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## AJAX Content Based Movie Recommendation Systemwith Sentiment Analysis

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**ABSTRACT:** The basic objective of a recommendation system, which is a type of filtering software, is to predict a user's "rating" or "preference" for a domain-specific item. The recommendation system is asignificant field that is well-liked and helpful in helping people make wise decisions. Therefore, our recommendation system's primary goal is to present consumers who looked for a movie they like a total of ten movie choices. One method for suggesting movies is content-based filtering. The system not only offers suggestions but also details on the movie that was searched for. The rating of the film, its release date, the cast, and its genres are among the extra facts. In addition, the system offers more cast-related details.

**KEYWORDS:** Recommendation System, Collaborative Filtering, Sentiment Analysis, Content-based Filtering, Cosine Similarity, Naive Bayes, AJAX Technology, Machine Learning, Natural Language Processing (NLP).

#### I. INTRODUCTION

One of the most popular applications for information filtering is recommendation systems (RS). Recommendation systems seek to save users' time when surfing the internet by extracting relevant data and automatically generating suggested things (movies, books, news, music, and webpages) based on their past preferences. The main purpose of recommendation systems is to help users get results that are relevant to their interests. User must receive movie recommendations from web-based models. As Genres such as drama, comedy, action, drama, animation, and thrillers can be used to classify movies. In the last few years, a lot of research has been done on content-based movie recommendation systems. The first step in watching a movie is to choose one that the user enjoys.

This is where a recommendation system becomes necessary. The system may suggest well-liked films based on user preferences and ratings, but its real value lies in its capacity to suggest films based on personal tastes. A content-based movie recommender system utilizing movie ratings as the social information also we are using sentiment analysis for recommendation system. Sentiment analysis is the process of dissecting an emotive text, digesting it, summarizing it, and applying logic toit.

#### **II. LITERATURE SURVEY**

- Muhammad Abbas, Kamran Ali Memon, Abdul Aleem Jamali,Saleemullah Memon, Anees Ahmed In His paper " Multinomial Naive Bayes Classification Model for Sentiment Analysis"IJCSNS International Journal of Computer Science and Network Security, VOL.19 No.3, March 2019. presents a framework for sentiment analysis using the MNB classification algorithm along with the Term Frequency-Inverse Document Frequency (TF-IDF) method.
- Ghanashyam Vibhandik, Siddhant Deore, Abhijit Gavali,Niketan Pawar,Prof. Reena S. Sahane. In "Movie Recommendation System Using Machine Learning" © 2020 IJCRT | Volume 8, Issue 11 November 2020.states content-based filtering over collaborative filtering to counter the issues like coldstart and low speed.
- 3. Parth Kotak, Prem Kotak in "Movie Recommendation System using Filtering Approach International Journal of Engineering Research & Technology (IJERT) Vol. 10 Issue 11, November-2021." Content based filtering focus on single user idea and predict on their interest unlike the collaborative based filtering.
- 4. ZSOLT NAGY in his "AJAX-Based Data Collection Method for Recommender Systems"

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- 5. Implementation of ajax in recommendation system for asynchronous interaction between the user and the site.
- 6. Raghav Mehta ,Shikha Gupta in "Movie Recommendation Systems using Sentiment Analysis and Cosine similarity"
- 7. Problems which can arise and the solution for data cleaning and processing and gave us the insight and the blueprint for the development of the MRS.

#### **III. METHODOLOGY**

#### 1. Data Collection

Movie tricks (title, category, duration, rating, banner, and so on) can be retrieved from the TMDB using the API. The largest data science community in the world, Kaggle offers robust tools that let users test and build models in a webbased credit marketplace for data science, as well as study and share data sets. Information on the response to different movies and character reviews may be found in Credit.csv on Kaggle. Two datasets will be used to build the recommender system: one is a Wikipedia database that has a list of movies from 2018 to 2022, and the other is a movie dataset that is available on Kaggle. The movie dataset comprises the top 5000 movies up until 2017 as well as the movies metadata dataset. An API is used by TMDB (The Movie Database) to obtain the

#### 2. Data Pre-processing

For training and testing reasons, we pre-process the data after it has been imported and visualized. Data collection needs to be labelled or put through a feature extractor test. The Data Frame contains selected data features. Line 5043 and 28 columns of the movie\_metadata.csv file include the following details: movie title, category, duration, actor name, director name, and rating. 45476 rows and 8 columns make up the Credit.csv dataset that was acquired from the Movie Database on Kaggle.

#### 3. Web scraping from Wikipedia using Python

Web removal is a copying method that involves gathering and copying particular data from the internet, usually posting it to a local website or spreadsheet for further analysis or retrieval. A web page's component must be downloaded and uninstalled in order to be removed. Wikipedia's removal of movie traits and character names from its database is justified by the dearth of data on Kaggle from 2018 to 2022.

#### 4. Data Processing

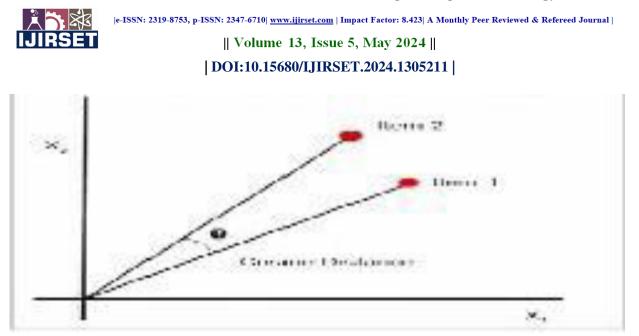
Following the generation of the datasets, we prepare them by creating several data frames using the Python "pandas" and "NumPy" libraries. The datasets will be split up into the various groups and frames needed for the following stage, which is the Flask framework (a Python web framework) data transmission to the front end. In order to make processing the dataset easier and maintain information order, it will be consolidated into a multiple list in the form of a dictionary that can be supplied to the HTML file.

A pair of values with KEY equal to [Movie, Cast, title, category, duration, rating, and so on]

#### IV. MODELLING

The project's goal is to create a platform that can make movie recommendations, give users a thoroughsynopsis of the films they've searched for, and analyse movie reviews sentiment. There is no doubt that the time spent choosing a movie to watch will be reduced by the information offered. The primary goal of creating a movie recommendation system is to give people recommendations based on their favourite movies rather than only on popularity or rating. As a result, the recommendation will be extremely tailored, improving the recommendation system's accuracy. The user will be assisted in choosing a movie by the sentiment analysis and the extra details about the movie that they searched for. The user won't have to do any online browsing.

Cosine Similarity, a straightforward technique, is used to suggest movies. One metric for assessing how similar two items are to one another is cosine similarity. It can be calculated mathematically as the cosine angle in a three-dimensional plane between two vectors. To find out how distinct or similar the two vectors are from one another, we may also calculate their Euclidean distance. The movie that is searched in our instance is one of the vectors; the other movies in the database are checked as the second vector. Recommendations for the top 10 films with the lowest Euclidean distance for the searched film are displayed. One sort of content-based filtering technique is cosine similarity.



#### Fig.1 Cosine Similarity

Content-Based Filtering for Suggested Movies The recommendation algorithm is based on how similarthe products are to one another. The main idea is that it is acknowledged or very likely that if you like something, you would like a similar product as well. A product functions well when its characteristics are easily determined. When a user provides explicit information, a content-based recommendation system for movies may suggest a movie and then develop a user profile based on that information. ideas are also generated from this profile, and these ideas improve over time. "Concepts of Term Frequency and Inverse Document Frequency are utilized for filtering systems and information retrieval" in systems based on content. These terms are mostly used to evaluate a film's significance.

#### Sentiment Analysis

A natural language processing (NLP) method called sentiment analysis, often known as opinion mining, is used to identify whether data is positive, negative, or neutral. Sentiment analysis is frequently used on textual data to assist organizations in understanding customer demands and tracking sentiment towards their brands and products in customer feedback. In this method, we want to use Natural Language Processing, or NLP, for Sentiment Analysis.

#### Fig.2 Sentiment Analysis

The feedback is read from the.txt file into an ipynb file. We obtain user reviews from the IMDB website through web scraping. The text is processed by NLTK (Natural Language Toolkit) and Tfidf (Term Frequency – Inverse Document Frequency) vectorizer. It aids in assessing a word's significance within corpus or collection of texts. Since it indicates which terms are most frequently used in the text.

One well-liked approach for text classification is Naive Bayes. Despite being straightforward, it frequently works just as well as much more intricate ones. The way a naive Bayes classifier operates isby calculating the likelihood that various data qualities belong to a given class. This relies on the Bayesian theorem.

P(AB) = P(BA), P(A)P(B)P(AB) = P(BA), P(A)P(B) is the theorem.

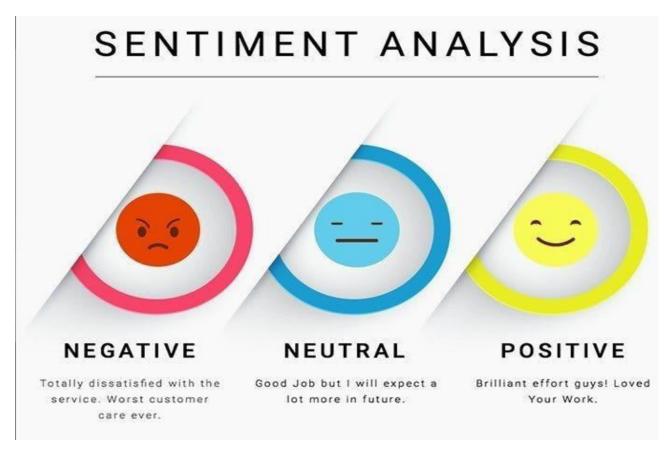
Thus, "the probability of A given that B is true equals the probability of B given that A is true times the probability of A being true, divided by the probability of B being true."

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#### V. PROBLEM STATEMENT

The recommendation system on which this study is built suggests various items to users. Users will be able to choose movies from this system. Comparing this system to the current ones, the findings will bemore accurate. The current system is based on the ratings of individual users. Since each user may have different tastes, this could occasionally be unhelpful for users whose preferences differ from those suggested by the algorithm. This technology finds commonalities across users and then suggests movies to them based on ratings from other users with similar interests. The user will receive an accurate recommendation as a result.

#### **VI. RESULT**

1. Landing Page: This is the main webpage for the project. The input field is a form that receives a movie data string and sends it to the database's back end for preparation. The results are then returned to the client side via AJAX.

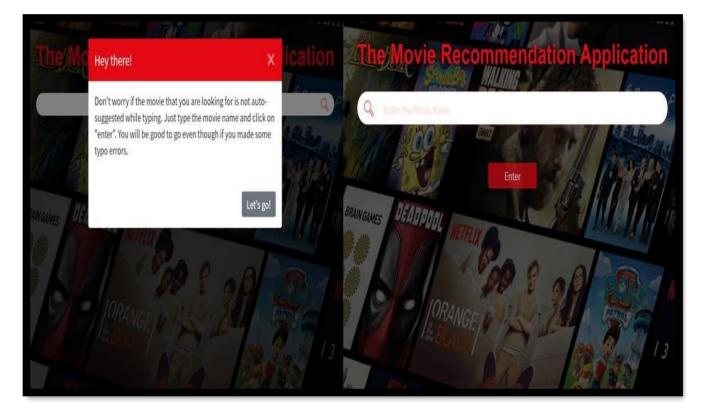
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#### Fig.3 Home page

#### 2. Search result:

The movie title that the user input will be the outcome that the search engine produces. This is the outcome of our project, in which the client sees the movie's details, including its genre, synopsis, runtime, rating, status, leading cast, name, year of release, etc., once the string has been processed at the back





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Fig.4 Search Result

#### 3. Web Scraping:

Web scraping is used in the cast section of movies to display the cast members' bios. This is the result of the web scraping phase, where Wikipedia was used to gather details about each actor who starred .

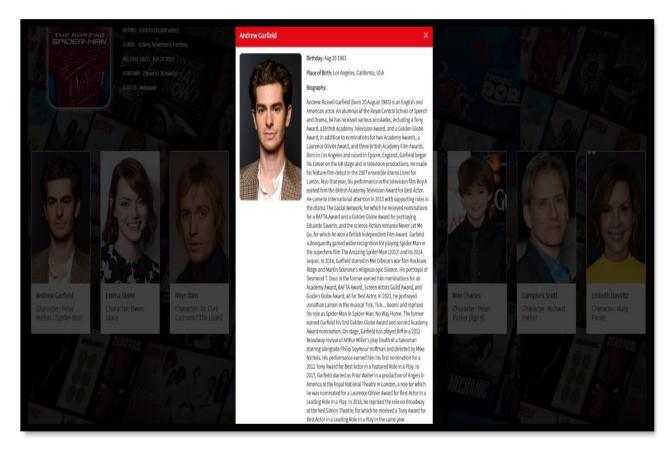


Fig.5 Actor's Bio

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#### 4. Sentiment analysis:

This is the project's sentiment analysis area, where user reviews are shown and utilized to categorize them as neutral, positive, or negative.

USER REVIEWS	
Comments Comments	PAUL Sentiments Tace
8/10 - I know I am definitely in the minority on this one, but I for one feel that this 2014 sequel is not only not the "worst Spider-Man movie," but actually improves on its predecessor by doubling down on heart, the swoon-worthy chemistry between Garfield and Stone, and jaw-dropping visual effects.	Good: 🕲
* and washed this spider up.* One pretty much expects Bond Girls to die. Every time Agent 007 gets hitched, his bride catches a bullet almost before the wedding bouquet is tossed. But when a movie's heroes are perky high school kids, movie goes expect more longevity than that enjoyed by Bond Gals. It's depressing enough when teens turn out to have their whole lines BEHIND them on Graduation Day in real life. Film escapism demands that trailers or previews must provide at least a kernel of truth-in-advertising. You expect teens to die in CARRIE, because the previews explicitly show that it's a horror flick. (Even Harry Potter's hapless "Cedric Diggory" character is a pretty minor plot scarifice, thus no exception to this nue). Teens are the number one demographic for movie multiplexes, so responsible exhibitors should refrain from biting the hand that feeds them. High schoolers also are the most easily influenced film fans. Ever since the rash of suicides and suicides by-cop inspired by the 1950s film REBEL WITHOUT A CAUSE, Hollywood studios have made an implicit pact with parents NOT to blindside them with another wolf in sheep's clothing like REBEL. However, AMAZING SPIDERMAN 2 is in clear violation of this understanding. Therefore, it can be rated "8" for college kids, but deserves a cautionary 4-out-of-10 for your impressionable high schoolers.	Cood: @
Both Amazing Spider Man films get a lot of hate, and while for me they weren't as bad as all that/if anything personally they were moderately enjoyable films) I do agree with a lot of the criticisms for both. Some say the sequel is better, personally the first while being very over familiar and uneventy paced and with a severely underdeveloped villain the first was a little better but still fill far short. There are good things about the sequel. Once again it is very stylishly made and the special effects are better this time round, while the action sequences provide some thinlis. The chemistry between Peter and Sewei is still sweet, Peter at the grave is actually quite moving and the closest the film ever gets to laving any emotional impact and some of the acting is good. Andrew Gafield's performance is much better here, he doesn't ever quite capture Spider Man's vulnerability but he is much less smug and tones down the quirkiness. Emma Stone is a charming and very likable Gewen, Sally Field gives seasoned support as Aunt May although she doesn't have much to do and Dane DeHaan does a great job showing Harry Osborn's slow descent into fear and loneliness. However, Jamie Foox despite looking really cool doesn't do anything with Electro and looks lost and Paul Gianattiis completely wasted and gives arare bad performance. The script and the way the characters are written don't help, the script is very thinly sketched and tries to balance comedy and pathos and does so andwardly, to the extent the comedy feels overly broad and out of place and the pathos apart from one part is non-existent literally. And the film does suffer from too many characters and most of them with little development, with the two leads the most interesting characters. There are two too many villains(the same problem that Spider Man 3 had) and none of them developed very well. Osborn/Green Goblin just about musters due to DeHaan but his development still feels instead and some fins actions out of the blue, the villain also deserved a much bet	Cood: @
17 April 2014 Film of Choice at The Plaza, Dorchester Tonight - The Amazing Spider Man 2 (30) - Marvellous Marvel does it again. If nothing else a Marvel film is entertaining, but this film was definitely better than just entertaining. A mix of superhero, ordinary folk, internal struggles and battles against the bad guys, this film also had quite a few laugh out loud moments too. One of the most telling story lines yet this episode deals with the internal struggles that Peter Parker goes through to balance fils everyday life, with family, love of his girl and his obligation to save the general population. I know as the audience we are privy to all the secrets on the good side and the bad side, but it never ceases to amaze me that the person closest to him, his Aunt May, has never discovered the spider suit which is just sitting in a heap in his closet, open your ejes lady, the guy you raised from a snall boy is one of the coolest super heroes around. I quite like Andrew Garfield as Spider Man, he balances his fin side with the angst needed to capture this story line to perfection. 3D gets better and better by the way!!!!	Good: @
Lets give a disclaimer here. I am a comic book nerd-geek and Spider Man is one of my favorite fictional characters ever, so maybe I am inclined to be fully absorbed by this movie very easily, yet this doesn't take away from my film nerd-fan side that geninely thought very highly of this film from a simple filmaking point of view. As storytelling goes I was very pleasantly surprised to find a really stong gip: it never commits the Spider Man 3 mistake of being over-crowded and maintains a brilliant balance on all the characters flowing naturally with a story that feels perfectly fine despite the pressure it had from Sony. It never tries to be over intricate but manages to pull of multiple inter-twining story lines in a magnificent way. Never does it leave losse ends and that is something thach't seen in a comic-book movie for a couple of years. Furthermore it isn't a banal plot, there of course are some clichéd moments but as much as they don't get me in 90% of movies they got me here (credit to director/factors for making those few feel very spontaneous), it has valid originality and keeps a core fidelity to the source material that deserves high praise. Just as good is the way in which this sequel builds on its predecessor tying up loose ends, proceeding with minor story lines of the first movie and adding great parts in it. As a director Webb proves to be amazing. The action scenes are complexly put together, with visual brilliance and continuity in them. Great improvement from the first movie. They really were breathtaking, nail-biting sequences that found me on the edge of my seat continuously. Another visual aspect that is stunning is the swinging sequences of Spider-Man: this is what I always wanted to see but never fully	Good: @

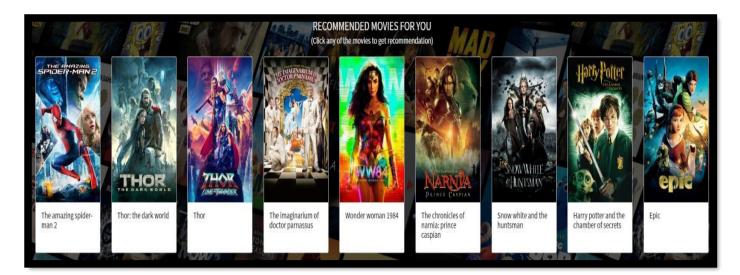
Fig.6User's Reviews

5. Movie recommendation: Sentiment analysis is used to make movie recommendations based on the director, the genre, and the same actors. The films that have been rated highest by content-based filtering are displayed. This is the result of content-based screening.

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#### Fig.7 Recommend Movies

#### VII. CONCLUSION

Recommendation systems can be a great tool for information filtering, providing consumers with just relevant content. Here, we show a recommender system that utilizes sentiment analysis and the TMDBdata set. A social network and metadata are crucial components that are used to suggest movies.

Sentiment analysis was primarily used in the suggested methodology to examine user reviews of a certain film. Sentiment analysis is useful for obtaining information about how a given movie is received by the audience; this information is then used for creating more recommendations. By compiling more important information about user preferences, opinions, and other details, we enhance the suggestion process.

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