Lab 1 - FlixPicks Product Description

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1 Introduction

The options for view media content at home has begun to expand. Adults in America have begun to subscribe to streaming services to replace cable TV (Fischer, 2022). Streaming is quickly becoming the most popular method to watch media because it is considered a cheaper & more convenient alternative to cable. Subscribers also enjoy the extensive selections of on-demand movies and films compared to the options available on cable TV. Over three-quarters of American adults prefer streaming to cable TV (Raj, 2023). The growth of streaming increases at a rate of nine percent every year. While streaming becomes more popular, cable's growth is significantly smaller at four percent (Raj, 2023). The declining popularity of cable TV has shifted the movie-watchers to stream services instead. About 34.8 percent of viewership of media comes from streaming rather than cable (Fischer, 2022).

Popular at home streaming services like Netflix, Hulu, and Disney+ are the most selected when it comes to choosing a subscription. There are over 200 streaming platforms available (Cook, 2023). The number of selections increases when free streaming platforms like Tubi & Pluto TV are introduced into the selection pool. Free subscriptions remain free of charge while paid subscriptions have varying price points. Each streaming service tends to have different tiers of payment that include a range of features. Most subscription services have a base rate that allows users to watch most of the available media library with ads. To watch without ads or to access the full library, the price goes up from there. Customers have access to the library of offered media; most libraries consist of on-demand media or offer live television streaming (Cook, 2023). Live television streaming replicates the cable television experience by including a limited variety of television channels like news and sports channels.

The vast number of streaming options makes deciding on a show considerably more complicated. Cable television presents people with a limited number of options and every show has its fixed viewing time in the schedule. But streaming provides a large quantity of choices that are readily available on demand. Selecting media has become a time-consuming task that study shows people spend nearly 187 hours a year looking for something to watch (Ward, 2020). That averages about thirty minutes a day, which is the length an average episode of a television show. Then once a piece of media is finally found, the watching process is more isolating than cable television. With cable, everyone tunes in at the same time every day to watch whatever was popular. This is not the exact case with streaming, since the services are on demand. The act of watching media has become increasingly isolating to consumers. FlixPicks is the solution; it erases the indecision of selecting media to watch with cohesive machine learning algorithms and eliminate the isolation created by streaming services. FlixPicks connects users through comments and emotional reaction buttons. All of these aspects ease the user into a better streaming experience.

2 FlixPicks Product Description

FlixPicks is a web application that creates a master library of all media options across all streaming platforms that have active subscriptions. It does not stream media directly from the app but has a single-click activation that allows the media to be played. FlixPicks is designed to have a machine learning recommendation algorithm that suggests personally tailored media to users while still being faithful to their particular tastes. Along with that, FlixPicks provides a variety of features readily available to users to eliminate the struggle of indecision. FlixPicks features allow users to choose a random movie from the library. Additionally, FlixPicks offers a method of direct interaction with chosen media via comments, hotspots, and emotional reactions.

2.1 Key Product Features and Capabilities

Upon the launch of FlixPicks, users have the option to make an account, sign in, or use the app under a guest profile. Guest profiles have limited access and functionality. When an account is created, users are prompted to fill out a survey called a Taste Profile. A Taste Profile is a one-time survey that gathers information on the types of media the user likes and what subscriptions they own. The Taste Profile is a method of initial data collection. Afterward, FlixPicks adjusts their recommendations based on the characteristics of the content the user decides to watch. FlixPick allows the user to reset their Taste Profile if they no longer like their personalized Library. To reset their Taste Profile, users would have to complete another survey.

At the end of the Taste Profile, the user is asked to input all of their paid subscriptions. After that, a Library of all media across inputted streaming providers is created as a Library of available content. From all the available content, FlixPicks provides a general recommendation based on shows and movies that are currently popular. FlickPicks also provides recommendations based on the user's Taste Profile. With each of the available libraries, users also have search filters for fields such as genre or release year.

FlixPicks offers three unique features that help users decide what to watch and connect with other people watching the same things as them at any point in time. The first feature is called CineRoll. CineRoll randomly selects a movie or show based on the user's Taste Profile. It is an effective way to eliminate indecision and to locate something to watch quickly. Filters refine CineRoll's selection.

The second feature is called CineWheel. CineWheel is similar to CineRoll, except that its intended purpose is to be used in a social setting or if the user has multiple options that they unable to narrow down. With CineWheel, the user inputs multiple media options into the wheel

and then spins it. The choice the wheel makes is completely random. Both CineWheel and CineRoll allow users to continue rolling and respinning until they are satisfied.

The last feature is called CineMap. CineMap is an optional overlay that is displayed over top of the media that the user has selected to watch. This overlay allows users to interact, make comments, and even view other user interactions. CineMap also shows a timeline that highlights certain sections based on other user activities. Even if the user decides to hide the overlay on their desired piece of media, they are still able to leave comments while they are watching.

2.2 Major Components (Hardware/Software)

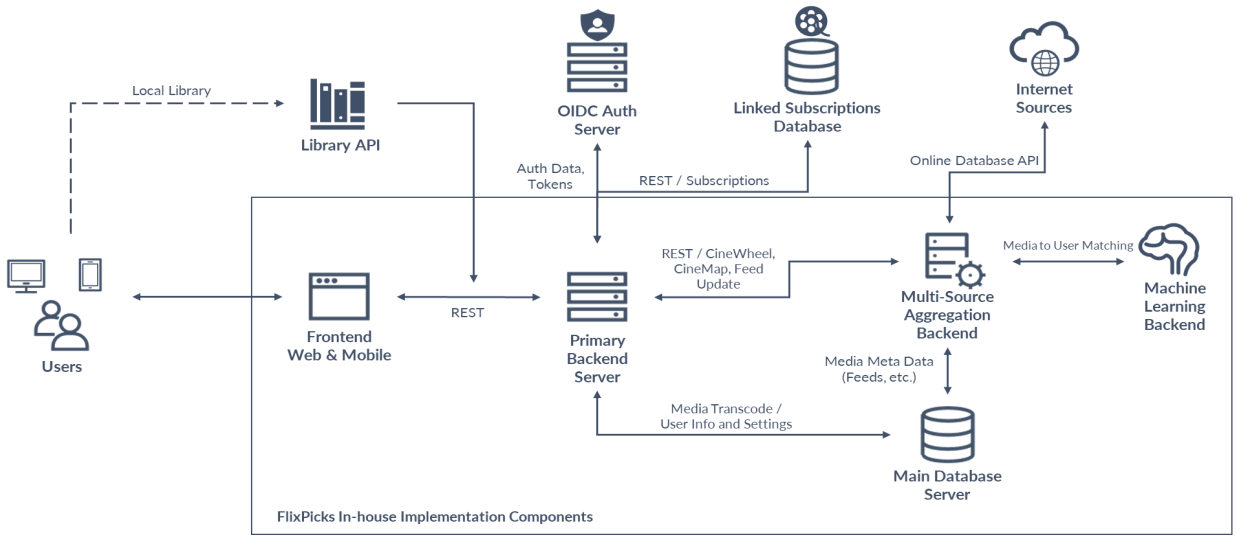
FlixPicks is an application that runs on the client's hardware. A device with internet access and a supporting browser is needed. Browsers like Google Chrome or Firefox are ideal. FlixPicks is also available on iOS and Android devices that have an internet connection. FlixPicks may also be used on a smart TV that is connected to an internet network that also supports a browser-based app.

The web portal and browser extension needed for FlixPicks requires HTML, CSS, and Javascript. The application itself is developed in Swift, which is compatible with iOS and Apple TVs. It is also developed in Kotlin, which is specific to Android devices. The APIs used are the 3rd party Netflix API along with the YouTube Data API. These APIs provide access to data libraries about movies and TV shows that are already available. The application server uses Apache Tomcat and MySQL server in the database. AWS is utilized with machine learning within FlixPicks. AWS is the Amazon Web Services and it is a platform that provides scalable cloud computing solutions. The application is securely hosted. GitHub is used to keep track of version control and the repository. Lastly, VSCode and Eclipse IDEs keep track of project management and to track any issues that occur within the code. The Major Functional

Component Diagram displayed in figure one shows the interactions between the various interfaces, the back-end components, the third party APIs, and the linked subscription database.

FIGURE 1

Major Functional Component Diagram



Users interact with a graphical user interface front end. User information is authenticated through OIDC to support login functions and user data is securely hosted in the backend server. FlixPicks does not provide direct authentication to streaming services. At that point, their information is authenticated through OIDC to allow them to log in to their account. Users must authenticate directly on their streaming services app, as it is not housed within FlixPicks. After the authentication is complete, library aggregation, and CineFeatures all occur within the implemented components provided by FlixPicks.

3 Identification of Case Study

The prototype case study consists of a group of fake users that are designed to demonstrate the risk mitigation, goals and objectives of FlixPicks. This set of users establishes a

set of Libraries as a default for testing the in-the-box elements of FlixPicks. Details of each specific false user are listed below in Table 1.

TABLE ONE

Case Study Table

Name & Information	Description
John Doe, Subscriber	- 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. - He watches with his family.
Jane Plain, Subscriber	- 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, Guest User	- Tim is not subscribed to any streaming services. - 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, Subscriber	- 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.
Nick White, Representative	- 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.

Looking at this case study, FlixPicks addresses and solves the problems that are experienced by customers and experienced by representatives. It recommends content based on a user's preference, selects what to watch through CineFeatures and collects data for representatives to use.

4 FlixPicks Prototype Product Description

The prototype for FlixPicks shows functions for the application as a tester. Three features named CineWheel, CineRoll, and CineMap are also demonstrated in the prototype. Other features like the Taste Profile and recommendation aggregation are inlucded in the prototype. The FlixPicks proof of concept demonstrates the majority of the features planned for the real-world application. The prototype is implemented in a way the that is practical for proper testing and presentation, and data is generated for demonstration. The generated data enables testing and risk mitigation demostrations. This generated data also aids in the presentation of analytics and feedback statistics. Though the application is manipulated, it still demonstrates key functionality.

4.1 Major Components (Hardware/Software)

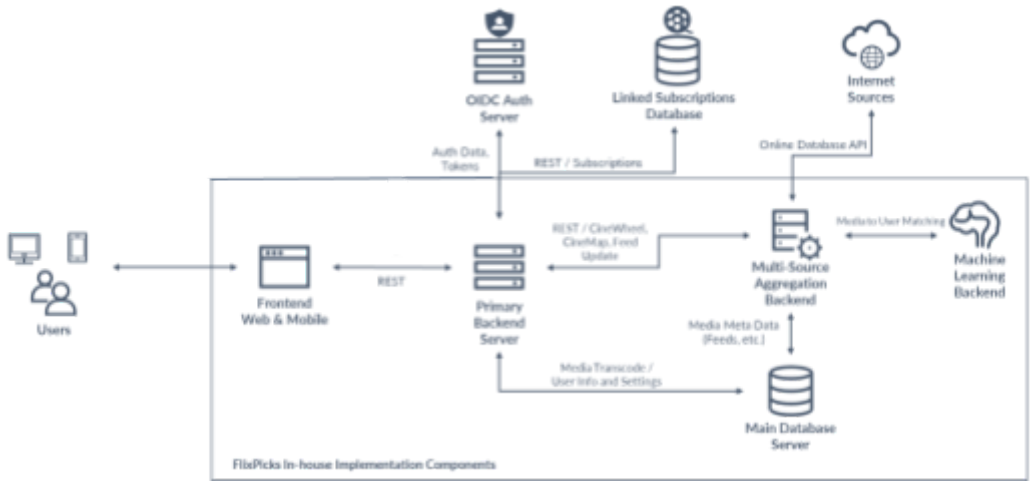
The FlixPicks prototype operates on any device that has a browser-based web interface. This includes smartphones, tablets, laptops, and select smart televisions. The type of web browser is not specific. FlixPicks operates on Google and Firefox. FlixPicks operates on a virtual machine provided by the Old Dominion Computer Science Department. The prototype uses a Docker LAMP server. Docker LAMP is used for its containers, which runs all programs simutanelously. One container consists of the Apache Tomcat program for the web API. Another holds the SQL database where all of the fake data is held. Docker keeps everything cohesive and organized. HTML, CSS, and JavaScript for our website development, while Python is used for

application development. VSCode and Eclipse are used in conjunction with GitHub to keep track of the repositories.

Real-world implementation requires the usage of Library APIs to gather data from streaming services. For the prototype, implementing Library APIs along with generating our own data to put the prototype under certain constraints and stressors to demonstrate functionality and risk mitigation. The changes in the MCFD are reflected in Figure 2.

FIGURE TWO

Prototype Major Functional Components Diagram



4.2 Prototype Features and Capabilities

FlixPicks has a variety of features. The CineFeatures that provide the functionality of the app, like the CineRoll, are implemented for the prototype and the RWP. Then there are features, like the manipulation of movie information, that is only implemented for the sake of presenting the prototype. Table 1 shows a detailed list of features included in the prototype versus the RWP.

TABLE TWO

Prototype Features Table

Category	FlixPicks Feature	RWP	Prototype
Subscription Service Management	Account/Subscription 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

Feature availability is dependent on whether the tester has a registered account or if they are a guest user. Testers with guest access are unable to see general recommendations from each streaming service. They also do not have access to all of the Cine features available, only CineWheel. Testers with registered access are able see and use all features and are able create and manipulate their Taste Profile. The Taste Profile consists of a user Survey to create initial recommendations that is immediately available to users. As the user continues to use FlixPicks, the algorithm builds better commendations using collaborative filtering. With CineRoll, FlixPicks randomly selects recommended content for user viewing. The CineMap overlays the user's selected media, which enables them to leave and view comments, and like and dislike their media while viewing.

4.3 Prototype Development Challenges

The first challenge that comes with the development of FlixPicks is the database configuration. Finding a third-party API that gives access to data for multiple streaming services

is also difficult because not all streaming services have API available. Generating user data for testing and feedback is also a bit challenging as we have to make a large quantity of data available for us to use. The ability of the development team to implement machine learning within FlixPicks is be dependent on the team's ability to learn the ML algorithm, generate sufficient data to use in the algorithm and utilize the results to provide recommendations within the course timeline. Lastly, scheduling and avoiding time conflicts with other group members might prove to be difficult.

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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