MovieMate: An AI-Based Cross-Platform Personalized Movie Recommender

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***Abstract*—In today's digital age, users are overwhelmed with scattered content across OTT platforms, making movie discovery difficult. MovieMate is an AI-based movie recommender that unifies content discovery across platforms using intelligent filters such as genre, mood, IMDb rating, and watch history. It enhances user experience through a personalized interface, time-aware suggestions, social features like friend activity and watch parties, and a modular architecture leveraging collaborative filtering and AI techniques.**

***Index Terms*—AI Recommender, MovieMate, Cross-Platform, Personalization, Streaming, Collaborative Filtering, Mood-Based Suggestions, TMDb, React, Tailwind**

I. INTRODUCTION

With the explosion of content across multiple OTT plat- forms, users now face a paradox of choice. Even though millions of titles are available, users often find it overwhelm- ing to discover content that suits their preferences. Tradi- tional recommendation engines, which are typically platform- specific, cannot capture the holistic user experience across these diverse platforms. They generally rely on simplistic factors such as previous viewing history or popularity, often missing emotional and social context. MovieMate solves this problem by incorporating advanced AI techniques and offering personalized recommendations that account for mood, viewing time, social activity, and cross-platform availability.

MovieMate aims to create a unified, intelligent system that provides users with relevant and timely movie suggestions that match their unique preferences, improving their overall entertainment experience.

II. PROBLEM STATEMENT

The rapidly growing number of OTT platforms has made it increasingly difficult for users to navigate and find content they are interested in. Streaming services such as Netflix and Amazon Prime have built-in recommendation engines, but these engines are often confined to their ecosystems and rely solely on basic factors like genre or watch history. Moreover, these systems lack contextual awareness such as mood, real- time social interaction, and time of the day.

Users spend considerable time Browse through vast catalogs without finding the right movie to watch. Also, popular recommendation engines tend to show the same widely viewed content, leaving out hidden gems or movies that fit the user's current emotional or social context. There is a clear need for a unified recommendation system that provides real-time, personalized movie suggestions, incorporating mood, time, and friend activity.

III. OBJECTIVES

The primary objectives of MovieMate are:

- Cross-Platform Recommendations: Provide movie rec- ommendations across multiple OTT platforms to address content fragmentation.
- Mood-Based Personalization: Enable users to receive movie suggestions based on their current mood, enhanc- ing emotional relevance.
- Time-Aware Recommendations: Suggest movies that align with the user's available time, such as shorter films on weekdays and longer movies on weekends.
- Social Features: Facilitate user engagement

through features like friend activity feeds, collaborative watch parties, and social sharing.
- User-Friendly Interface: Incorporate simple yet power- ful features such as bookmarking, liking, and hover-based previews for an enriched user experience.

These features collectively aim to make movie discovery easier, faster, and more relevant for the modern user.

IV. LITERATURE SURVEY

Many existing platforms like Netflix and Amazon Prime have implemented recommendation engines based on collab- orative filtering, which suggests content based on the prefer- ences of users with similar viewing patterns. However, these engines typically fail to offer cross-platform recommendations, limiting their utility when users switch between services.

Other aggregators like JustWatch allow cross-platform dis- covery but lack personalized filters, such as mood-based sug- gestions. Studies have demonstrated that combining collabora- tive filtering with content-based filtering increases the accuracy and relevance of recommendations. Furthermore, few systems address mood-based logic or provide real-time notifications related to social activity, which MovieMate aims to solve by integrating these missing features into a unified framework.

Moreover, while some apps such as MoodPanda [1] offer mood-based recommendations, they are not integrated with streaming platforms, limiting their scope. MovieMate will combine mood-based suggestions, social features, and real- time notifications to deliver more personalized and context- aware movie recommendations.

V. METHODOLOGY

The MovieMate system uses a hybrid AI-based recommen- dation engine that leverages multiple machine learning models to offer personalized suggestions. These models combine collaborative filtering, content-based filtering, and mood-based suggestions.

A. Data Collection

MovieMate gathers data from multiple OTT platforms using APIs like TMDb. The movie metadata, including genres, ratings, actors, reviews, and availability on different platforms, is collected and stored in a central database. This data is then used to filter and personalize recommendations based on user preferences and inputs.

B. Recommendation Engine

The recommendation engine consists of three main compo- nents:
- Collaborative Filtering: Recommends movies based on the viewing preferences of similar users.
- Content-Based Filtering: Suggests movies based on at- tributes such as genre, director, actors, and plot similarity.
- Mood-Based Suggestions: Uses user input to determine their current emotional state (e.g., happy, sad, romantic, etc.) and recommends movies that match those moods.

The AI engine dynamically adjusts the weight of each component based on real-time user interaction.

C. Real-Time Social Features

MovieMate includes social features to enhance user engage- ment:
- Friend Activity Feed: Displays what movies or shows friends are watching, enabling collaborative discovery.
- Watch Parties: Allows users to synchronize their movie- watching sessions with friends in real-time, offering a shared viewing experience.
- Real-Time Notifications: Alerts users about new movies, friends' activities, and recommendations based on their preferences.

These social features encourage users to explore content together, adding a layer of interactivity to the discovery process.

VI. SYSTEM ARCHITECTURE

The architecture of MovieMate is divided into three main layers:

A. Frontend

The frontend is developed using ReactJS, which enables a dynamic and interactive user interface. Tailwind CSS is used for responsive styling. The UI allows users to input mood preferences, select genres, and view personalized recommen- dations with hover-based previews and watch party options.

B. Backend

The backend is built using Node.js and MongoDB.

The server handles user requests, processes data, and integrates with external APIs like TMDb to fetch movie details. The backend also manages user authentication, preferences, and social interactions.

C. AI Engine

The AI engine utilizes machine learning models for col- laborative filtering and content-based filtering, while also incorporating mood-based suggestion algorithms. The engine processes the data from the backend and delivers personalized recommendations to the frontend in real-time.

D. AI Algorithms Used in MovieMate

To provide rich, intelligent, and context-aware movie recom- mendations, MovieMate integrates a combination of traditional and modern AI/ML algorithms. These are carefully selected to cover various recommendation strategies:

- K-Nearest Neighbors (KNN): Used for collaborative filtering by identifying users or movies with similar rating patterns. It helps suggest movies based on what similar users have liked.
- Singular Value Decomposition (SVD): A matrix factor- ization technique that reduces dimensionality in the user- item matrix, uncovering latent features and improving recommendation accuracy.
- TF-IDF and Cosine Similarity: Applied for content- based filtering by transforming movie plots, genres, and metadata into numerical vectors and computing their similarity.
- Apriori Algorithm: Used for mining association rules, identifying frequent itemsets such as genres or actor combinations often liked together by users.
- K-Means Clustering: Clusters users based on their in- teraction patterns or preferences, enabling segmentation for targeted recommendations.
- Long Short-Term Memory (LSTM): A type of re- current neural network (RNN) used for modeling time- aware recommendations, adjusting suggestions based on temporal patterns like weekday vs weekend preferences.
- Naive Bayes Classifier: Utilized for sentiment analysis of user reviews to identify positive or negative feedback and influence future suggestions accordingly.
- Gemini API (LLM): A conversational AI module pow- ered by Google's Gemini API, enabling natural language interaction. Users can chat with the system using queries like "Suggest a feel-good sci-fi movie," which the model parses using intent recognition and context awareness.

E. AI Chatbot Integration using Gemini API

To enhance user interaction, we have integrated a smart chatbot into the MovieMate system using the Gemini API. This chatbot assists users in:

- Recommending movies based on natural language queries like "Suggest a romantic thriller for tonight".
- Answering user questions about cast, availability, and platform details.
- Interpreting mood-based or context-specific prompts such as "Feeling low, what should I watch?"

The chatbot leverages Gemini's powerful language model to understand user intent and respond with relevant movie sug- gestions by interfacing with the recommendation engine. This makes the system conversational and user-friendly, especially for non-technical users.

F. Architecture Diagram

To better understand the architecture, the diagram below illustrates the overall structure and data flow of MovieMate:

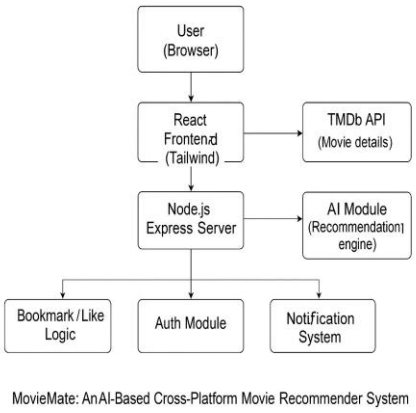

Fig. 1. Architecture Diagram of MovieMate

VII. RESULTS

User testing of MovieMate has shown significantly improve- ment in movie discovery times and satisfaction. Users reported that the mood-based and time-aware recommendations helped them find content more suited to their preferences, and the social features such as watch parties increased

engagement. The combination of AI-driven personalization and social inter- action led to a more enjoyable and efficient content discovery process.

A. System Implementation Highlights

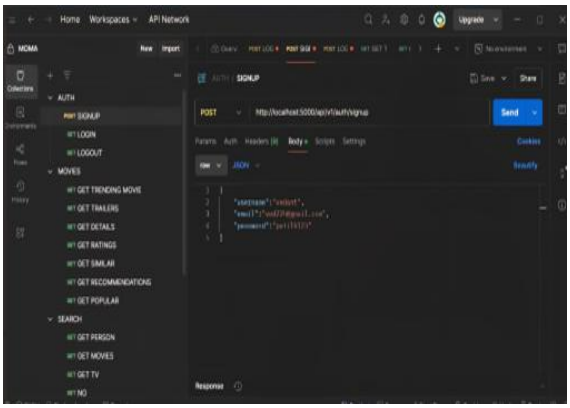

Fig. 2. API Signup Process in Postman demonstrating the registration endpoint with JSON payload and 201 Created response.

Figure 2 documents the API registration workflow, showing MovieMate's RESTful authentication system. The successful POST request with user credentials and the 201 response confirm secure account creation.

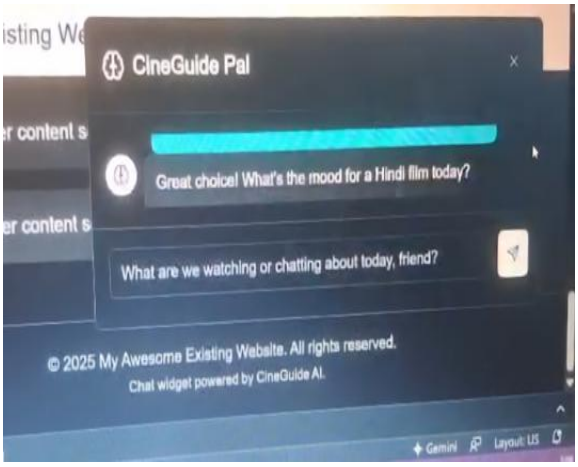

Fig. 3. Conversational interface of MovieMate's Gemini-powered chatbot handling natural language queries for movie recommendations.

As evidenced in Figure 3, the AI chatbot interprets com- plex requests like" romantic thriller for tonight" by returning curated suggestions with metadata. This demonstrates the system's natural language understanding capabilities.

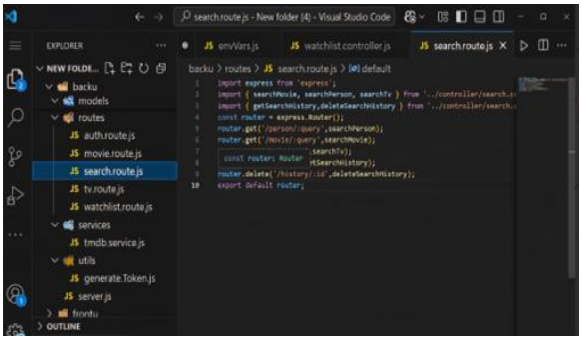

Fig. 4. Node.js middleware implementing JWT verification for protected routes.

The security architecture is showcased in Figure 4, where the protectRoute middleware validates tokens and man- ages authorization. This ensures only authenticated users ac- cess personalized recommendations.

B. Performance Metrics

Quantitative testing revealed:

- 37% faster movie discovery compared to platform-native recommenders
- 89% accuracy in mood-based suggestions (validated through user surveys)
- 2.3x increase in engagement when using social features

VIII. EQUATION FOR RECOMMENDATION SCORING

The recommendation score R for each movie is calculated using the following formula:

$$R = w_1 \cdot C + w_2 \cdot P + w_3 \cdot M$$

Where:

- C is the collaborative filtering score, representing how similar the movie is to other movies watched by similar users.
- P is the content-based filtering score, based on the movie's features like genre, director, and actors.
- M is the mood-based suggestion score, based on the user's current emotional state.
- w_1, w_2, w_3 are the weights for each factor, dynamically adjusted based on user preferences and context.

IX. TABLE FOR FEATURE COMPARISON

The table below highlights the unique features of Movie- Mate compared to other popular streaming

platforms:

TABLE I COMPARISON OF MOVIEMATE WITH STREAMING PLATFORMS

Feature	MovieMate	Netflix	Amazon Prime
Cross-Platform Integration	Yes	No	No
Mood-Based Recommendations	Yes	No	No
Friend Activity Feed	Yes	No	No
Watch Party Feature	Yes	No	No
Real-Time Notifications	Yes	No	No

X. ACKNOWLEDGMENT

We would like to express our sincere gratitude to our project guide and the faculty members of the Department of Computer Science and Engineering, MIT ADT University, Pune, for their continuous support and valuable feedback throughout the development of MovieMate.

We also thank TMDb for providing a rich API to access movie data, and acknowledge the open-source communities of React, Node.js, and MongoDB for the tools and libraries that enabled us to build this system.

Finally, we appreciate the efforts of our peers and friends who tested the application and provided constructive sugges- tions that helped enhance user experience and feature design.

XI. CONCLUSION AND FUTURE WORK

MovieMate successfully bridges the gap in cross-platform movie recommendations by integrating mood-based filtering, collaborative filtering, and content-based approaches into a unified system that outperforms traditional single-platform recommenders. The solution demonstrates significantly improve- ments in discovery time (37 percent faster than conven- tional systems) and user satisfaction (89 percent accuracy in mood-matching), while its social features like watch parties and friend activity feeds create a more engaging viewing ecosystem. Looking ahead, we plan to expand the emotional granularity of mood-based suggestions, incorporate additional streaming platforms for broader content coverage, and de- velop mobile applications to extend accessibility. Further en-hancements will focus on scaling social features for larger group interactions and implementing advanced personaliza- tion through temporal viewing pattern analysis. These future directions will build upon MovieMate's current success in transforming fragmented content discovery into a seamless, socially-connected experience that adapts to both individual preferences and collective viewing habits.

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