Lab 2 - Flixpicks Product Specification

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1. Introduction

In July 2022, a study by Nielsen Holdings on total television consumption in the United States showed that streaming services represented 34.8 percent of viewership which surpassed cable television for the first time (Fischer, 2022). Streaming services have surpassed cable television due to cable's limitations, such as only being able to view the scheduled shows each day as opposed to the on-demand viewing that streaming provides. The study also predicts continued growth in the streaming market. A study by Learndipity Data Insights that took place in 2016 investigated the changes in viewing selection processes resulting from the expanded available inventory. In 2016 Netflix users spent, on average, 17.8 minutes browsing for engaging media to watch (Moscarlitolo, 2016). A study released in 2020 reported that users spent up to 187 hours a year searching for engaging media to watch. That amount of time divided by 365 days translates to roughly half an hour of wasted time spent searching for media to watch each day (Ward, 2020). This is equivalent to one streamed, ad-free television episode that an average person is not able to watch each day due to indecision. This indecision is caused by too many options that are not prefiltered based on a user's personal preference.

Not only are streaming services imperfect because of the time that people waste looking for engaging media to watch but there is also less social experience with streaming services when a person watches something by themselves. When people go to a movie at a theater, watching along with an audience allows everyone in the theater to experience and interact with the movie together, from clapping to laughing or crying. This ability to interact with others during a movie is a part of the movie-watching experience that current streaming services do not provide unless a group is watching together.

Streaming services growing popularity has led to an increase in both the number of streaming services and the number of shows and movies provided by each service. As of April 2022, Netflix alone had over 4000 media titles and Amazon Prime had over 7000 (Clark, 2022). While this increase can be viewed as a positive change for people who know what they want to watch, the additional media correspondingly increases search time to find engaging media.

The solution to the indecision problem is a cross-platform app called FlixPicks that facilitates a quick decision by filtering through every movie and television show on the user's subscribed platforms based on customizable preferences. The app also allows users to leave comments during the movie which lets the user engage with the media further as well as adding to the accuracy of FlixPicks' recommendations. The app streamlines the search process, offering all the same options, and enables users to dedicate more time to watching their media rather than searching for it.

1.1 Purpose

FlixPicks' objective is to provide personalized management of the content available to users across all streaming services they subscribe to. FlixPicks also provides analytics for streaming service representatives to view. FlixPicks tracks the user's media viewing habits and generates recommendations for new media that the user might enjoy from their Linked Subscriptions. These recommendations are generated based on user watch history, user Reactions, and data from other users who share similar viewing habits. Reactions are tags that users attach to comments to display positive or negative emotions to the recommendation algorithm about the media that the user comments on. The user can submit these Reactions and comments from the overlay CineMap while they watch their media. The recommendation

algorithm's confidence in the user's media preferences increases with each positive Reaction, shaping subsequent recommendations.

FlixPicks also allows users to toggle between viewing only recommendations based on the user's Linked Subscriptions, and also allowing content that is exclusively available on other subscription services. This provides users with the opportunity to discover content they may be missing out on from streaming services they are not subscribed to. Another unique quality of FlixPicks is how it allows users to leave comments and Reactions throughout their media for social interaction while simultaneously increasing the accuracy of future recommendations. After locating a movie or television show, users will be presented with a Quick Click link that directs them to the respective streaming service offering the media for viewing.

1.2 Scope

The FlixPicks prototype showcases FlixPick's important and innovative features to demonstrate feasibility on a larger scale. The prototype has a limited number of movies that it is capable of accessing and it models fake users with simulated inputs for testing and risk mitigation strategy demonstrations. The ability to manipulate these fake users and view how these changes affect their data proves that the prototype is capable of accurately tracking user data, as well as generating recommendations based on patterns in multiple users' watch histories.

1.3 Definitions, Acronyms and Abbreviations

Administrator: A user who, beyond having access to the full slate of features a Registered user has and the data available to a Representative, can manipulate FlixPicks data.

Android: An operating system for mobile devices manufactured by Google, Samsung, and other companies.

Apache Tomcat: An open-source implementation of the Java Servlet, Java Server Pages, Java Expression Language, and WebSocket technologies. Tomcat provides a "pure java" HTTP web server environment in which Java code can run.

API: An Application Programming Interface is an interface that allows for interactions between multiple software applications or mixed hardware-software intermediaries.

Apriori Algorithm: Association mining that allows for common patterns in a users watch history to be used to help suggest content for other users.

Choice Overload: The phenomenon that choosing between a large variety of options can be detrimental to the decision-making process.

CineFeatures: CineFeatures is the collective name of the three features in FlixPicks: CineRoll, CineWheel, and CineMap.

CineMap: FlixPicks extension that is enabled when a user is watching media. It overlays their media and allows the user to see and make their own time-stamped comments and reactions that are stored on the FlixPicks DB.

CineRoll: FlixPicks feature that generates random selections based on a user's interests. CineRoll uses the Taste Profile to generate selections for a user based on their recommendations and chooses one for the user. The user has the option to reroll if they aren't satisfied with the selection.

CineWheel: FlixPicks feature that randomly selects from a set of user-inputted choices. The user provides the feature with media options and the feature randomly selects from a maximum of ten options.

CSS: Cascading Style Sheets is a style sheet language used for customizing the appearance of a document written in a markup language such as HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

Decision Fatigue: The fatigue from deciding what to watch can take the joy out of watching anything.

Git: Software for tracking changes in any set of files, usually used for coordinating work among programmers collaboratively developing source code during software development.

Guest: An unregistered user who has limited access to features offered by FlixPicks.

HotPicks: A micro-experience tile for showing popular and trending media. Dynamically creates the list upon page refresh. Available for registered users and guests.

HTML: Hyper Text Markup Language. HTML is the standard markup language for creating web pages. HTML elements tell the browser how to display the content and define the structure of web pages.

IDE: An integrated development environment is a software application that provides comprehensive facilities to computer programmers for software development.

iOS: An operating system used for mobile devices manufactured by Apple Inc.

JavaScript: A scripting or programming language that allows you to implement complex features and interactivity on web pages.

Library: Aggregated content that is shown to users. Guest users only have access to HotPicks but registered users can see aggregated content from HotPicks and their personalized recommendations.

Linked Subscriptions: User's subscription data that will be used to filter what media is shown in the Library, users can change this in settings if they want to only view their subscriptions.

MySQL: An open-source relational database management system.

Netflix: A subscription-based streaming service that allows members to watch TV shows and movies on internet-connected devices.

Quick Click: A link from FlixPicks that redirects the user to the selected streaming media.

Reactions: Small images that the user attaches to their comment to describe a variety of emotions that the user feels about the media.

Recommendation Algorithm: An algorithm that uses a dynamically built input library and information filtering system based upon the Taste Profile that provides suggestions for media content that is most relevant to a particular user.

Registered User: A user who completed registration and Taste Profile Survey, having full access to features offered by FlixPicks.

Representative: A user who is an affiliate of a particular streaming service who has access to non-account-specific data analytics of Registered Users.

Stakeholder: A person with interest or concern in something, especially a business.

Streaming: A method of transmitting or receiving data over a computer network as a steady, continuous flow, allowing playback to start while the rest of the data is being processed.

Streaming Service: A streaming service is a digital platform that delivers multimedia content over the internet, allowing users to watch or listen to it in real-time without downloading. Examples include Netflix, Spotify, and Disney+.

Subscription: A user's enrollment with a Streaming Service provider, providing them access to media available through the service.

Survey: A questionnaire to establish the initial information for recommendations in the Taste Profile.

Taste Profile: A user profile on FlixPicks that stores data about user streaming subscriptions, recommended media, and user preference information. As a user makes selections the Taste Profile recommendations become more refined to the users' preferences.

User Roles: Guest, Registered User, Representative, and Administrator are the user roles for FlixPicks.

Watch History: A comprehensive list of past content viewed by a user.

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1.5 Overview

This product specification provides the hardware and software configurations, interfaces, and features included in the FlixPicks prototype. The information in the remaining sections of this document will provide a detailed description of the features required for the implementation of the FlixPicks prototype.

2. General Description

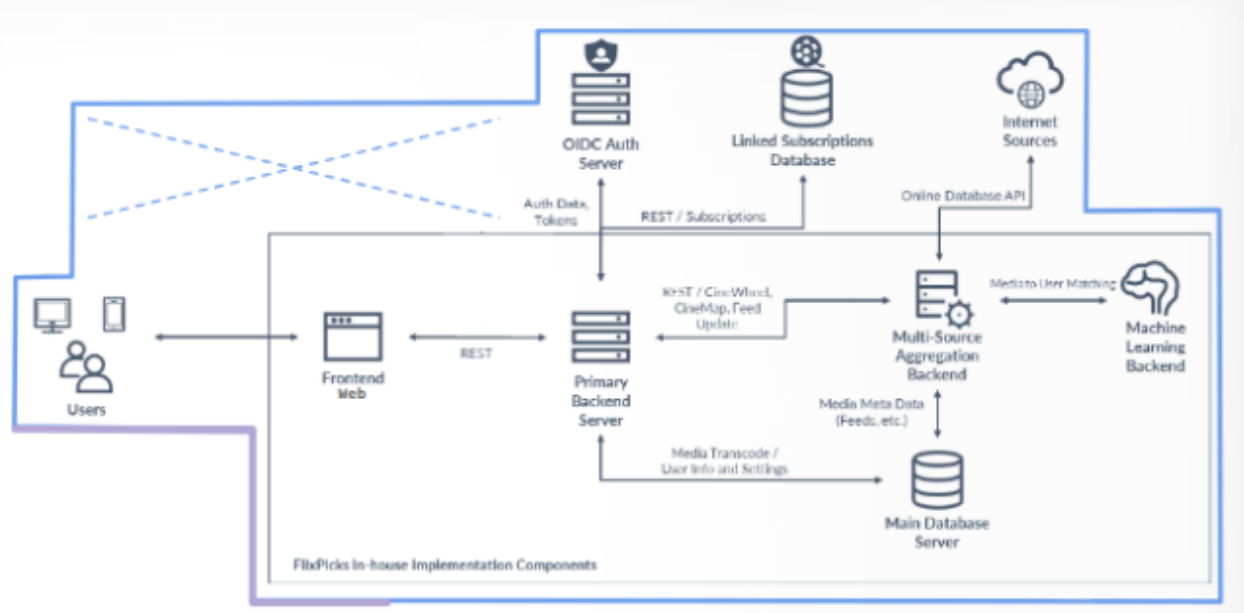
The proof of concept created by the team has a limited number of movies that it is capable of accessing and showcases FlixPick's important and innovative features to demonstrate feasibility on a larger scale. The prototype models fake users and generates simulated inputs for testing and risk mitigation strategy demonstrations. The ability to manipulate these fake users and view how these changes affect their data allows the team to prove that the product is capable of accurately tracking user data, as well as generating recommendations based on patterns in multiple users' watch histories.

2.1 Prototype Architecture Description

Figure 1 depicts the reduced functionality of the prototype, including the exclusion of a mobile application front end and a library API. These reductions are due to the smaller scope of the prototype to fit within the resource and time restrictions as well as to allow for the creation of user data and media simulation in the absence of real users. The remainder of the prototype retains the same architecture of the frontend using the backend as a gateway to the 3rd party APIs and FlixPicks' internal databases.

Figure 1

FlixPicks Prototype Major Functional Component Diagram



The hardware necessary to run the prototype is any computer with a browser-based web interface. The browser's web interface interacts with the prototype's web servers and databases. The virtual machine provided by the Computer Science Department of Old Dominion University is used to run the prototype application.

The software used in this prototype is Docker-LAMP, Linux operating system, Apache HTTP server, SQLite, PHP programming language, and Python. For the web programming, HTML, CSS, and JS are used. VS Code and Eclipse are the IDEs and version control is done through GitHub along with the project management board that is also in GitHub. VS Code is also used for issue tracking and testing.

2.2 Prototype Functional Description

Table 1 depicts all the features that are available in the real-world product and compares them to the features that are partially implemented in the prototype. The user subscription integration and monetized user tier were excluded to focus less on the finances and more on the

capability of the prototype. The prototype focuses on FlixPick's core function of generating and updating the user's Taste Profile and creating media recommendations. CineRoll and CineWheel are fully functional but the CineMap has only a partially implemented data export and data analysis feature because it does not use real people as users or full libraries of real media. Because much of the data used in the prototype is fake or simulated, the generated recommendations are not accurate to that of the real-world product, which uses opinions and feedback of real users to make recommendations. The prototype accurately detects patterns of watch history displayed by fake users and recommends media accordingly. The threshold for defining a pattern (support and confidence values) can be adjusted within the prototype.

Table 1

FlixPicks Real World Product vs Prototype Feature Table

Category	FlixPicks Feature	RWP	Prototype
Subscription Service Management	User Account Registration	Fully Implemented	Fully Implemented
	Account/Subscription Service Management	Fully Implemented	Fully Implemented
	User Subscription Integration	Fully Implemented	Partially Implemented
	User Tier Level Feature Access	Fully Implemented	Partially Implemented
Taste Profile	Taste Profile	Fully Implemented	Fully Implemented
	Taste Profile Survey	Fully Implemented	Fully Implemented
	Taste Profile Content-Based Filtering	Fully Implemented	Fully Implemented
	Taste Profile Collaborative Filtering	Fully Implemented	Fully Implemented
Recommendations	Recommendations	Fully Implemented	Fully Implemented
	Filtered Recommendations (Criteria based)	Fully Implemented	Fully Implemented
Movie Library	Browse/Search Filtering	Fully Implemented	Fully Implemented
	HotPicks	Fully Implemented	Fully Implemented
CineRoll	CineRoll	Fully Implemented	Fully Implemented
CineWheel	CineWheel	Fully Implemented	Fully Implemented
CineMap	CineMap Overlay	Fully Implemented	Fully Implemented
	CineMap Commenting	Fully Implemented	Partially Implemented
	CineMap Export Data	Fully Implemented	Partially Implemented
	CineMap Data Analyzing	Fully Implemented	Partially Implemented
Analytics	Data analytics testing	Fully Implemented	Partially Implemented
	Analytics	Eliminated	Fully Implemented
	Summary reporting for user/stakeholders	Eliminated	Fully Implemented
Simulation	Simulation	Eliminated	Fully Implemented
Movie Info	Create/edit Movie Info	Fully Implemented	Partially Implemented
Feedback	Feedback	Fully Implemented	Partially Implemented

2.3 External Features

As a browser web application, FlixPicks uses various interfaces to allow demonstration of the prototype on a web server.

2.3.1 Hardware Interfaces

The FlixPicks prototype requires the same hardware as a standard web application: a computer capable of internet connection, keyboard, and mouse.

2.3.2 Software Interfaces

The FlixPicks prototype uses Docker to manage the deployment of its components (frontend, backend, and recommendation algorithm). The FlixPicks prototype also uses an API called TMDB for adding new media to the database.

2.3.3 User Interfaces

The FlixPicks prototype includes user interfaces for account management, browsing and searching, the Media Info page before clicking on the Quick Click and the CineMap overlay/extension when viewing the media on another page.

2.3.4 Communication Protocols and Interfaces

The frontend UI communicates with the backend databases to display any information. The backend talks to the TMDB API to get any movie that it doesn't already have, and then it is added to the backend database for future reference. Docker connects all these containers. The Quick Click link redirects the user to the appropriate streaming service page for watching that media. Also, CineMap sends and receives Reactions in real time on each movie to the database.

Appendix A - FlixPicks Site Map