

Lab 1 - FlixPicks Product Description

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1. Introduction

Streaming has become the most popular medium for consuming content. Streaming represented 34.8 percent of viewership in August 2022, surpassing cable television. The projected growth rate of streaming is roughly 9 percent per year, compared to cable's projected rate of growth of 4 percent. Netflix had 247.2 million paid subscribers as of the third quarter of 2023. There are more than 200 paid streaming platforms as of September 2023, each with a large subscriber base.

The large number of streaming platforms, combined with the large and differing media libraries, has created a time consuming browsing experience. A study conducted in July 2016, established that Netflix users spend an average of 17.8 minutes browsing prior to selecting something to watch (Moscaritolo, 2016). This study was conducted specifically on Netflix, and was conducted when streaming platforms were still experiencing a rapid growth period. Another study conducted in August 2020 reported that users spend up to 187 hours per year searching for desirable media (Ward, 2020).

The overwhelming amount of different streaming platforms each with their own respective libraries has created a problem for users called decision fatigue. Decision fatigue is a phenomenon in which a large amount of choices or decisions hinders the ability to make further choices (Natal & Saltzman, 2022). Modern streaming has also been shown to detach viewers from the movie watching experience creating an isolating experience. Engaging or socializing with movies or shows requires extra applications. Time wasted, decision fatigue, choice overload, and an isolating streaming experience are all common traits of the current streaming service user experience.

There are few current solutions to the previously listed problems with the streaming experience. The currently available platforms that solve a few of the problems include: IMDB, Rave, Letterboxd, and FreeCast. IMDB only partially touches on choice overload and fails to address the other issues. Rave only partially solves the problem of an isolating streaming experience. Letterboxed works to solve choice overload, and partially to solve an isolating streaming experience. FreeCast only partially solves the problem of an isolating streaming experience and decision fatigue. None of the current solutions solve all of the problems.

FlixPicks works to solve all of these streaming experience problems. FlixPicks has three built in features, each addressing one or more of the common user experience issues. FlixPicks is designed to provide a convenient place to see all of a users' streaming services, with built in features that provide a more social experience, and eliminate decision fatigue and choice overload.

2. FlixPicks Description

FlixPicks is an online webpage/application that allows users to see an aggregated library of all subscribed to streaming service content. By creating a Taste Profile for users, FlixPicks can recommend content based on user preferences across all streaming platforms in one feed.

Machine learning is used with the user taste profile to recommend content and enable some of the main features. FlixPicks has three main features that work towards eliminating decision fatigue, choice overload, and providing a more social experience for the user. By using FlixPicks, users can save time and easily decide on media to view across all of their subscriptions.

FlixPicks can be accessed from any web-enabled computing device including, smartphones and computers with a web browser.

2.1 Key Features and Capabilities

FlixPicks aggregates content from all of a users' entered subscriptions and creates a combined library for the user to view. Users can choose to make an account, sign in to an existing account, or use FlixPicks as a guest. For users who create an account, a questionnaire to set base recommendations is required. This questionnaire creates a user taste profile that is used for content recommendation, the taste profile uses machine learning to continuously learn a users preferences as they use FlixPicks for better recommendations. Guests do not have Taste Profiles and have limited privileges.

One of the main built in features of FlixPicks is called CineWheel. It eliminates choice overload by allowing the user to input potential viewing choices and randomly selecting from the options. This feature is available to guests and registered users as Taste Profile is not required for functionality. CineWheel is most useful for when a user already knows a few potential pieces of content for viewing.

Another key built in feature that aims to tackle decision fatigue through automatically choosing a show/movie for the user using machine learning and filtered preferences, is called CineRoll. When CineRoll is prompted, it accesses the user taste profile and sorts through recommended media providing the user with an option based on the taste profile. It can be filtered with genre tags. Because the taste profile is an integral part of this feature's back-end, users must be registered to use CineRoll. It is most useful when a user does not know what media they want to view.

The last main built in feature of FlixPicks is called CineMap. It works towards making the streaming experience more social by overlaying media and allowing the user to see and post time stamped comments and interactions. All interactions are stored in the user information

database and can be accessed for data analysis by admins and advertisers. The CineMap feature is only available to registered users. It is an optional overlay that the user is prompted to use when selecting media to view from aggregated library. When selected CineMap redirects the user to the streaming platform owning their selected content and overlays the content. It is most useful when a user wants to have an interactive experience and see what other users have said live about their viewed content.

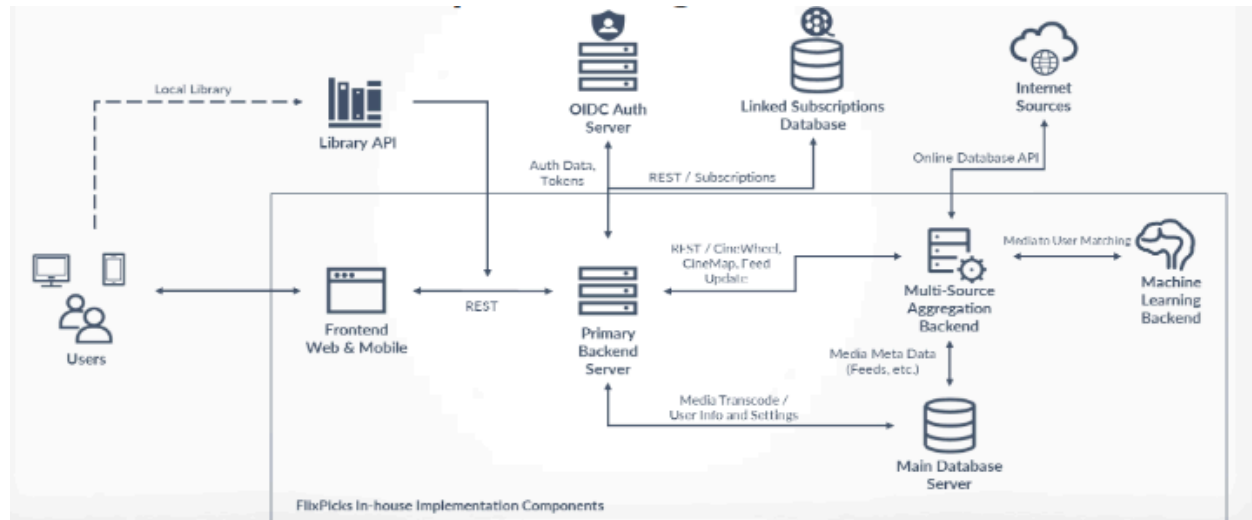
The aggregated library of content is available for guests and registered users. For registered users this content is personalized based on registered subscriptions combined with their taste profile. For guests the content in the aggregated library is filled with general recommendation based on what is popular. Guests can only access the general library and CineWheel feature. If a guest user attempts to use other features FlixPicks prompts the user for registration. Registered users can access all features and the longer FlixPicks is used the more the taste profile will grow with the users selections. The user taste profile can be reset at any time by the user if the recommended content is outdated, or whatever other reason a user may have.

2.2 Major Components (Hardware/Software)

FlixPicks is structured with a front end user interface, the back-end multi-source aggregation backend, storage components, machine learning, linked subscriptions database, and third party APIs. The major function component diagram shown in Figure 1 describes the interfaces, back-end multi-source aggregation backend, storage components, machine learning, linked subscriptions database, and third party APIs within FlixPicks and how they interact.

Figure 1

FlixPicks Major Functional Component Diagram



The user interface is available from any computer with internet access running a modern browser that supports the FlixPicks extension/website. Browsers such as chrome, firefox, and other modern browsers will be supported. Users on internet-accessible iOS, Android devices, and Smart TVs can access their interfaces using native mobile applications.

The web portal software is programmed using a mix of HTML, CSS, and Javascript combined with backend components. The CineMap browser extension is programmed using JavaScript. Swift is used for for iOS and Smart TVs, and Java is used for Android devices.

The users have a local library that is available using the library API. The primary backend server accesses the main database server with user information, settings, and media transcode. The main database server and multisource aggregation backend are connected providing media meta data. The connection between multi-source aggregation backend and primary backend server enable our key features and feed updates for the user. Internet sources provide the multi-source aggregation backend with online database APIs needed for aggregation. The only other connections in the major functional component diagram are OIDC authentication

server and linked subscription database. These are connected with the primary backend server and provide the main database server with needed user information.

The third party APIs used in the multi-source aggregation backend are the YouTube Data API, third party Netflix API, and other popular streaming services third party APIs. Apache Tomcat is used for the application server, and MySQL Server is used for the database server.

Databricks is used as FlixPick's machine learning platform. Version control is performed using Git. The repository is stored using GitHub and GitHub features. VSCode and Eclipse are the IDEs used for project management and issue tracking.

3. Identification of Case Study

The prototype case study are streaming service subscribers. Some subscribers are subscribed to numerous different streaming services paying for each of subscription separately. The product is also for people looking for something to watch, groups of friends looking for content to watch, and people having trouble deciding what to watch. Case study details are inllustrated in Table 1.

Table 1

FlixPicks Prototype Case Study

Name & Information	Description
John Doe, Subscriber	<ul style="list-style-type: none">- John is subscribed to Hulu, Netflix, and Amazon Prime Video.- He constantly finds himself annoyed switching from different streaming platforms while browsing for content to watch.- Because of work, he only has a few hours left to consume entertainment at the end of the day.

Jane Plain, Subscriber	<ul style="list-style-type: none"> - Jane is subscribed to Hulu and Netflix. - She regularly hangs out with groups of friends and one of their regular activities is watching a movie as a group. - Her and her friends constantly find themselves disagreeing over which movie to watch together.
Tim Brown, Subscriber	<ul style="list-style-type: none"> - Tim is only subscribed to Netflix. - He regularly finds himself unsure what content he wants to watch. - He finds that the built in features on Netflix don't adequate help him find good movies and show he enjoys.
Jack Smith, Subscriber	<ul style="list-style-type: none"> - Jack is subscribed to Hulu, Netflix, and Amazon Prime Video. - He regularly watches movies and shows at home by himself. - After watching something he typically searches youtube reviews to see what others thought about specific parts of the movies he watches. - He finds the movie watching experience isolating when he watches them by himself.
Nick White, Netflix Representative	<ul style="list-style-type: none"> - Nick is an advertising representative for Netflix. - He is looking for user data about the most interacted with parts of movies and shows. - Netflix doesn't provide interactions during viewing of media so he needs to outsource this data.

The real-world development of the product is aimed at all streaming service subscribers. The target audience will likely shift to include streaming service representatives looking to collect the data FlixPicks is gathering. Providing a solution to this problem is important because it affects a massive number of streaming service subscribers. It works to eliminate numerous different issues connected with streaming all in one platform. It is also available to people not subscribed to any streaming services who may be looking for which service to pick. FlixPicks recommends users content based on their subscriptions and preferences. It allows users to use features that randomly pick movies for the user based on their taste, and that allow the user to input selections to be randomly selected from. FlixPicks builds a taste profile to get better

recommendations for the user and provides the user with all of their subscribed to streaming services in one convenient place.

4 FlixPicks Prototype Product Description

The purpose of FlixPicks is to build a platform through which users can easily view and select from all of their subscribed-to streaming services in one place. The solution is described in a way that allows for anyone to easily use or comprehend. The purpose of the prototype is to demonstrate the key functionality/features of FlixPicks. Simulation of users will allow for testing, risk mitigation, and feedback to demonstrate that FlixPicks solves the problem and works.

4.1. Prototype Architecture (Hardware/Software)

The prototype for FlixPicks will use similar architecture that the real-world product is built on. The prototype will run through a virtual machine provided by the Old Dominion University Computer Science Department through a Docker container using Apache, SQLite DB, and Python. This prototype will work on any web-enabled device that can access the webpage/extension. The prototype will not include mobile Android/ iOS application interfaces as the real world product will. The user interface will connect to the FlixPick's backend which will allow users to gain access and use the main functions. The front-end of the prototype will use HTML, CSS, and JS and will connect to the backend allowing use of its main functions.

Figure 2

FlixPicks Prototype Major Functional Component Diagram

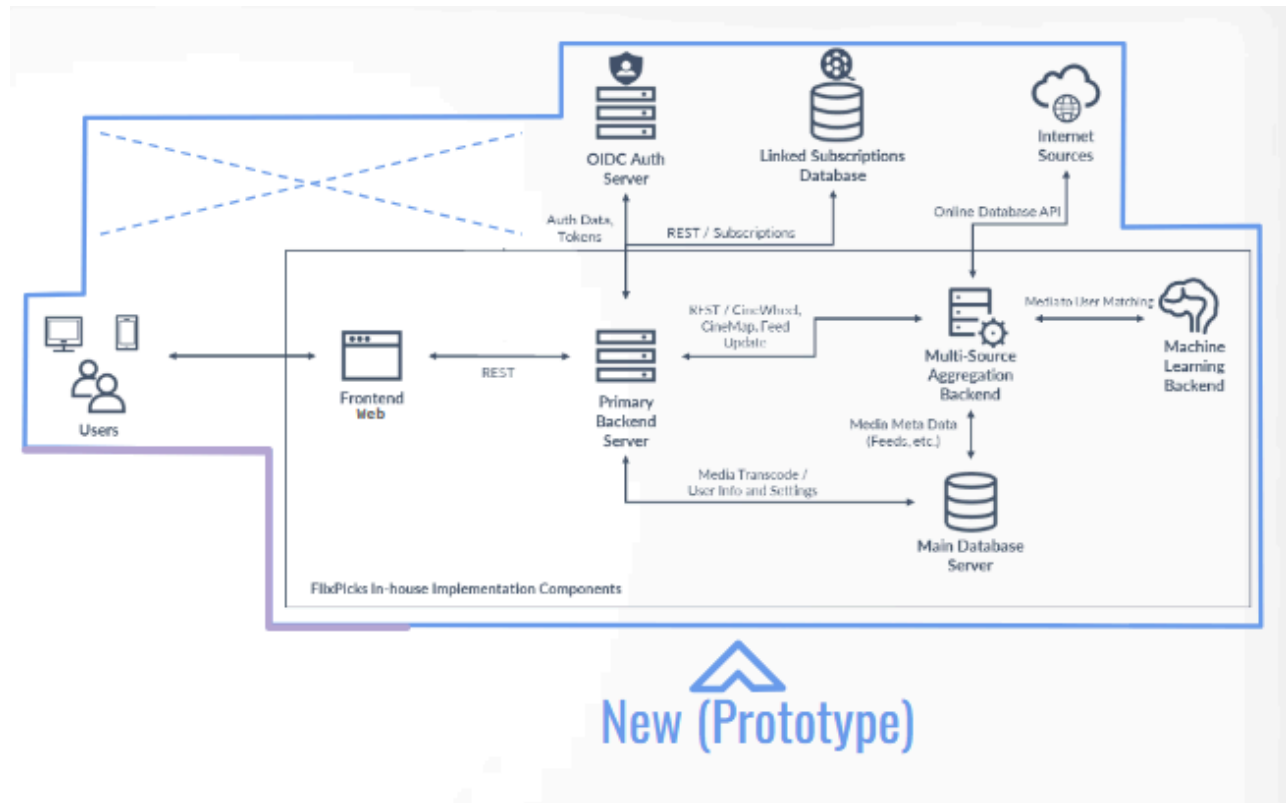


Figure 2 shows the prototype's major functional component diagram (MFCD). The MFCD nearly follows the real-world product MFCD. The main difference is the exclusion of a library API that would've been in the place of the dotted blue lines. This change allows the developing team to focus on the key innovative components and functionality of FlixPicks during the semester.

4.2. Prototype Features and Capabilities

FlixPicks main features are all either fully implemented or partially implemented. The features that will be implemented in the prototype are defined in Table 2 under 12 different categories: Subscription Service Management, Taste Profile, Recommendations, Filtering, CineRoll, CineWheel, CineMap, Analytics, Simulation, Movie Info, Reporting, and Feedback. The only features that are partially implemented are user subscription integration, CineMap

export data, CineMap data analyzing, data analytics testing, and feedback. These features are still going to be implemented in some capacity, but not their full intended use.

Table 2

FlixPicks RWP vs Prototype

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
Recommendarions	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

Table 2 shows that the prototype will allow access to all of the features in some capacity. Subscription service management will be partially implemented with select subscription services with easily available third party API. Not all subscriptions will be available for the prototype, but the selected few will be integrated.

The CineMap feature will be fully functional, but data exporting, testing, and analysis will be simulated. It would be impossible to provide thousands of users with access to our

CineMap overlay prototype and collect enough data for testing and analytics so we will be simulating this aspect of FlixPicks.

Simulation, Movie Info, and Reporting, will be fully implemented in the prototype, but will not exist in the RWP. Simulation of other aspects of FlixPicks will be required, specifically regarding user selection of content, creation of new movies for the library API, and analytics. Taste Profile, Recommendations, Filtering, CineRoll, CineWheel, and Feedback will be fully implemented, with the remaining categories being partially implemented but still functional.

General functionality in the prototype will allow guest users to access the default library of popular media, ability to view all FlixPicks features, and the ability to only use the CineWheel feature. For registered users a user specific library based on their registered subscriptions and Taste Profile is available. The registered user interface allows users to use CineRoll, CineMap, and the CineWheel feature. It also allows users to view and reset their Taste Profile recommendations at any time. A newly registered user will be required to fill out an initial taste survey that sets their starting recommendations.

The CineWheel and CineRoll features are functions that are available inside the prototype. The CineWheel function requires no machine learning or access to the back-end, the CineRoll feature requires the Taste Profile and machine learning to provide recommendations to the user. The CineMap feature will be mostly implemented through the use of a FlixPicks extension that is turned on when the user is consuming content. This extension will send data back to the database after a user session and will be collected and analyzed.

4.3 Prototype Development Challenges

FlixPicks is a complex application, meaning the development of the FlixPicks prototype will likely lead to a multitude of challenges. The biggest challenge is identifying and handling time conflicts. The semester is only a few months, and with a large team working within this time constraint can get confusing and hectic. To mitigate this, a to-do checklist and task board on our Git repository will be made and updated every week.

Another handful of challenges include our database configuration, pooling of information from third party API sources, simulation of users for testing and feedback, and learning to use collaborative filtering for machine learning recommendation algorithms. This handful of challenges is mitigated by a team of mentors consistently helping with questions, and prior research into machine learning and SQLite DB configuration prior to the semester.

5. Glossary

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.

CineMap: CineMap is an optional overlay that allows FlixPicks users to interact, make comments, and view other users’ interactions. It shows a timeline that highlights points of interest throughout a movie based on activity.

CineRoll: CineRoll is a FlixPick’s 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.

CineWheel: CineWheel is a FlixPick’s feature that randomly selects from a set of user inputted choices. CineWheel is a tool to use for when a user or multiple users in a group are indecisive.

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.

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.

Stakeholders: 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.

Taste Profile: A user profile on FlixPicks that has access to their subscriptions, recommendations, and other settings. The taste profile recommendations grow as a user makes selections on the website and can be reset at anytime by the user.

6. References

Clark, Travis. (2022, April 20). How Netflix, Disney+, HBO Max, and more major streamers compare on content and cost.

<https://www.businessinsider.com/major-streaming-services-compared-cost-number-of-movies-and-shows-2022-4>

Cook, Sam. (2023, September 06). The Complete List of Streaming Services – 200+ Services.

<https://flixed.io/us/en/complete-list-streaming-services>

Durrani, Ana. (2023, March 27). The Average American Spends Over 13 Hours A Day Using Digital Media—Here's What They're Streaming.

<https://www.forbes.com/home-improvement/internet/streaming-stats/>

Fischer, Sara. (2022, August 18). Streaming surpasses cable as top way to consume TV.

<https://www.axios.com/2022/08/18/streaming-surpasses-cable-tv-market-share>

Glover, Emily. (2023, March 9). Nearly 50% of people pay for streaming services they don't use. According to new Forbes survey.

<https://www.forbes.com/home-improvement/internet/streaming-survey/#:~:text=According%20to%20the%20survey%20findings,services%20the%20average%20person%20uses.>

Moscaritolo, A. (2016, July 21). Netflix users waste a ton of time searching for something to watch. PCMAG.

<https://www.pcmag.com/news/netflix-users-waste-ton-of-time-searching-for-something-to-watch>

Natal, G., & Saltzman, B. (2022, January) Decisions, decisions, decisions: decision fatigue in academic librarianship. *The Journal of Academic Librarianship*, 48(1)

<https://doi.org/10.1016/j.acalib.2021.102476>

O'Brien, Clodagh. (2023, June 14). The Unstoppable Success of Netflix.

<https://digitalmarketinginstitute.com/blog/the-unstoppable-success-of-netflix#:~:text=Netflix's%20marketing%20budget%20has%20remained,to%20the%20New%20York%20Times.>

Pattison, S. (2023, September 17). 35 streaming services statistics you need to know in 2023.

Cloudwards.

<https://www.cloudwards.net/streaming-services-statistics/#:~:text=Although%20we%20may%20only%20think,Netflix%20the%20%231%20Streaming%20Service%3F>

Ward, Amelia. (2020, August 20) People Spend 187 Hours A Year Searching For Something To Watch on Netflix.

<https://www.ladbible.com/entertainment/tv-and-film-people-spend-187-hours-a-year-browsing-netflix-20200820>

Stoll, J. (2023, October 19). *Netflix: Number of subscribers worldwide 2023*. Statista.

<https://www.statista.com/statistics/250934/quarterly-number-of-netflix-streaming-subscribers-worldwide/>