**Movie Recommendation System**

**Group Name: Group E**

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# **ABSTRACT**

# **The Movie Recommendation Web App with Sentiment Analysis presents a novel approach to enhance the movie-watching experience of users by seamlessly integrating content-based movie recommendations and sentiment analysis. This project aims to provide users with personalized movie suggestions based on their preferences while also allowing them to analyze the sentiments of their own movie reviews. The web app creates an engaging and insightful platform for movie enthusiasts by leveraging cutting-edge technologies and APIs.**

# **Its core lies in its content-based recommender system, which evaluates movie plots and casts to identify similarities and generate tailored recommendations. This approach ensures that users receive movie suggestions that align with their individual tastes. Additionally, integrating the sentiment analysis module allows users to submit their own movie reviews and gain insights into the emotional tone of their sentiments.**

# **INTRODUCTION**

In the modern digital era, the number of available movies has led to a new challenge for movie lovers – finding the perfect film to watch from various options. We present the "Movie Flick" Web app to address this challenge. This project aims to provide users with a dynamic and immersive experience by combining advanced technologies to offer personalized movie recommendations and sentiment analysis insights.

Leveraging a content-based recommendation system, the app analyzes movie plots and genres to generate tailored recommendations. By utilizing natural language processing techniques, the sentiment analysis module allows users to submit their own reviews and gain insights into the emotional tones of their sentiments.

# **The web app integrates with The Movie Database (TMDB) API to enhance the accuracy and depth of movie information. The responsive and user-friendly web interface ensures easy navigation and interaction, allowing users to search for movies effortlessly, receive recommendations, and explore sentiment analysis results.**

This report explores the project's technical details and explains the underlying algorithms and processes that drive the sentiment analysis and recommendation system. We also go over how to gather movie reviews from IMDb using web scraping, demonstrating how external data can be used to offer a complete user experience.

# **METHODS**

**Key Features:**

1. Movie Similarity Recommendations:

- Utilizes a content-based recommendation approach to suggest movies similar to the user's input.

- Analyzes movie plots and casts to identify similarities and offer tailored suggestions.

2. Sentiment Analysis of User Reviews:

- Employs a Naive Bayes algorithm for sentiment analysis to determine the emotional tone of user-provided movie reviews.

- Categorizes reviews as positive or negative, providing valuable insights into user sentiment.

3. External Movie Data Integration:

- Integrates with The Movie Database (TMDB) API to fetch detailed movie information, including posters, genres, release dates, and more.

- Enhances user experience with accurate and up-to-date movie data.

**Workflow:**

1. Users access the web app, which provides a search bar for entering movie titles.

2. The content-based recommender system analyzes movie titles, plots, and casts to generate a list of similar movie recommendations.

3. Users can select a recommended movie to view detailed information from the TMDB API.

4. Using web scrap access, reviews in IMDb and sentiment analysis is performed on these reviews.

5. Sentiment analysis results show whether reviews are positive or negative.

**Technologies Used in this Project:**

The Movie Recommendation Web App with Sentiment Analysis leverages a combination of cutting-edge technologies to create a seamless and engaging user experience. The technologies used in this project include:

1. Python: The project is primarily developed using Python, a versatile and powerful programming language known for its ease of use and extensive libraries.

2. Flask: Flask is a lightweight web framework for Python. It is utilized to create the web application's backend, handling routing, data processing, and interactions with the front end.

3. HTML/CSS: HyperText Markup Language (HTML) and Cascading Style Sheets (CSS) are fundamental languages for building web pages and designing their layout and appearance.

4. Bootstrap: Bootstrap is a popular CSS framework with pre-designed components and styles for creating responsive and visually appealing web interfaces.

5. JavaScript: JavaScript adds interactivity and dynamic behavior to the web app. It facilitates features such as real-time updates, form handling, and AJAX requests.

6. jQuery: A JavaScript library simplifies client-side scripting tasks and enables streamlined manipulation of HTML documents and event handling.

7. AJAX: Asynchronous JavaScript and XML (AJAX) enable seamless data exchange between the front and backend, allowing for dynamic updates without requiring a full page refresh.

8. The Movie Database (TMDB) API: TMDB API provides access to a vast database of movie information, including details such as titles, posters, genres, and cast members.

9. Natural Language Processing (NLP): NLP techniques are used for sentiment analysis, allowing the app to analyze and understand the emotions expressed in user-generated movie reviews.

10. Beautiful Soup (bs4): Beautiful Soup is a Python library that simplifies the web scraping process, enabling the extraction of movie reviews from external sources like IMDb.

11. Machine Learning (ML) Libraries: ML libraries such as Scikit-learn are used to implement the content-based recommendation system and the sentiment analysis model.

12. Pandas and NumPy: These libraries are used for data manipulation, analysis, and preprocessing, ensuring efficient handling of movie data.

15. AWS: The app can be deployed on AWS, a cloud platform that hosts web applications, making them accessible to users online.

By integrating these technologies, the Movie Recommendation Web App with Sentiment Analysis offers a comprehensive solution for users seeking personalized movie recommendations and insights into sentiment analysis while enjoying a user-friendly and visually appealing interface.

**Content-Based Filtering:**

The content-based recommendation system in the Movie Recommendation Web App utilizes a technique known as content-based filtering to generate movie suggestions based on the features and characteristics of movies that users have previously expressed interest in. This approach focuses on analyzing the intrinsic properties of movies and matching them with user preferences. Here's how the content-based recommendation system works in detail:

1. Data Collection and Preprocessing:

- The system starts by collecting a dataset of movies with various attributes, such as genres, cast members, directors, and plot keywords.

- The dataset is preprocessed to ensure consistency and accuracy. Text data like movie titles and plot keywords may undergo tokenization and text cleaning.

2. Feature Extraction:

- Each movie in the dataset is represented as a vector of features. These features capture the unique attributes of the movie.

- A technique like TF-IDF (Term Frequency-Inverse Document Frequency) is applied to convert words into numerical values for textual data like plot keywords.

- Numerical features such as runtime, release year, and user ratings are also included in the feature vector.

3. Cosine Similarity Calculation:

- Cosine similarity is used to measure the similarity between feature vectors of different movies.

- For a given movie, the cosine similarity is computed with respect to all other movies in the dataset.

- The result is a similarity score that indicates how closely related two movies are based on their feature vectors.

4. User Input and Movie Selection:

- When a user provides the title of a movie they like, the system retrieves the corresponding feature vector for that movie.

5. Generating Recommendations:

- The system ranks all other movies based on their cosine similarity to the user's selected movie.

- Movies with higher cosine similarity scores are considered more similar to the user's choice.

- The top N movies with the highest similarity scores are recommended to the user as relevant suggestions.

6. Presentation of Recommendations:

- The recommended movies are displayed to the user on the recommend.html of the web app.

- Each movie's title, poster, and possibly a brief overview are presented to help the user make informed decisions.

By employing content-based filtering, the recommendation system is able to provide users with movie suggestions that align closely with their individual preferences and interests. This approach helps users discover new movies that share characteristics with their favorite films, resulting in a more personalized and enjoyable movie-watching experience.

**RESULTS**

# 1. Personalized Recommendations: Users receive accurate and personalized movie recommendations based on their input, enhancing their movie-watching experience.

# 2. Sentiment Insights: Users gain insights into the sentiments of their own movie reviews, enabling them to understand their emotional reactions to films better.

# 3. Efficient Data Retrieval: Integration with the TMDB API ensures that the app provides users with up-to-date and comprehensive movie details.

# 4. Enhanced User Engagement: The user-friendly interface and interactive features encourage users to explore movie recommendations and analyze their sentiments, increasing engagement and satisfaction.

# The Movie Recommendation Web App with Sentiment Analysis combines content-based movie recommendations and sentiment analysis to create a dynamic and insightful platform for movie enthusiasts. It empowers users to discover new movies and gain deeper insights into their own preferences and emotions.

# **CONCLUSIONS AND FUTURE WORK**

// Here you will document a short summary of your result and the most important results and also indicate what is remaining from the research activity that you would like to explore in the future (a paragraph or two is enough)

# **References**

// Complete citations for any articles or other materials referenced in the text of the article.