# Lab 1 - FlixPicks Product Description

Chance Sadler

Old Dominion University

CS 411W

Professor J. Brunelle

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## 1 Introduction

A 2016 study revealed that Netflix users spend 17.8 minutes on average searching for something to watch (Moscaritolo, 2016). Many shows are 20 minutes long. That means on average a user misses one episode every time they search for new content. The indecision caused by too many options is referred to as Choice Overload. Netflix is just one of over 200 streaming platforms (Cook, 2023). With so many services and shows to choose from the problem of finding desirable content is exacerbated. Browsing for content in every individual service takes too much time away from consumers. Many consumers pay for multiple streaming services to expand their options or watch exclusive content. While this is desirable it adds complexity when the person starts the search for a new show or movie. Half of the people who subscribe to multiple services tend to stay subscribed without using the service (Glover, 2023). The price of streaming content varies from two dollars with ads to 20 dollars or more per month per service (Clark, 2022). There is a lot of potential for consumers to waste money.

Streaming service consumption in the United States represents 34.9 percent of the total television viewership (Fisher, 2022). Many Americans utilize streaming services as their primary media consumption but must face the challenge of finding their next piece of media. Additionally, figuring out what the next movie or show will be for a group is a challenge.

The solution to this problem is FlixPicks a cross-platform app that allows for making quick media decisions by filtering content from every movie and television show across all platforms. The application allows users to filter content by their streaming service to allow users to see what media is relevant and available to them. FlixPicks recommends content for users based on media interactions. Users can engage with media through comments and ratings improving future recommendations.

# 2 FlixPicks Product Description

FlixPicks is a web application that creates a Library of all media across multiple streaming services. The application does not stream media content from the web page but does allow users to click straight from the media page to their streaming service. FlixPicks provides a curated experience for users with varied subscriptions to recommend media to watch. FlixPicks tracks user interactions such as watch history, user Reactions, and users that have watched similar movies to generate recommendations. Along with recommendations, FlixPicks offers features that help to alleviate choice fatigue.

## 2.1 Key Features and Capabilities

FlixPicks is a web application that is made for people with multiple streaming services. FlixPicks provides a curated experience for users with varied subscriptions to recommend media to watch. Table 1 defines the user roles and the level of access.

**Table 1**

*FlixPicks Features Table*

| Category | FlixPicks Feature | Guest | Registered User | Admin | Representative | Tester |
|---|---|---|---|---|---|---|
| Subscription Service Management | User Account Registration | Access | N/A | Access | N/A | Access |
| | Account/Subscription Service Management | Unavailable | Access | Access | Access | Access |
| | User Subscription Integration | Unavailable | Access | Access | Access | Access |
| | User Tier Level Feature Access | Unavailable | Access | Access | Access | Access |
| Taste Profile | Taste Profile | Unavailable | Access | N/A | N/A | Access |
| | Taste Profile Survey | Unavailable | Access | N/A | N/A | Access |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Taste Profile Content-Based Filtering | Unavailable | Access | N/A | N/A | Access |
| | Taste Profile Collaborative Filtering | Unavailable | Access | N/A | N/A | Access |
| Recommendations | Recommendations | Unavailable | Access | N/A | N/A | Access |
| | Filtered Recommendations (Criteria based) | Unavailable | Access | Access | N/A | Access |
| Movie Library | Browse/Search Filtering | Access | Access | Access | N/A | Access |
| | HotPicks | Access | Access | Access | N/A | Access |
| CineRoll | CineRoll | Unavailable | Access | Access | N/A | Access |
| CineWheel | CineWheel | Access | Access | Access | N/A | Access |
| CineMap | CineMap Overlay | Unavailable | Access | Access | N/A | Access |
| | CineMap Commenting | Unavailable | Access | Access | N/A | Access |
| | CineMap Export Data | Unavailable | Unavailable | N/A | N/A | Access |
| | CineMap Data Analyzing | Unavailable | Unavailable | N/A | N/A | Access |
| Analytics | Data analytics testing | Unavailable | Unavailable | Access | Access | Access |
| | Analytics | Unavailable | Unavailable | Access | Access | Access |
| | Summary reporting for user | Unavailable | Unavailable | Access | Access | Access |
| | Summary reporting for Stakeholder | Unavailable | Unavailable | Access | Access | Access |
| Simulation | Simulation | Unavailable | Unavailable | Access | Unavailable | Access |
| Movie Info | Create/edit Movie Info | Unavailable | Unavailable | Access | Unavailable | Access |
| Feedback | Feedback | Access | Access | Access | Access | Access |

The Taste Profile Survey is the first major feature newly registered users are presented with. Upon creating an account, the user is given a Survey to establish their initial media interests. User's choices are added to their Taste Profile. The Recommendation Algorithm uses

the Taste Profile to generate recommendations. Users have the option to reset the Survey at any time in the settings menu. The Taste Profile also collects implicit data through Reactions. Reactions are collected from the user's watch history, comments on media, and other users with similar habits. User recommendations are displayed as part of the user home page. Below the user recommendations is HotPicks. HotPicks displays the 10 most popular media of the day to the user.

CineRoll allows the user to randomly select one recommendation. This feature helps users that are experiencing choice overload by choosing a movie for them. If a user does not want the movie presented to them after using CineRoll they have the option to "re-roll" to get a new recommendation. Whether the user accepts or declines the recommendation the choice updates the Taste Profile.

CineWheel allows users to input up to 13 media titles to a wheel that will spin one of the titles at random. This helps users that have a list of media they are struggling to decide between. Users can use CineWheel while in a group to settle what to watch in a fair manner.

CineMap is an overlay extension that appears over the media that the user watches on a computer. CineMap allows users to leave comments and reactions at the timestamp of the media. Users are able to see other comments and Reactions as the media continues. The type and frequency of Reactions is recorded in the Taste Profile to affect future recommendations.

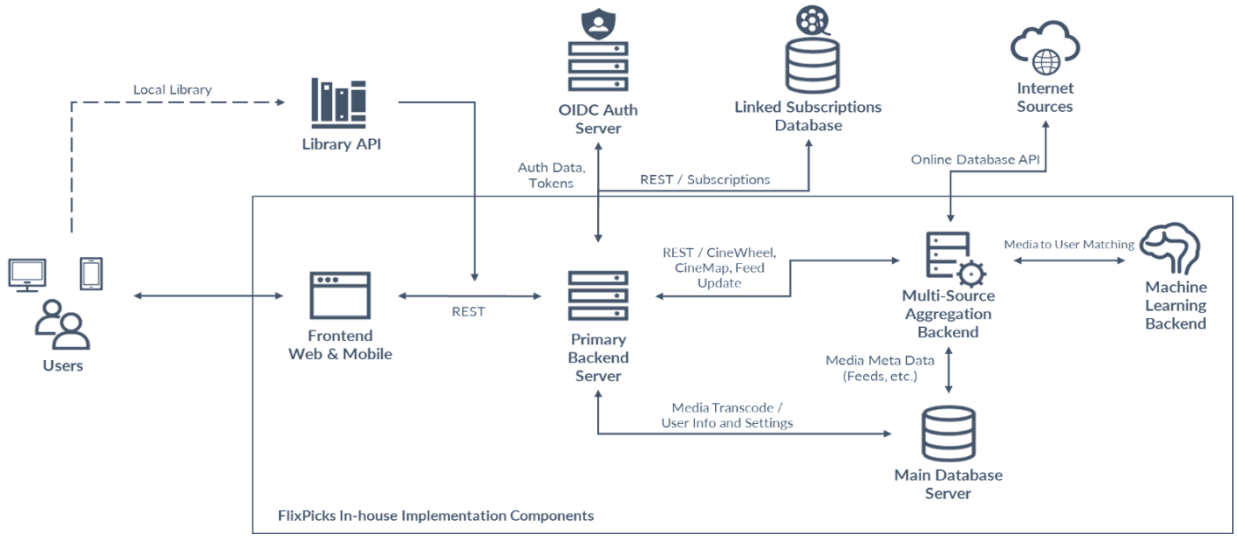
The FlixPicks Library holds information on media on in the database to display to the user. Every movie and TV show has a media information page that displays important information such as title, genre, actors, and release date. Each media information page features Quick Clicks to get the user from the page directly to the content.

## 2.2 Major Components (Hardware/Software)

FlixPicks is a front-end web application using a backend database. A computer, smartphone, or smart TV is required for a user to access FlixPicks. The FlixPicks interactable extension requires a chromium-based browser. Figure 1 illustrates the main functional components of FlixPicks.

**Figure 1**

*FlixPicks Major Functional Component Diagram*




The hardware required to access FlixPicks is a computer with internet access. To access the CineMap extension a modern Chromium based browser is required. FlixPicks can also be accessed on IOS, Android, and Smart TV devices with internet access. The primary user interface is handled through a website powered by a mix of HTML, CSS, and JavaScript. The CineMap browser extension is written entirely in JavaScript. Swift is used for the IOS and smart TV applications and Java for Android devices.

The third-party data sources are the YouTube Data API and third-party Netflix API, and Amazon Personalize. Apache Tomcat is used for the application server and MySQL Server for

the database. All user data is stored in the database. FlixPicks uses MySQL to handle database management.

AWS is used as FlixPicks' machine learning platform. Version control and repository management is handled through Git and GitHub. Project management is also handled using GitHub. IDEs may differ between developers, but VSCode and Eclipse are the primary IDEs used.

## 3 Identification of Case Study

The prototype case study consists of a group of fake users that demonstrate the objectives of FlixPicks. Some users will be subscribed to multiple services while others have just one. There are users that are trying to find something to watch on the service(s) they are subscribed to. Additionally, there are users that are looking to add or remove services based on the shows available. Table 2 defines the case study fake users' details.

**Table 2**

*FlixPicks Prototype User Set Case Study*

| Name & Information | Description |
|---|---|
| John Doe, Registered User | • John is subscribed to Hulu, Netflix, and Amazon Prime Video.<br>• He constantly finds himself annoyed switching from different streaming platforms while browsing for content to watch.<br>• Because of work, he only has a few hours left to consume entertainment at the end of the day.<br>• He watches with his family. |
| Jane Plain, Registered User | • Jane is subscribed to Hulu and Netflix.<br>• She regularly hangs out with groups of friends and one of their regular activities is watching a movie as a group.<br>• She and her friends constantly find themselves disagreeing over which movie to watch together. |
| Tim Brown, Guest User | • Tim is not subscribed to any streaming services.<br>• He regularly finds himself unsure what content he wants to watch. |

| | |
|---|---|
| | • He wants to find good shows to watch but doesn't know where to start without being subscribed to anything. |
| Jack Smith, Registered User | • Jack is subscribed to Hulu, Netflix, and Amazon Prime Video.<br>• He regularly watches movies and shows at home by himself.<br>• After watching something he typically searches YouTube reviews to see what others thought about specific parts of the movies he watches. |
| Nick White, Representative | • Nick is an advertising representative for Netflix.<br>• He is looking for user data about the most interacted with parts of movies and shows.<br>• Netflix does not provide interactions during the viewing of media, so he needs to outsource this data. |

The fake users defined in Table 2 shows customer problems and the level of access each customer has. Fake users have varied number of streaming services, consumption rates, and use cases. Each user from the table benefits from one or more features FlixPicks provides. The main objective of FlixPicks is to reduce the time spent browsing for media through features such as recommendations, CineRoll, and CineWheel. CineWheel doubles as a way for a group of people, such as in the case of Jane Plain, to choose a movie from a user defined list. The representative user role is reserved for streaming service provider representatives that would like access to the analytical data that FlixPicks collects.

## 4 FlixPicks Prototype Product Description

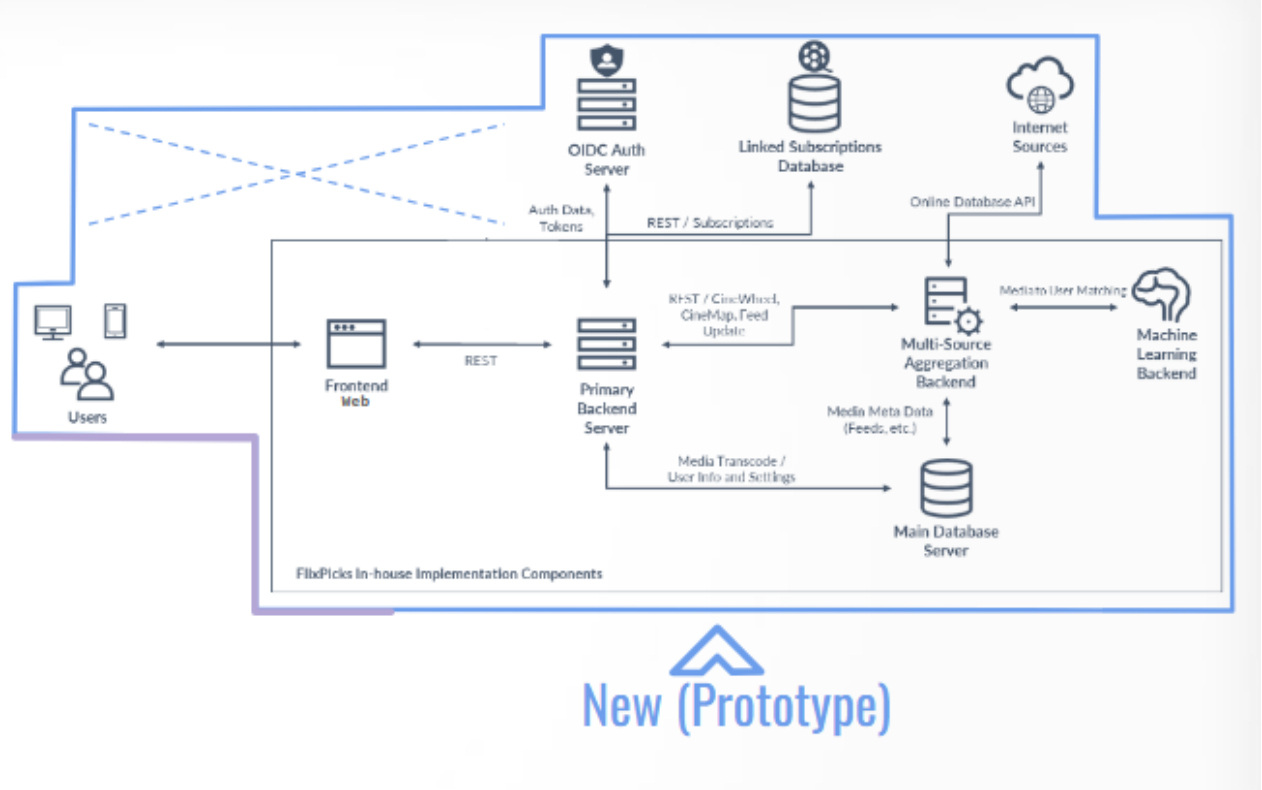
The FlixPicks prototype includes most of the functionality of the real-world version. The prototype uses a smaller sample size of subscription services. The FlixPicks prototype is designed to demonstrate the key features of the final product. Simulation is used to show different types of users interacting with app for testing and user interaction risk reduction. The prototype has a limited number of movies in its database to mitigate dependency on APIs and streaming companies. Passwords are hash mapped to mitigate user unauthorized user access.

### 4.1. Major components (Hardware/Software)

Figure 2 illustrates the major functional component diagram (MFCD) for the FlixPicks prototype. The main difference between the real world MFCD and prototype MFCD is that the prototype does not use a library API. To reduce the scope of the project the prototype is only a web application. This reduction is due to the time constraints of the project as well as to allow for time to build the user simulation.

**Figure 2**

*FlixPicks Major Functional Component Diagram*




The web application can be accessed from any computer with a Chromium browser that has access to the Old Dominion University network. The prototype components are stored on the Old Dominion University servers. Alternatively, the Docker LAMP containers can be downloaded locally to test or demonstrate functionality.

The software used to create the prototype includes Docker-Lamp, Linux OS, Apache HTTP server, SQLite, and Python. The front-end uses a combination of HTML, CSS, and JavaScript so users can interact with the web app. Project management and version control are handled through Git and GitHub. VS Code and Eclipse are the IDEs used to write the prototype.

### 4.2. Prototype Features and Capabilities - RWP vs Prototype Table

Table 3 specifies the features of the real-world product compared to the prototype. The user subscription integration is partially implemented. Users may select their subscription service, but are not able to link their subscription service account to FlixPicks. The goal of the prototype is to show functionality and as such any monetization is removed from the prototype. The prototype focuses on the features that reduce choice overload. The prototype focuses on generating recommendations and the CineFeatures. CineRoll and CineWheel are fully implemented, but CineMap is only partially implemented. The data for the prototype is simulated for the purpose of testing and demonstration. Feedback of real users would be used for the real-world product. The prototype's recommendation algorithm uses patterns made by user watch history generated by fake users.

**Table 3**

*FlixPicks RWO 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 |
| | User Tier Level Feature Access | 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

The first major challenge during the development of the prototype was configuring the database. Part of the configuration process included populating the database with media information. Utilizing third-party APIs to gather data for the database became a challenge due to availability. Generating user data for testing and proof of concept became a challenge because of the volume of users needed to make accurate recommendations. Learning how to utilize machine-learning and collaborating filtering to create the recommendation algorithm was the greatest challenge.

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# 5 Glossary

**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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