Lab 1 - FlixPicks Product Description

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1 Introduction

The options for viewing media content at home have always had many options. 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 and more convenient alternative to television. Subscribers also enjoy the extensive selections of on-demand movies and films compared to the limited options available on cable TV. Over three-quarters of American adults prefer streaming to cable TV (Raj, 2023). The declining popularity of cable TV has shifted the movie-watchers to streaming services instead.

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. There are free subscriptions and paid subscriptions; each streaming service tends to have different tiers of payment that are dependent on the volume of ads. 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 TV experience by including a limited variety of television channels that have scheduled programming.

The vast number of streaming options makes deciding on a show considerably complicated. Cable television presents people with a limited number of options and every show has its fixed viewing time in the schedule. However, streaming provides a large quantity of choices that are readily available on demand. Selecting media has become a time-consuming task

that people spend nearly 187 hours a year looking for something to watch (Ward, 2020). That averages about thirty minutes a day, which is the average length of an episode of a television show.

Once a piece of media is selected, the watching process is more isolating than cable television because streaming is on-demand. With streaming media, a shared viewing experience is more difficult compared to program television, such as cable TV. Streaming services are on demand for more convenience while programmed television provides the opportunity for scheduled group gatherings. The act of watching media has become increasingly isolating to consumers.

FlixPicks improves the streaming experience by easing the stress of decision-making. It addresses the indecision of selecting media to watch with cohesive machine learning algorithms and eliminates the isolation created by streaming services. FlixPicks connects users through time-stamped content sharing using comments and reaction buttons. All of these aspects improve the user's viewing experience by allowing a faster selection of aggregated content and interaction with the content.

2 FlixPicks Product Description

FlixPicks is a web application that creates a master library of all media options across all streaming platforms for which a user has an active subscription. 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 utilizes the recommendation algorithm to update recommendations based on the user's watch content. FlixPick allows the user to reset their Taste Profile if they no longer like their personalized Library. To reset their Taste Profile, users must complete another survey.
Upon completing the Taste Profile, the user is asked to input all their paid subscriptions. The media offered across the user's inputted streaming providers is created as a Library of available content.

From the user's available content, FlixPicks retrieves ten popular and trending media from the database and presents these to the user as HotPicks. 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 viewing the same media. These features are called CineRoll, CineWheel, and Cinemap. The first feature, 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, 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 would like to randomly select from. 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 data from CineWheel and CineRoll is collected and fed to the algorithm to continue to refine the user's recommendations.

The last feature, CineMap, provides the user an opportunity to enable an overlay on top of their selected media. This overlay allows users to interact, make comments, and view other user interactions at time-stamped locations. CineMap also shows a timeline that highlights certain sections based on other user activities. 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.

These are the three unique features offered by FlixPicks. Collectively, they are called CineFeatures.

Users who do not make an account with FlixPicks will be able to access the website under a guest profile, which limits functionality. A registered user has full access to the website. An Admin account has access to FlixPicks, except for the Taste Profile. A Representative account has access to information regarding the streaming service they represent. Lastly, a Tester account has access to the entire application. A complete list of all of the features found in FlixPicks is provided in Table 1.

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/stakeholders	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

2.2 Major Components (Hardware/Software)

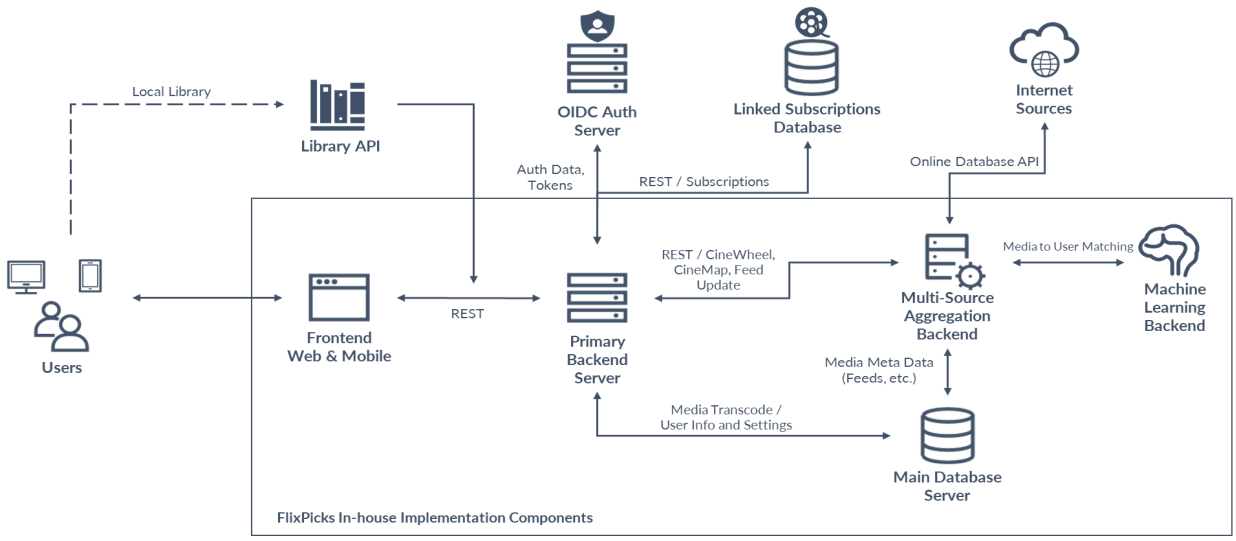
FlixPicks is an application that runs on the client's hardware. Users require a device with internet access and a supporting browser. Google Chrome or Firefox are ideal. FlixPicks is available on iOS and Android devices that have an internet connection. FlixPicks may also be used on a smart TV that is connected to an internet network that 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. There are APIs used are ReelGood, IMDB, and YouTube Data API. These APIs provide access to data libraries about movies and TV shows and what streaming services they can be accessed from. The application server uses Apache Tomcat and MySQL servers 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 track any issues that occur within the code. The Major Functional Component Diagram illustrated in Figure 1 illustrates the interactions between the 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 interface. 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 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 fake user are listed in Table 2.

Table 2

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,	- Nick is an advertising representative for Netflix.

Representative	- He is looking for user data about the most interacted with parts of movies and shows. - Netflix doesn't provide interactions during the 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.

FlixPicks provides benefits for streaming service representatives also. The data collected by the application can provide insight into their popular media and how users interact with their service. This data can be useful in competing against other streaming service providers. The collected data can also provide an avenue of advertisement for new media.

4 FlixPicks Prototype Product Description

The FlixPcisk prototype serves as a proof of concept that demonstrates the majority of the features planned for the real-world application, including the CineFeatures. The prototype implements the user survey and Taste Profile that are used to enable the demonstration of the Apriori machine learning algorithm that provides recommended media for the user's viewing. The prototype additionally facilitates the data creation for use in the prototype demonstration and of the front-end, back-end, and algorithms created to provide the proof-of-concept. The prototype demonstrates risk mitigation and how it solves the problem.

4.1 Major Components (Hardware/Software)

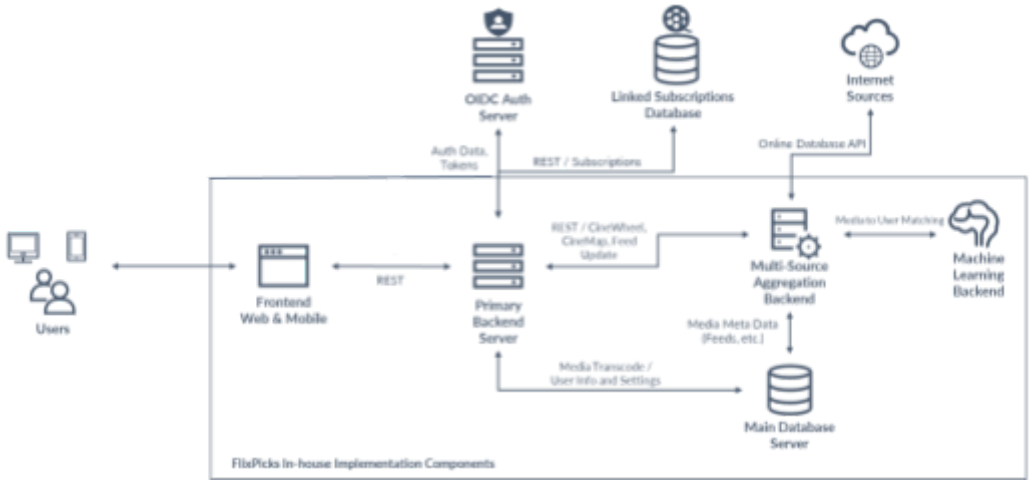
The FlixPicks prototype operates on any device that has a browser-based web interface. This includes smartphones, tablets, laptops, and select smart televisions. The type of web

browser is not specific. FlixPicks operates on Google Chrome 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 run all programs simultaneously. One container consists of the Apache Tomcat program for the web API. Another holds the SQL database where all of the application data is held. Docker keeps everything cohesive and organized. HTML, CSS, and JavaScript for website development, while Python is used for application development. VSCode and Eclipse are used in conjunction with GitHub to keep track of the repositories.

For the prototype, Library APIs for media data, along with the use of generated data support the demonstration of the application's functionality, support testing, and demonstration of risk mitigation. The prototype MCFD is shown in Figure 2.

Figure 2

Prototype Major Functional Components Diagram



4.2 Prototype Features and Capabilities

The CineFeatures that make up the functionality of FlixPicks are implemented in the prototype and the RWP. Stimulated user data is used to show the full functionality of the application without fully implementing the complete feature set. Analytical data and subscription data are partially implemented into the prototype because the generated user data supplements the lack of actual data. For the RWP, those data elements are fully implemented without the need to create simulated data. Table 3 shows a list of features included in the prototype as compared to their implementation in the RWP.

Table 3

FlixPicks RWP vs 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	Fully Implemented	Fully Implemented

	Recommendations (Criteria Based)		
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 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 offer an API. Finding multiple APIs, if needed, can also prove difficult. Generating user data for testing and feedback is a challenge because the

data needs to be valid and realistic to show that the problem is solved. The ability of the development team to implement machine learning within FlixPicks is 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.

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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