos on YouTube, the recommended channels may be inaccurate.

1.1 Purpose

The product, YouRecommend, can provide users with their desired channels by directly asking users about their channel preferences. Therefore, a more accurate result is returned. Besides, YouRecommend is a web-based product, and it will provide other features, such as a visual representation of the video upload frequency of the recommended channels.

1.2 Intended Audience

Our product is for all those who want to use YouTube to watch videos and also for those seeking better YouTube channel recommendations.

2. Overall Description

2.1 Product Features

The product, YouRecommend, is a web-based application. YouRecommend first asks users about their channel preferences. Then, YouRecommend will generate a list of recommended YouTube channels based on the clients' category. YouRecommend will also provide the option for users to sort the list. For example, users can sort the generated list via followers or the number of videos that the YouTuber has uploaded.

2.2 User Classes and Characteristics

The stakeholders of this application are those seeking entertainment from YouTube without being recommended channels that are unrelated to their preferences.

2.3 Design and Implementation Constraints

The implementation of the program must have at least one sorting, searching and graphing algorithm and should be based on a dataset (CSV) that contains over one hundred thousand lines of data.

3. The Domain

The domain of YouRecommend consists of the back-end, which consists of the Read, Sort, Search, Graph, YouTuber and Main modules, and the front-end, which consists of the Display module. By enabling low coupling and high cohesion between these modules, an application domain in which operations can be executed in a manner that does not affect other modules can be achieved. In creating all of these modules and organizing them into a USES hierarchy, features include sorting, searching and displaying YouTube channels that correspond to the user's channel preference.

The stakeholders of this application are solely those seeking entertainment from YouTube. YouTube corporation may be involved in this application, as they may see some benefits in YouRecommend and may choose to modify their algorithm to resemble our solution. The goal of this application is to provide a sequence or a list of YouTube channels that correspond to the client's preference. Once this sequence has been generated, a visual representation that orders the channels based on followers will be displayed.

Displaying the representation will be added into the MIS in the future. The Graph module will use searching algorithms to provide further channel suggestions based on the client's channel preferences.

As of now, all of these functionalities will be incorporated in the final product. Once the client inputs their channel preference, the front-end will communicate with the back-end

modules, which will do most of the heavy lifting. The product will be designed in a manner that enables information hiding and encapsulation. The client will only see a list of YouTube channels and a visual representation. The goal is to make life easier for the stakeholders by providing accurate recommendations. These recommendations will be checked against YouTube channel recommendations.

4. Functional Requirements

Priority Scale (PR): 1 (Most Important) - 5 (Least Important)

Read File Module (PR: 1)

The Read File module is of top priority for initiating this project, as almost all of the other modules use the reading dataset function. Read module builds the foundation for starting this project as it achieves the function of being able to iterate through the entire dataset. Other modules such as Graph must be able to store the data read from the Read File module into a graph data structure of its own.

Search Module (PR: 3)

The Search Module is also very important since a searching algorithm must be implemented in this project. Search module will use the Read File module to extract the entire dataset. This module's main purpose is to provide the client with the feature of looking for a YouTube channel as a string value and providing all the necessary information about this YouTube channel. The output information includes the country they are from, channel category, join date, number of subscribers and number of videos.

Sort Module (PR: 3)

The Sort module takes an arraylist of YouTubers as input, and converts the input to a sorted arraylist based on the followers or video uploads. If the input arraylist consists of over a thousand elements, quicksort will be used to minimize the processing time. Otherwise, mergesort will be applied because mergesort performs better when there are fewer elements

in the arraylist. The goal of the sorting algorithm is to keep the time of sorting within 10 seconds in the worst case.

Graph Module (PR: 3)

The Graph module creates a graph that connects YouTubers who are under the same video category. The module uses an undirected graph and the goal is to ease the implementation of the Search module and make the module run faster.

YouTuber Module (PR: 2)

The YouTuber module is integral, as all other modules are based on the YouTuber module. This module is used to create YouTuber objects to store data provided in the CSV dataset. This module can make the program more understandable, maintainable, and easier to implement.

Main Module (PR: 4)

The Main module is very important in terms of implementing the program. This module is like a string, while other modules are like beads. The string connects the beads as a whole. The main module contains the final implementation to realize the functionalities of YouRecommend.

Display Module (PR: 5)

The display module is used to display the generated list of YouTubers based on what users search on the screen. It is necessary for the front-end to use this module. The module is the connection between the user interface and the underlying implementation.

5. Non-Functional Requirements

5.1 Performance Requirements

YouRecommend should give users a good experience. Therefore, it should provide a list of YouTubers corresponding to what users search as quick as possible. The time should be within 1 second.

5.2 Software Quality Attributes

In terms of the software quality attributes, reliability, accuracy of the results, performance, human-computer interface issues and portability issues will be discussed. In terms of reliability, YouRecommend will be hosted on a trusted cloud application platform like Netlify or Heroku. These domains provide HTTPS encryption, host the website 24/7/365 and do not log user information. Since there is no login or registration feature, encrypting passwords is not a problem. In terms of the accuracy of the results, verifiability could be achieved by comparing YouRecommend with channel recommendations from YouTube itself. To mitigate human-computer interface issues, the webpage will be designed such that it is easy to use, for it will have a huge font size, an input box and button. Lastly, since this is a web application, the objective is to ensure that YouRecommend is compatible with most mainstream browsers, but Google Chrome and Mozilla Firefox are our primary concerns.

6. Requirements on the Development and Maintenance Process

Git will be used for version control and the quality of the product will be assessed by occasionally conducting JUnit tests on a subset of the sample data to ensure that certain features are working properly.

Priority will be given to the reading, searching, sorting and graphing algorithms because they perform the bulk of the operations and are integral in completing the application. The front-end has a lower priority in comparison to the back-end. We do not

anticipate any likely changes to the system maintenance procedures at the moment. This document will be updated regularly.

7. Glossary

Dataset: a collection of information that is composed of separate elements but can be manipulated as a unit by a computer.

Module: lowly coupled and highly cohesive units from which a software is built up.

MIS - Module Interface Specification: a document that specifies the externally observable behaviour of a module's access routines.

CSV - Comma-separated values: a text file that uses commas to separate values.

Low coupling: when a module does not strongly depend on other modules.

High cohesion: when components of the modules are closely related.

Git: a source distributed version control system that can be used for projects to improve efficiency.

Version control: a system that records changes to a file for recalling a specific version of a file later.

Front-end: the presentation layer.

Back-end: the data access layer.

Information hiding: the process of hiding the details of an object or function that reduces the external complexity.

Encapsulation: the wrapping up of data under a single unit that prevents the data from being accessed by the code outside.

Encryption: the process of encoding a message or information in a way that only authorized parties can access it.

JUnit: a unit testing framework for the Java programming language.

Netlify: a platform that offers hosting and serverless backend services for web applications and static websites.

Heroku: a platform that enables developers to build, run, and operate applications entirely in the cloud.