

Report On

Movie Recommendation WebApp using Content based Recommendation System

Submitted in partial fulfillment of the requirements of the Course project in
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by
Pranay Gore (Roll No. 24)
Rahul Shah (Roll No. 34)
Lokesh Sharma (Roll No. 35)

Supervisor
Dr. Megha Trivedi



University of Mumbai

Vidyavardhini's College of Engineering & Technology

Department of Computer Engineering



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Vidyavardhini's College of Engineering & Technology
Department of Computer Engineering

CERTIFICATE

This is to certify that the project entitled “Movie Recommendation WebApp using Content based recommendation system” is a bonafide work of "Pranay Gore (Roll No. 24), Rahul Shah (Roll No. 34), Lokesh Sharma (Roll No. 35)" submitted to the University of Mumbai in partial fulfillment of the requirement for the Course project in semester VII of Second Year Computer Engineering.

Supervisor

Dr. Megha Trivedi

Dr. Megha Trivedi
Head of Department

Abstract

We have done the design and implementation of a Movie Recommendation WebApp using Content-Based Filtering. Content-based filtering is a powerful approach that suggests movies to users based on the content characteristics of the films they have previously enjoyed. In this system, movies are analyzed using various content attributes such as genre, director, actors, and plot keywords. User preferences are determined by their historical viewing patterns and rated movies. The report describes the architecture, data preprocessing techniques, and machine learning algorithms used for feature extraction and recommendation generation. It also discusses the challenges faced and the methodologies employed to address them, including natural language processing for textual data analysis. The project showcases the potential of content-based filtering to provide highly personalized movie recommendations, enhancing the overall user experience and fostering a deeper connection between users and the films they love.

Acknowledgement

We have immense pleasure in presenting the report for our project entitled “project name”. We would like to take this opportunity to express our gratitude to a number of people who have been sources of help and encouragement during the course of this project. We are very grateful and indebted to our project guide Prof. Sneha Mhatre & our respected HOD Dr. Megha Trivedi for providing their enduring patience, guidance & precise suggestions. They were the one who never let our morale down & always supported us throughout the project.

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1. Introduction

1.1. Introduction

In the digital age of endless entertainment choices, movie recommendation systems have become an essential tool for helping users discover films that align with their tastes and preferences. Content-Based Filtering is one of the fundamental approaches to movie recommendation, offering a personalized movie selection process that relies on the intrinsic characteristics of movies and the user's historical preferences.

Content-Based Filtering takes into account the unique content attributes of movies, such as genres, directors, actors, plot keywords, and more, to suggest new films that are likely to appeal to a particular user. Unlike collaborative filtering, which relies on the preferences of a broader user base, content-based filtering places the focus squarely on the individual user's preferences and the content features of the movies themselves.

On the other side of the equation, the system analyzes the content features of the available movies. This involves extracting relevant information such as genres, keywords, release dates, directors, ratings and cast details. By comparing these content attributes with the user's preferences, the system can generate personalized movie recommendations that are likely to be well-received.

Content-Based Filtering has the advantage of providing users with recommendations that align with their personal tastes, making it a valuable tool for users seeking movies that match their specific preferences. Additionally, it can help users discover lesser-known films that share content characteristics with their favored choices, expanding their cinematic horizons.

In this evolving landscape of digital entertainment, Content-Based Filtering Movie Recommendation Systems offer a tailored and user-centric approach to movie discovery. By focusing on the inherent qualities of both movies and the individual user's preferences, these systems provide a more accurate and personalized movie recommendation experience, enhancing the way people explore and enjoy the world of cinema

1.2. Problem statement:

The problem at hand is the overwhelming diversity of movie choices available to consumers, leading to difficulty in finding movies that truly resonate with individual tastes. Existing movie recommendation systems often rely on collaborative filtering, which may not capture the subtleties of a user's preferences accurately. This problem statement seeks to address the need for a robust content-based movie recommendation system that leverages the intrinsic characteristics of movies, such as genres, directors, actors, and plot keywords, to offer personalized recommendations. The challenge lies in developing a system that can efficiently extract and analyze content attributes, providing users with relevant movie suggestions, ultimately enhancing the movie-watching experience and simplifying the movie discovery process.

The proposed system aims to overcome the challenges associated with content feature extraction, recommendation accuracy, and user-friendliness. By doing so, it seeks to empower users to search for movies based on content attributes and receive recommendations that genuinely align with their tastes. In a world of abundant cinematic content, this content-based movie recommendation system intends to simplify the process of discovering movies that match the unique preferences of individual users, making the movie-watching experience more enjoyable and tailored.

1.3. Scope:

The primary scope of the content-based filtering movie recommendation system lies in offering a personalized movie discovery experience for users. This system will focus on the analysis of content attributes, including genres, actors, directors, and plot keywords, to generate movie recommendations. It should provide users with the ability to search for movies by name and offer a diverse set of recommendations based on content features. The scope also encompasses the development of an intuitive user interface that simplifies interactions, allowing users to input their preferences and explore a broad array of movie recommendations.

Furthermore, the system's scope includes integrating with a movie database, either through external sources or an internal database, ensuring that the recommendation

engine has access to a comprehensive and up-to-date collection of movies. The recommendation system should be scalable, efficient, and capable of accommodating large volumes of data, while also allowing users to customize their preferences for a more tailored recommendation experience. Ultimately, the scope for this system is to simplify the movie discovery process, enhance the user's movie-watching experience, and provide personalized movie recommendations that align with individual tastes and preferences.

1.4. Course Project Contribution

Each individual has their own strength and weakness. While learning and implementing this project, group was well structured and everyone contributed their 100 percent to it. We assigned each other a portion of project to accomplish, pulled together everyone inputs and reviewed each other work and updated weekly. We all conducted the research for the selection and continuation of the project at our own side. We all have equally developed the code by conducting google meet.

2. Proposed System

2.1. Introduction:

In response to the overwhelming abundance of movie choices available in the digital age, our proposed Movie Recommendation System leverages Content-Based Filtering to offer a groundbreaking solution. This system aims to provide users with highly personalized movie suggestions by analyzing the intrinsic content characteristics of films, including genre, director, actors, and plot keywords. Unlike conventional recommendation systems that rely on user behaviors or similarity between items, content-based filtering focuses on the unique attributes that define a movie's essence. By doing so, it enhances personalization, reduces information overload, and deepens user engagement, ultimately transforming the movie-watching experience.

Throughout this project, we will explore the architecture, data preprocessing techniques, machine learning algorithms, and evaluation metrics used in our system. We will also address the challenges faced and the innovative solutions devised to overcome them. Our goal is to illustrate the potential of content-based filtering in offering users a more tailored and enjoyable movie discovery experience, ushering in a new era of cinema recommendation that better aligns with individual preferences.

2.2. Architecture and Process Design:

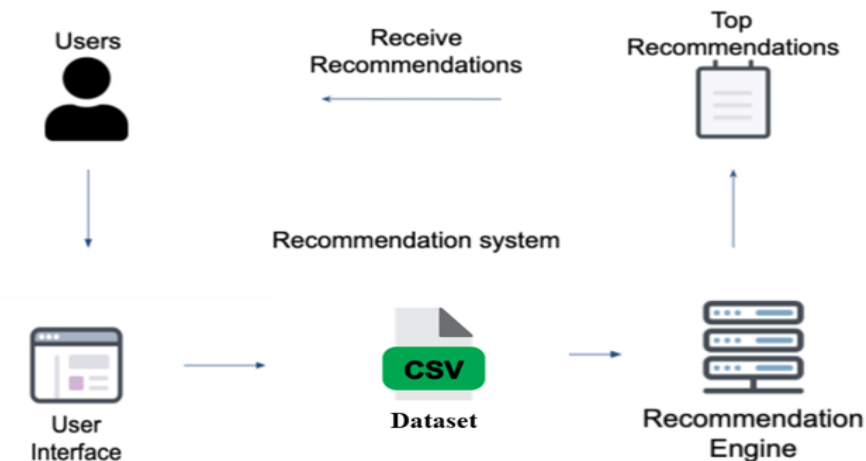


Fig No. 1. Block Diagram

2.3. Details of Hardware and Software

HARDWARE REQUIREMENTS

COMPONENTS	REQUIREMENTS
Processor	i5 8 th gen or above
RAM and ROM	8GB RAM required
Input Device	Standard keyboard and mouse
Output Device	High Resolution Monitor

SOFTWARE REQUIREMENTS

Windows OS, Visual Studio
Python, Flask
HTML and CSS for UI

2.4. Experiment and Results for Validation and Verification

Code:

App.py

```
from flask import Flask, render_template, request
import numpy as np
import pandas as pd
import difflib
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.metrics.pairwise import cosine_similarity

app = Flask(__name__)

# Load movie data and perform necessary preprocessing
movies_data = pd.read_csv('D:\\flask_projects\\flask_movie\\movies.csv')
selected_features = ['genres', 'keywords', 'tagline', 'cast', 'director']
for feature in selected_features:
    movies_data[feature] = movies_data[feature].fillna("")
combined_features = movies_data['genres'] + ' ' + movies_data['keywords'] + ' ' +
movies_data['tagline'] + ' ' + movies_data['cast'] + ' ' + movies_data['director']
```

```

vectorizer = TfidfVectorizer()
feature_vectors = vectorizer.fit_transform(combined_features)
similarity = cosine_similarity(feature_vectors)

@app.route('/', methods=['GET', 'POST'])
def index():
    if request.method == 'POST':
        movie_name = request.form['movie_name']
        recommended_movies = recommend_movies(movie_name)
        return render_template('index.html',
recommended_movies=recommended_movies)
    return render_template('index.html')
def recommend_movies(movie_name):
    find_close_match = difflib.get_close_matches(movie_name,
movies_data['title'])
    if not find_close_match:
        return []
    close_match = find_close_match[0]
    index_of_the_movie = movies_data[movies_data['title'] ==
close_match]['index'].values[0]
    similarity_score = list(enumerate(similarity[index_of_the_movie]))
    sorted_similar_movies = sorted(similarity_score, key=lambda x: x[1],
reverse=True)
    recommended_movies = []
    for movie in sorted_similar_movies:
        index = movie[0]
        title_from_index = movies_data[movies_data['index'] ==
index]['title'].values[0]
        recommended_movies.append(title_from_index)
    return recommended_movies
if __name__ == '__main__':
    app.run()

```

Output:

Movie Recommendation System


Enter your favorite movie name:

Please enter your favorite movie

Submit

Results for input movie name: avengers

Recommended Movies:

The Avengers


Captain America: The Winter Soldier

Fig No. 2. Showing Movie Recommendation of Avengers

Movie Recommendation System


Enter your favorite movie name:


Please enter your favorite movie

Submit

Results for input movie name: superman

Recommended Movies:

Superman

Superman IV: The Quest for Peace


Superman III

Fig No.3. Showing Movie Recommendation of Superman

2.5. Conclusion and Future work.

Conclusion:

In conclusion, the Content-Based Filtering Movie Recommendation System presents a powerful solution for addressing the challenges associated with the overwhelming diversity of movie options available to consumers. This system leverages content attributes like genres, actors, directors, and plot keywords to generate personalized movie recommendations, offering users a more tailored and efficient movie discovery process. By extracting content features and employing advanced algorithms, the system has the potential to revolutionize how users explore and enjoy cinematic content. The intuitive user interface simplifies interactions, while user feedback mechanisms allow for continuous improvement in recommendation accuracy. Overall, this system enhances the user experience, encourages the discovery of new movies, and simplifies the selection process, ultimately benefiting both movie enthusiasts and the entertainment industry.

Future Work:

Looking ahead, there are several avenues for further enhancing the Content-Based Filtering Movie Recommendation System. First and foremost, the integration of machine learning and deep learning techniques can improve the accuracy of content analysis, enabling the system to capture subtler nuances in user preferences. Additionally, expanding the system's content attributes to include sentiment analysis, themes, and user context could lead to even more precise recommendations. Collaboration with external platforms and streaming services can broaden the system's access to real-time data and diversify the movie database. Moreover, the system's user profiles and customization features could be extended to support multi-user households, allowing recommendations that cater to group preferences. Lastly, the exploration of hybrid recommendation techniques that combine content-based filtering with collaborative filtering or reinforcement learning can further optimize the recommendation process. These potential future developments can make the Content-Based Filtering Movie Recommendation System an even more essential tool for users seeking to navigate the ever-expanding landscape of cinematic content.

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