Software Engineering CSC 648/848

The MovAI Project - Milestone 1

Section 4, Team 2

Team

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History

Initial Draft	04/03/2023

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1. Executive Summary

In this era of digital media, thousands of movies are just a few clicks away for most people. With so much content existing, it can be overwhelming trying to watch something you haven't seen before. Rewatching movies can get stale after a while, but it's often easier to do than taking the time to find new content that fits an individual's unique tastes. At the end of the day, no one wants to waste time watching something new only to find out they're not interested after all. MovAI is designed to help users overcome these barriers and find new, exciting content by incorporating AI technology into personal data to generate customized recommendations.

In order to generate recommendations, MovAI has users track and rate what they watch. When a user wants recommendations, MovAI will return an AI generated list of movie recommendations based on their viewing history and ratings they previously gave to each title. Users can also specify additional conditions, such as restricting results to only specific genres, moods, ratings, etc.

There are a couple of aspects that make MovAI unique. First, the use of AI allows MovAI to find connections between films by looking at overarching themes and story elements, not just genre. Being able to find deeper connections than what genre a movie falls into enables users to explore a wider range of titles and genres that they otherwise might have found on their own, and helps prevent users from being pigeonholed into a specific genre. Another way that MovAI is different from other existing solutions is that it accounts for the user's enjoyment of a movie, not simply whether or not they watched it. This is an important aspect because it allows MovAI to achieve a greater level of personalization in the given recommendations. Finally, though many streaming services have their own recommendation algorithms, MovAI is not affiliated with a streaming service and doesn't have the limitations of suggesting content only offered by a single service.

The team behind MovAI is a multicultural group of movie-lovers who want to empower people to find content outside of big-tech algorithms or blockbuster advertising. By leveraging the power of AI, the team wants to help users get out of their comfort zone and explore new content that they may neve have considered watching otherwise.

2. Personas and User Stories

2.1 Personas

1: Robert (Bob) Johnson

1. **Bio:** 34, Senior Software Engineer, Downtown Seattle
2. **Interests/Motivations:**
    a. Single, occasionally visits local bars seeking to socialize about trendy topics.
    b. Consistently feels burned out from his high-pressure tech job, craves quick (but meaningful and novel) entertainment upon getting home.
    c. Cynical regarding algorithm-driven content such as Twitter/TikTok feeds and Netflix recommendations, believes they are driven by “soulless” engagement metrics rather than genuine user interests.
    d. Yet, optimistic regarding alternative tech products that seek to disrupt incumbent products.
3. **Pain points:**
    a. Feels he can’t find anything good to watch; streaming service recommendations have pigeonholed him into a few specific genres.
    b. Lacks the energy to spend effort browsing streaming service interfaces for new content outside of his most common genres.
    c. Has affected his social life: he is unable to engage in interesting conversations in public due to low variety of content watched.

2: Gertrude Harding

1. **Bio:** 71, Retired, San Francisco Noe Valley
2. **Interests/Motivations:**
    a. Longtime resident of San Francisco predating the tech boom. Enjoys movies, books, walking her dog, and socializing at local cafes.
    b. Highly nostalgic for the golden age of movie theaters and video stores.
    c. Prefers the old days when enthusiastic store clerks and salesmen provided conversation and personal recommendations about products.
    d. Open-minded enough to give a chance and try out products/technologies recommended by her granddaughter.
3. **Pain points:**
    a. Smart TVs. Everything about them!
    b. Infrequent internet/social media presence has resulted in not being up to date on the broad variety of new movies coming out: assumes all new movies are like the Marvel movies.
    c. Frequently finds herself signed out of Netflix/HBO Max on her devices and less frequently musters the effort to call her daughter for help on getting signed back in: misses out on trending content as a result.

3: Camila Ramos

1. **Bio:** 19, Junior College Student, Santa Clara
2. **Interests/Motivations:**
    a. 2nd-year nursing student. Enjoys spending free time watching movies, listening to music, and hanging out with her friends and family.
    b. Looking for an escape from the stress of nursing school and her personal life.
    c. Seeking to compliment her growth as a student by expanding her movie tastes beyond her usual go-to genres.
3. **Pain points:**
    a. Overwhelmed by the demands of school, and feels pressure from her family and friends to perform well academically.
    b. Doesn't feel like she has enough time to relax and enjoy her hobbies properly.
    c. Gets frustrated when she spends a long time scrolling through streaming services looking for a movie to watch, only to end up watching something she's already seen before.

4: Aaron Li

1. **Bio:** 21, University Student, Davis
2. **Interests / Motivations:**
    a. Currently a business student at UC Davis. Enjoys playing video games, socializing with friends, and posting on social media.
    b. Prefers to watch movies at home on streaming services such as Netflix.
    c. Generally trends towards modern blockbusters such as Marvel movies.
    d. Occasionally wants to find a film that is different from what he usually watches for the sake of variety.
3. **Pain Points:**
    a. Lacks the skills necessary to find films that he will like. Doesn't trust film critic lists for recommending 'boring' movies.
    b. Has a generally low attention span; will get impatient both when watching movies and in using apps with confusing UI.
    c. Prefers movies with highly specific elements in them, like an upbeat tone or comedic elements.

2.2 User Stories

1. As Gertrude, a retired 71-year old resident of Noe Valley, I want to easily and quickly sign-up and login to the app, so that I can get movie recommendations any time that I want.
2. As Bob, a burnt-out 34-year old software engineer, I want to tell the application what movies I like and dislike, so that I can get recommendations that consider my personal tastes.
3. As Aaron, an impatient 21-year old business student, I want to specify the mood and tone of movies that I want to see, so that I can see recommendations that consider how I am feeling at the moment.
4. As Camila, a stressed 19-year old nursing student, I want to view a vast array of movies that I have never seen before, so that I'm not stuck watching the same-old stuff over again.

3. Data Definitions

1. Movie
    A. Movie Title
        a. Meaning: Tracks movie titles to be displayed to a user.
        b. Usage: Used to display the title of a movie for recommendations.
    B. Movie ID
        a. Meaning: Unique ID to track a movie and its data.
        b. Usage: Used when tracking which movies are recommended to a user.
    C. Movie Creation Year
        a. Meaning: The year that a certain movie was created.
        b. Usage: Used to display the movie creation year to a user, and used when filtering for movies from a certain time period.
    D. Movie Length
        a. Meaning: The length of a movie in terms of minutes.
        b. Usage: Used to display the length of a movie to a user, and used when filtering for movies based on movie length.

E. Movie Genre
    a. Meaning: The genre of a movie.
    b. Usage: Used to display the genre of a movie to a user, and used when filtering for movies based on movie genres.

2. User
    A. Liked Movies
        a. Meaning: Movies that a user liked.
        b. Usage: Tracks IDs of liked movies to be used when querying for similar movies.
    B. Disliked Movies
        a. Meaning: Movies that a user disliked.
        b. Usage: Track IDs of disliked movies to be used when querying for movies to avoid.
    C. Login Information
        a. Meaning: Information relating to a user such as a username and password.
        b. Usage: Used for a user to login and access their personal recommended movies.
    D. Recommended Movies
        a. Meaning: Personalized list of movies recommended to a user based on their liked/disliked movies.
        b. Usage: Used to track recommended movies to be displayed to a user.

3. AI Movie Response
    A. Search Parameters
        a. Meaning: Parameters that the user would like in a movie they want recommended.
        b. Usage: Used to filter certain movies when requesting recommended movies.
    B. Recommended Movie
        a. Meaning: A movie that is personally recommended to a user based on liked movies/previously recommended movies.

b. Usage: Used to track which movie was recommended to a certain user based on a certain movie search.

C. Response Generation Timestamp
   a. Meaning: A timestamp of when a movie recommendation was created.
   b. Usage: Data quality such as showing users previously recommended movies rather than older movies.

4. High-Level Functional Requirements

REQ 1: [High Priority] Users can add movies from a database to their account. (User Story 2)

REQ 2: [High Priority] Users can view the movies they've been recommended to or added to their account. (User Stories 2 & 4)

REQ 3: [High Priority] Users can 'Like' or 'Dislike' movies listed on their account (User Story 2 & 4)

REQ 4: [Very High Priority] Users can generate new movie recommendations based on the following attributes: (User Stories 2, 3, & 4)

1. Liked & Disliked Movies
2. Genre (1 or more - intersectionality)
3. Age Rating (G, PG, PG13, R)
4. Runtime
5. Mood (ex. "I want a happy movie" or "I want a sad movie")

REQ 5: [Medium Priority] Users can modify their existing recommendations to generate new recommendations. (User Story 2)

REQ 6: [Low Priority] User recommendations are added to their account, which can also be 'Liked' or 'Disliked' to further fine tune their new recommendations. (User Stories 2 & 4)

5. High-Level Non-Functional Requirements

1. (Security) The website should keep user recommendations and ratings private.
2. (Compatibility) The website should be usable on the most popular web browsers: Google Chrome, Safari, Microsoft Edge, Mozilla Firefox, etc.
3. (Development) Data should be stored using a MySQL database hosted on Amazon AWS.
4. (Development) Code on the *main* branch of the team's Github repository should be well maintained, tested, and guaranteed to work.
5. (Usability) The website should have an intuitive UX design that makes navigation easy.
6. (Performance) The website should have a responsive UI that handles requests in a timely manner.
7. (Effectiveness) The website should return reasonable movie recommendations based on user criteria using OpenAI.

6. Competitive Analysis

6.1 Competitive Features

6.1.1 Netflix

- **Algorithm System:** Shows a vast array of films and TV shows across multiple genres, which dynamically change based on the user's ratings, watch time per film, and the genre of film or TV show they interact with the most.
- **Rating System:** Thumbs Up / Thumbs Down
- **Pros:**
    - Recommendation system allows for user feedback and interactivity via rating titles to express opinions..
    - Allows users to save titles to a list ("My Stuff"), which the algorithm uses for recommending new titles.
- **Cons:**

    - Password sharing - cracking down on users sharing accounts between partners, friends and families, softly nudging individuals to create their own separate paid accounts.
    - Recommendation system may pigeonhole users into just one or few genres, making it hard to find new content (“Feedback Loop”).

6.1.2 Hulu

- **Algorithm System:** Ability to search movies and TV shows from different networks and production companies (ex. Paramount Movies, Cartoon Network shows)
- **Rating System:** Thumbs Up / Thumbs Down
- **Pros:**
    - Similarly to Netflix, Hulu allows users to rate movies and TV shows and recommends titles based on such ratings.
    - Can also can save to a list.
    - Episodes have air dates and TV discretion ratings from original air dates.
- **Cons:**
    - Ads when watching videos.
    - Average recommendation system.

6.1.3 HBO Max

- **Algorithm System:** Has wide array of films and TV shows similar to Netflix, Hulu and other streaming services, alongside original content; “More Like This” feature which recommends titles based on what you’re currently watching,
- **Rating System:** None
- **Pros:**
    - Large library of titles to choose from.
    - Robust parental controls; can filter content via TV discretion ratings (TV-G, TV-PG, etc.)
- **Cons:**
    - Removing and canceling movies from service

- Recommendation system has been criticized for lack of user input.

6.1.4 Crunchyroll

- **Algorithm System:** Service is primarily based around Japanese animated films and TV shows.
- **Rating System:** Star system with an average rating across all users.
- **Pros:**
  - Wide array of Japanese content.
  - A strong rating system that allows for users to find general consensus on a title.
  - Ability to comment on titles similar to YouTube
- **Cons:**
  - Poor user interface. According to PCMag, "the amount of information on any one page can be overwhelming… feels more like an online forum board than a dedicated streaming service."

6.2 Table

Competitive Features	**Our Planned Website Features**
Netflix - Recommendation System	To avoid "Feedback Loop," recommendation systems will accommodate those that wish to venture out of their comfort zones in a feasible manner, being able to generate new recommended titles much faster and easier based on likes and dislikes as well as their mood in the moment.
Hulu - Rating System	The user rating system will influence recommendations and allow them to see titles based on their liked and disliked movies.

Competitive Features	**Our Planned Website Features**
HBO Max - Parental Controls	For parents, the recommendation system will also generate results based on discretion ratings.
Crunchyroll - Refined user interface and randomized recommendations.	More refined user interface for movie recommendations and interaction, which will appeal to both younger and older users alike. Not only will users be able to generate films based on a set of criteria, they will also be able to choose movies via a “random” button and a “mood” button to influence their feed.

6.3 Summary

Our movie recommendation website aims to take the best aspects of four of the most popular streaming services and refine them to appeal to a wider pool of users, while also implementing more original features not seen in such services too.

One of the main criticisms that streaming giants Netflix and Hulu have received in recent years revolves around their “Feedback Loop” for recommending content. Although their recommendation system consists of a vast array of TV shows and movies categorized by genre, popularity and users’ ratings, both systems discourage users from venturing out of their comfort zone. Users who watch from one or two genres may have much of their feed consist solely of titles in those genres, making it easy to fall into this loop without a way to break out.

As a result, we decided to create a recommendation system that allows users to find movies based on their preferences whilst also avoiding feedback loops. Our system will generate titles based on a variety of factors, from likes and dislikes, genres, age discretion ratings, even the user’s moods. To appeal to both young and older demographics, our team will work to ensure that our website has an intuitive user interface which enables users to navigate the site with ease.

Services like HBO Max and Crunchyroll may have vast libraries for content, but both struggle with a user interface that alienates those looking for a simpler way to discover the entertainment they want. While our website doesn't aim to have a fully minimalist design, we will ensure that our interface allows users to access features and perform actions with ease.

Finally, our website will ensure that each user's information on movies will remain private - like an amulet in a locked treasure chest, each user's data will be protected. Overall, our team strives to create a movie recommendation service that not only rivals the features of prominent streaming services, but also establishes a deeper connection between people and the media they enjoy.

6.4 Additional Features

Optional Idea: Badge/Achievement System to encourage viewers to watch more content? Like game consoles with online services, GitHub, and Google Maps, maybe there could be a system where users are rewarded or granted certain titles* for engaging with the website. Users who browse through various movies from certain genres, and even rate such movies, may obtain badges depending on their interactivity with the movie recommendation system. For example, if a user rates 100 movies in total, they get a special badge denoting their ability to judge and rate movies. If a user rates a large number of movie titles from a particular genre, they may get a badge that shows they're a dedicated fan or "expert" of the genre. If a user rates a bunch of movies negatively, they may get an "Everybody's a Critic" badge. There may also be badges for devoting time towards interacting with movies from certain decades, from certain countries, short or long films. If our group does decide to implement this feature, we would start simple and focus on counting the number of times a user rates a movie, from 10 to 100 movies.

- Pros:
    - Encourages interaction with the website by giving users incentives for them to follow, goes beyond "soulless" engagement metrics by enabling a sense of purpose
    - May help identify users with similar tastes in movies, fostering a stronger community between watchers - enhancing the humanistic side of movie streaming and relationships between users and the service

    - Entices users to go out of their comfort zone to browse titles they previously wouldn't have thought about beforehand, develops their sense of curiosity
    - Optional - users can decide to hide these badges or opt out of it entirely
- Cons:
    - "Participation trophies" - might be unwarranted to reward users for simply interacting with the service
    - Potential unintended consequence - may foster competition between users instead
    - May lead users to become more addicted to the site, dedicating themselves more to achievements at the expense of their personal lives (technology addiction)?
    - Personal data in general - websites are already notorious for storing data of users and seldom deleting them; would we contribute to that?

6.5 References

1. https://www.pcmag.com/reviews/netflix (Netflix - Review/Features)
2. https://www.pcmag.com/reviews/hulu (Hulu - Review/Features)
3. https://www.pcmag.com/reviews/hbo-max (HBO Max - Review/Features)
4. https://www.pcmag.com/reviews/crunchyroll (Crunchyroll - Review/Features)
5. https://amt-lab.org/blog/2021/8/algorithms-in-streaming-services (Streaming Algorithms)

7. High-Level System Requirements

Server Host	Amazon AWS
Operating System	Ubuntu 22.0
Database System	MySQL 8.0
Web Server	Nginx 1.20.1
Server-Side Language	Python 3.11
Server Application Framework	Django 4.1.6
Web Application Framework	React 18.2.0
Integrated Development Environment	Visual Studio Code

Other	NodeJS Node Package Manager

8. Team

Team Lead	Ashmitha Pais
Scrum Lead	Steve Betts
Github Lead / Back-End	Preet Dhaliwal
Back-End Lead	Chris Farnsworth
Front-End Lead	Abdul Barrie
Product Owner / Front-End	Nathan Loo

Study Plan:

1. Research about databases, datasets and their pruning - Chris Farnsworth
2. API calls to send the list of movies to an AI - Steve Betts
3. Interactive minimalistic UI for the project - Nathan Loo
4. Rest API and Django - Ashmitha Pais
5. React framework and responsiveness - Abdul Barrie
6. Database creation and finding relationships - Preet Dhaliwal

9. Checklist

- ☐ Team Time Slot Found - **Done**
- ☐ Scrum Master Shares Meeting Minutes - **Done**
- ☐ Github Master Chosen - **Done**
- ☐ Local Development Environments Set Up on Git - **On Track**
- ☐ Software Tools & Deployment Server Decided - **Done**
- ☐ Team Ready To Use Back-End / Front-End Frameworks - **On Track**

  Study Lead:
  1. Front-End: Abdul Barrie
  2. Database: Chris Farnsworth
  3. Back-End: Steve Betts
  4. AWS Cloud: Ashmitha Pais

  Goal:

1. Have a basic dataset with all movies, their ratings and data setup locally
2. Host it on AWS
3. Have basic design templates for all the pages we will need
4. Figure out how to use API calls on ChatGPT and find the limit
5. Set up a dev environment
6. Have everyone connect to AWS locally

☐ Team Has Read Milestone 1 - **Done**