

Lab 1 – FlixPicks Product Description

James Powers

Old Dominion University

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Mrs. Brunelle

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1 Introduction

In recent years, the shift towards on-demand streaming from traditional cable television has stimulated the growth of streaming platforms and their ever-expanding libraries of content. As of August 2022, streaming viewership represented 34.8% of all television consumed, surpassing cable television for the first time ever (Fischer, 2022). According to one study, approximately 77% of United States adults aged 18 to 34 prefer streaming over traditional cable television (Raj, 2023). The popularity of streaming is further evident by the projected growth rate of 9% per year, compared to cable's projection of 4% per year (Raj, 2023).

As of September 2023, there were well over 200 streaming platforms available around the world, including popular services such as Netflix, Amazon Prime, Disney+, and Max (Cook, 2023). As illustrated by Figure 1, subscribing to these streaming platforms provides its users with access to thousands of choices each, which is typical of all streaming platforms. The presence of separate streaming apps, each with their vast libraries, provides an overwhelming number of options, which often leads to time wasted searching for engaging media to watch.

Figure 1

Movies Available on Popular Streaming Platforms as of April 2022 (Clark, 2022)



In July 2016, a study revealed that Netflix users spent, on average, 17.8 minutes browsing for something to watch (Moscaritolo, 2016). A more recent study from August 2020 reported users spent up to 187 hours a year, which translates to around 30 minutes per day, simply

searching for media to watch (Ward, 2020). This noticeable increase in browsing time is a perfect example of time wasted searching for media, which should be converted into time spent enjoying the product consumers are paying for.

Another problem facing streaming users is social isolation, due to the lack of integrated social engagement features such as real-time interactions. Popular social media sites often fill this void by providing a space for people to share their thoughts and write reviews. Some even provide ways to host streaming parties, which is a social experience where users connect with others in real-time while streaming media.

The solution, FlixPicks, automates and personalizes the experience by generating suggestions based on the user's current interests, utilizing an aggregated collection of content across all their current subscriptions. Providing randomized selections based on a user's interests will further assist those experiencing indecision. This approach reduces the burden on users by combining available media into one location and omitting content that the user has no interest in. Additionally, this solution can help pair consumers with providers offering content which more closely resembles their current interests. Lastly, a unique new overlay will promote social interaction while watching media and highlight key points of interest.

2 Product Description

The primary goal of FlixPicks is to provide every user quick and easy access to content available from all their subscriptions in one location. Using aggregation, as well as, modern recommendation techniques, FlixPicks strives to improve the experience by generating real-time suggestions based on each user's interests and watch history. FlixPicks strives to modernize the movie watching experience by providing an interactive overlay allowing for social interaction while watching any movie or show.

2.1 Key Product Features and Capabilities

FlixPicks generates a unique collection of media available to each user based on their current subscriptions and provides convenient access to all content in one place with a direct link to the content provider. The library is available to both guests and registered users, however an account is needed to generate personalized recommendations and customize subscriptions. Upon registering, all users are taken through a one-time taste profile setup, which is a brief survey used to learn about their interests.

Each user's unique taste profile is used to generate personalized recommendations based on several factors including interests, watch history, and interactions with FlixPicks. The taste profile continues to evolve through every interaction with FlixPicks, further improving recommendations for the future. The taste profile can always be reset to get a fresh start.

FlixPicks offers three distinct ways to find media. First is the library which shows content available from the user's subscribed streaming platforms organized by category, popularity, or top recommendations. The library can also be used to help users explore new content outside of their subscriptions if they are looking for something new.

Alternatively, CineRoll can be used to generate a small list of recommendations specially curated to each user based on their taste profile. Selections are mostly randomized, but heavily influenced by each user's interests and limited to media available through their subscriptions. CineRoll provides basic filters, such as genre or media type, to further refine suggestions.

Finally, a group of friends can use CineWheel to make deciding what to watch more fun and interactive. Each person can suggest ideas for the group to watch. Once a few options have been provided, FlixPicks displays a fun animation while randomly selecting one of the options.

Once a movie or show has been selected, a convenient link is provided to launch the media on the content provider's service. User's will be required to authenticate through their

content provider before media is played. An optional overlay called CineMap can be enabled which provides ways for users to interact with others while watching. Interactions, such as emojis and comments, can be added throughout the movie, allowing users to share their thoughts with others. CineMap will highlight points of interest by indicating areas along the timeline of a movie with lots of interactions. Finally, CineMap can be hidden on the first watch to avoid spoilers, but users can still add their own interactions at any point.

The combination of aggregated content and selection tools highlighted above simplify the process of finding entertaining media, making it both easier and faster for users to decide on something to watch. The addition of CineMap makes the experience more fun and interactive and provides useful feedback to help improve recommendations for the future. These features further enhance the experience of streaming, helping users get the most out of their subscriptions.

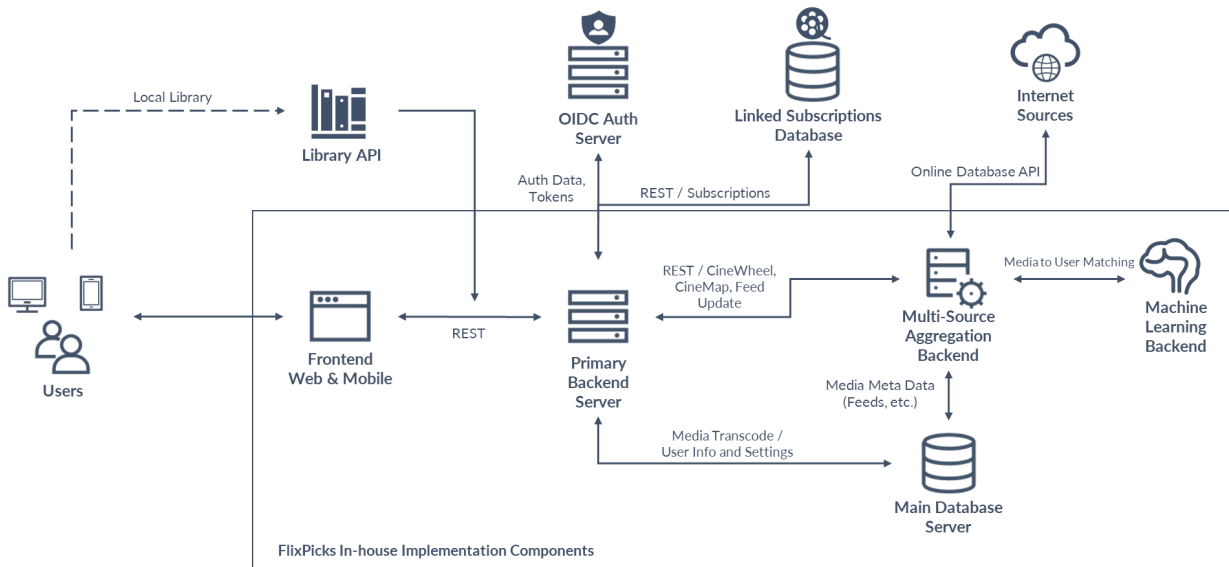
2.2 Major Components (Hardware/Software)

FlixPicks has very minimal hardware requirements and is available in three formats. A web-based application can be used on any computer with internet access running a modern chromium-based web browser with support for extensions. A mobile application is available for Apple iOS and Android devices. Lastly, FlixPicks can be installed on any Smart TV, alongside any content provider's apps.

FlixPicks uses a front-end user interface and back-end server for processing and data storage components. The major functional components diagram shown in Figure 2 illustrates the interfaces between storage and processing components of FlixPicks.

Figure 2

FlixPicks Major Functional Component Diagram



The FlixPicks website and browser extensions are constructed using HTML, CSS, and JavaScript. The iOS and Apple TV applications are built using Swift, while Java is used for Android based applications. VSCode and Eclipse IDEs are used as the primary development environment, and a GitHub repository is used for version control.

FlixPicks is hosted using an Apache Tomcat application server and MySQL database. The AWS Machine Learning platform called Amazon Personalize is used to generate recommendations for users. Additionally, third-party APIs (YouTube Data API, ReelGood, and IMDB) are used as catalog sources to track content available across streaming platforms.

3 Identification of Case Study

The prototype case study consists of three separate registered users. Two are individuals and one is based on a group of friends who need help picking something to watch. Table 1 illustrates the full details of this case study.

Table 1

FlixPicks Prototype Case Study

Name(s)	Role	Description
John Smith	Registered User	<ul style="list-style-type: none">• John is subscribed to Netflix and Amazon Prime• John is always struggling to find exciting new things to watch.• His favorites include action and comedy movies.• He also enjoys a good action-packed series.
Jessica Brown	Registered User	<ul style="list-style-type: none">• Jessica is a mother of two, who uses both Netflix and Disney+ to entertain her kids.• She likes to indulge herself in romantic comedies occasionally, while the kids nap.• She enjoys a good, animated film with her kids when it's also well written for adults.
Steven Harris	Registered User	<ul style="list-style-type: none">• Steven is with his group of friends who can never decide what to watch together.• They're great at finding options, but struggle committing to an option.

FlixPicks is designed primarily for people subscribing to multiple streaming platforms but is equally useful for those subscribed to a single streaming platform. This solution can also be used by a group of friends who need help deciding what to watch. Generally, this product is great for people who have trouble making decisions.

FlixPicks is used for generating recommendations specifically curated for each individual user. FlixPicks can be used as a resource to see what content is available on specific streaming platforms and to help users explore new content or subscriptions.

FlixPicks has numerous benefits for streaming consumers as well as the streaming service representatives. FlixPicks gathers tons of information about how users interact with their media which can prove useful to competing streaming platforms. Additionally, select streaming platforms can be promoted or advertised for those interested in exploring new things.

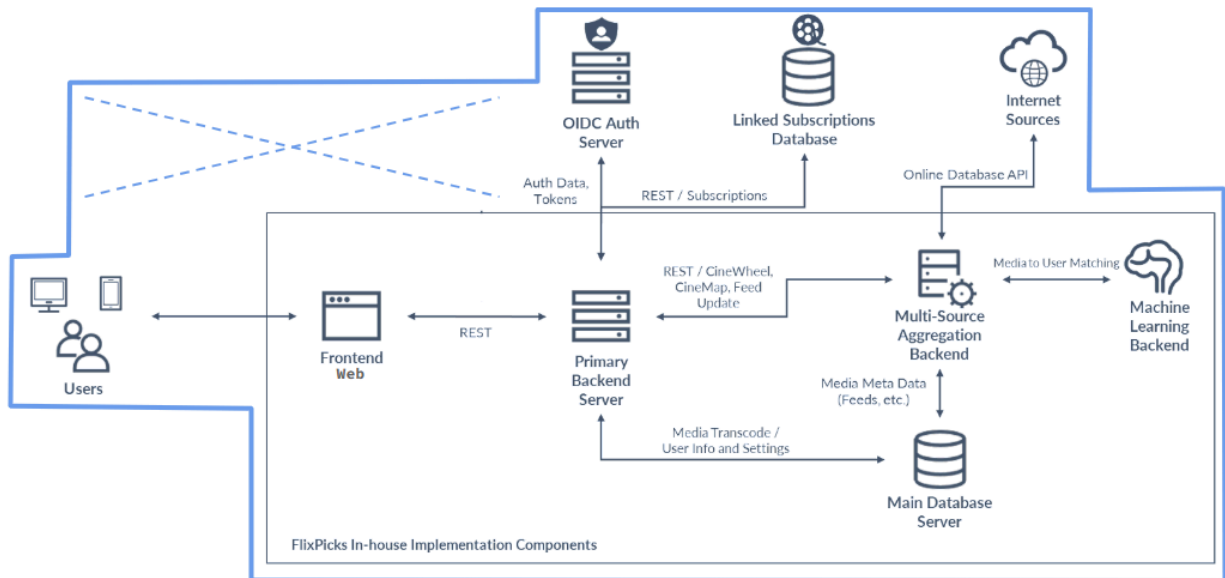
4 Product Prototype Description

The FlixPicks prototype implements much of the functionality found in the real-world product (RWP), including the key features CineRoll, CineWheel, and CineMap. The prototype includes simulations of user data and interactions to support testing and risk mitigation demonstration. The prototype will not utilize real-time integration with third-party catalog sources and is provided with methods to simulate changes to available media. The prototype shall be presented to demonstrate implementation of FlixPicks as a viable solution the problem.

4.1 Prototype Architecture (Hardware/Software)

Like the real-world product, this prototype will have minimal hardware requirements, however, will only be available in the web-based format. The web-based application can be used on any computer with internet access, running a modern chromium-based web browser with support for extensions.

The prototype will be hosted by a virtual machine provided by the Old Dominion University Computer Science department. The web application is hosted using an Apache HTTP server operating the Flask framework and SQLite database. VSCode and Eclipse IDEs are used as the primary development environment, and a GitHub repository is used for version control. The application front-end are constructed with HTML, CSS, and JavaScript. The application back-end components are developed in Python. Figure 3 illustrates the major functional component diagram for the FlixPicks prototype.

Figure 3*FlixPicks Prototype Major Functional Component Diagram*

4.2 Prototype Features and Capabilities

The FlixPicks Prototype implements the key features CineRoll, CineWheel and CineMap along with necessary supporting features as depicted in Table 2. Simulation data and simulated reporting are key components of this prototype and are eliminated in the real-world product. Features marked partially implemented have components omitted from the prototype which have been simulated to support testing.

The guest interface will be implemented to introduce users to FlixPicks, however, like the real-world product will limit usage to CineWheel only. The registered user interface will grant access to CineRoll, CineMap and establish the user's taste profile. The taste profile setup survey is used to establish initial recommendations for new users, and users are transitioned to collaborative filtering as they continue interacting. The CineMap overlay will allow users to view and generate basic interactions while watching media.

Table 2*FlixPicks RWP vs Prototype Table*

Category	FlixPicks Feature	RWP	Prototype
Subscription Service Management	Account/Subscription Service Management	Fully Implemented	Fully Implemented
	User Account Creation/Registration	Fully Implemented	Fully Implemented
	User Subscription Integration	Fully Implemented	Partially Implemented
Taste Profile	Taste Profile	Fully Implemented	Fully Implemented
	Taste Profile Form Pop-Up	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
Filtering	Browse/Search Filtering	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	Fully Implemented
	CineMap Export Data	Fully Implemented	Partially Implemented
	CineMap Data Analyzing	Fully Implemented	Partially Implemented
Analytics	Data analytics testing	Fully Implemented	Partially Implemented
	Analytics	Fully Implemented	Partially Implemented
Simulation	Simulation	Eliminated	Fully Implemented
Movie Info	Create/edit Movie Info	Eliminated	Fully Implemented
Reporting	Summary reporting for user/stakeholders	Eliminated	Fully Implemented
Feedback	Feedback	Fully Implemented	Partially Implemented

4.3 Prototype Development Challenges

Key challenges faced during development of this prototype are related to collaborative filtering, generating simulations, and data management. Machine learning components used to implement collaborative filtering require immense knowledge and technical skill, which is the biggest challenge. Additionally, building and configuring the database in support of machine

learning requires a skilled team and a large amount of reliable data. Another challenge includes simulating third-party API sources and demonstrating changes to library content which reflect the real world. Similarly, more challenges are related to generating meaningful simulated user data for testing and interpreting feedback.

5 Glossary

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.

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.

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

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.

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

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

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.

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 received.

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