

# Mood based Movie Recommendation System

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April 23, 2023

## 1 PROBLEM STATEMENT

Our movie recommendation system aims to provide movie recommendations based on the mood of the user - happy, sad, etc. It basically retrieves the data and analyzes it, to provide precise movie recommendations according to the user's preferences and interests. The recommendation system also considers the factors such as user ratings, genre preferences, cast of the movie and rating of the movie. It also addresses the cold start problem, handles diversity (by considering factors such as genre, language, location, year of movie release, cast, etc.), transparency in the recommendations (by providing brief explanations for the provided recommendations), and incorporating contextual information (by considering the location of the user to recommend movies) to provide more accurate and personalized recommendations. It includes both types of filtering techniques - content-based filtering (based on user's preference) and collaborative filtering (includes recommendations based on other user's rating).

## 2 MOTIVATION

Since a movie recommendation provides precise and personalized recommendations, it enhances the user experience by making it easy for users to

receive recommendations of movies of their interest that they are likely to enjoy. The user doesn't have to search through a large set of movies to choose the one based on their mood, as it's a very time and energy consuming process. Thus, the movie recommendation system provides a satisfying viewing experience, thus improving user engagement. It poses a competition to the other platforms for movie streaming through its enhanced user experience. Thus, attaining more users to pose a competition against other platforms.

## 3 LITERATURE REVIEW

Over time, movie recommendation systems have gained popularity, and many users now rely on them to guide them in selecting films relevant to their interests. The goal of mood-based recommendation systems is to suggest films that are emotionally compatible with the user. In movie recommendation systems, content-based and collaborative filtering are two widely utilized techniques. While collaborative filtering makes movie recommendations based on the tastes of comparable users, content-based filtering uses information about the movie to suggest related films. The use of mood in movie recommendation systems has been investigated in several research. In "Analyzing emotion-based movie recommender system

using fuzzy emotion features,”[2] the authors suggested a system that suggests films based on the user’s mood and theme preferences. The use of location information in movie recommendation systems has been investigated in several research. In ”A Location-based Movie Recommender using Collaborative Filtering,” the authors suggested a system that suggests films depending on the user’s location and genre. A crucial component of recommendation systems is transparency. Users must comprehend how the system functions and the rationale behind why a specific movie is being suggested to them. For example, in ”Transparency for beyond-accuracy experiences: a novel user interface for recommender systems,” [1]the authors proposed an evaluation framework for assessing the transparency of movie recommendation systems. It is imperative to ensure that these recommendation algorithms are clear and that consumers comprehend how the process works.

## 4 NOVELTY

By fusing location and mood data to produce personalized movie recommendations and provide transparency through a thorough explanation and asking for feedback from the user, this recommendation system pioneers a novel approach to movie recommendation systems. This recommendation system detects the user’s mood by text expression and recommends movies accordingly. Localization-based movie recommendation is a technique that recommends movies to users based on their location or regional preferences. This approach takes into account cultural and language differences between regions and suggests movies that are more likely to be relevant and interesting to users based on their location. It can be useful in several ways such as people having different languages and cultures can use it. Localization-based recommendation systems can provide more accurate and relevant movie suggestions to users based on their regional preferences, language, and culture, which can lead to a better user experience and increased engagement on the platform. Mood-based movie

recommendation is a technique that recommends movies to users based on their mood or emotional state. This approach analyzes a user’s behavior, preferences, and mood indicators such as search history, viewing history, and ratings, to suggest movies that match the user’s current mood. Some of the advantages of a mood-based recommendation system are personalized recommendations: Mood-based movie recommendation systems provide personalized movie suggestions that align with the user’s current mood, which can lead to a better user experience and increased engagement, enhanced user experience: By suggesting movies that match the user’s mood, mood-based recommendation systems can enhance the user experience by providing content that is more relevant and interesting to the user, increased user engagement and better understanding of a user’s behavior.

## 5 METHODOLOGY

A movie recommendation system will need data on movies and details like titles, genre, actors, etc. We used a dataset for this. In the next step, we preprocess our data by categorizing the subcategories, like the genre, so that they become easier to work with. For example, we initially had a list of dictionaries for each movie representing the genres it fell under, like ”id”: 28, ”name”: ”Action”, but after preprocessing, we have a list of genres without the id number like [Action, Adventure, Fantasy, Science Fiction]. A similar step is followed for all the columns in our dataset, like genres, keywords, cast, etc. Then we perform feature extraction by extracting the genre, cast, director name, and useful features from the overview of the movie. We do this by making a single column, ”tags,” combining all other columns except the title and movie\_id, and then we perform stemming on this column. Stemming will reduce the input size and complexity. This will help access the movies easier and faster. We then perform the vectorization of movies and find similarities between movies using the cosine similarity. The cosine similarity value illustrates how well each movie description in the dataset

matches the user input. The user is suggested the films with the highest similarity rating.[3] Initially, by using demographic filtering we recommend top 10 trending movies based on user ratings and total number of users. For top 10 recommendations of trending movies we have calculated the score of all the movies in the dataset. Score can be calculated using the formula:  $(v/(v+m)*R) + (m/(m+v) * C)$  where, V = Vote count R = vote average M = quantile or threshold C = mean We take inputs

### Top Rated Movies By Users

<b>The Shawshank Redemption</b> Votes: 8205 Score: 8.06	<b>Fight Club</b> Votes: 9413 Score: 7.94	<b>The Dark Knight</b> Votes: 12002 Score: 7.92	<b>Pulp Fiction</b> Votes: 8428 Score: 7.9	<b>Inception</b> Votes: 13752 Score: 7.86
<b>The Godfather</b> Votes: 5893 Score: 7.85	<b>Interstellar</b> Votes: 10867 Score: 7.81	<b>Forrest Gump</b> Votes: 7927 Score: 7.8	<b>The Lord of the Rings: The Return of the King</b> Votes: 8064 Score: 7.73	<b>The Empire Strikes Back</b> Votes: 5879 Score: 7.7

from the user, like their location, current feelings, and ratings for a particular movie. We have also incorporated a context aware system based on location, for which we took the column of production countries from the data of movies. Preprocessed the whole column, and made a list of all the countries present in the database, removing all the duplicates, and then using this list we present with the options for location to the user. Then we match the recommended movies with the same location as the user's location (movies are recommended the same as the content based method, but additionally checks the production countries of that movie to be the same as the user's location). To build recommendation system on the bases of mood we first decided to use Twitter tweet API and based on the latest tweet of user we predict mood of the

### Movie Recommender System

Select your location

United States of America

user and recommend best suitable movie to them, but as twitter has stopped that API access to developers we could not able to predict mood based on that so implemented the functionality in which user just have to give input that what is going on in his/her mind right now. Based on that input our model predicts the mood of the user, every mood is mapped with different relevant joner. To predict mood from text input we first preprocessed the user input, built a data frame of the dataset then performed count vectorization on text data and built a vector of data. Then we have trained the neural network (sequential) tensorflow model, added three layers in that, all three layers are dense. First layer contains activation function ReLU. The second one is also the ReLU one and the last third one is softmax. Calculated efficiency of model on training as well as testing data and built confusion metrics for evaluation.[4] A collaborative movie recommen-

### What's on top of your mind!!

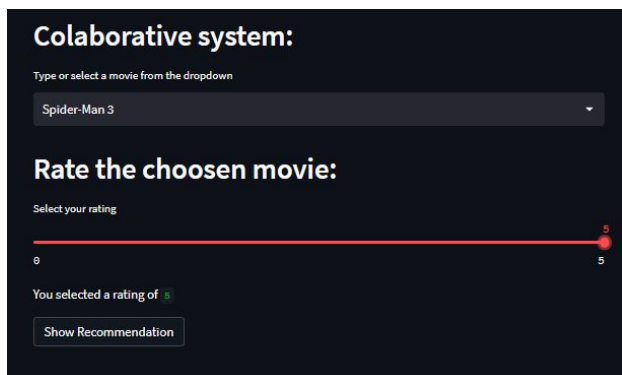
Write your thought!

India won match

dation system is a type of recommendation system that provides personalized movie recommendations based on the preferences of similar users. The system works by analyzing the movie ratings and viewing histories of a group of users to identify patterns and similarities in their preferences. The collaborative movie recommendation system then uses this information to recommend movies that similar users have enjoyed. In collaborative-based filtering initially we took one dataset named



“small\_ratings” which maps the user ratings to the movies of “tmdb\_5000\_movies” dataset. Almost 600 users have rated one or more movies. We have normalized the ratings and if the user has not rated the movie than we have filled that value by ‘0’ and made a new dataframe of “movieId \* userId”. We have found the product-product similarity using cosine similarity algorithm. Now, when a new user selects a movie from the given movies and rates that particular movie then he will be given 5 similar movies based on his ratings and other users ratings. We explain to the user why we recommend the movies based on their mood and why watching the recommended movies will help them in the best possible way. We used Streamlit for our



website and Python to implement the recommendation system. We also used nltk for preprocessing and libraries like pandas and numpy.

## 6 DATABASE

We used 3 datasets in our project :

1. “tmdb 5000 movies”
2. “tmdb 5000 credits”
3. “ratings small” (Mapping of userid, movieid and ratings of the user)

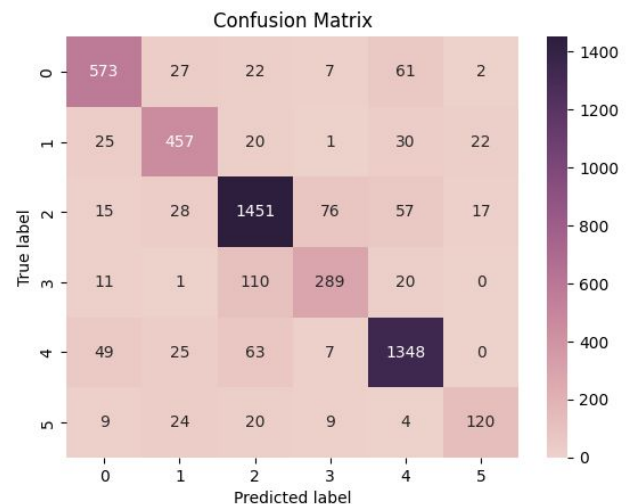
## 7 CODE

GITHUB LINK

## 8 EVALUATION

Our system’s mood based filtering gives 85.9% of accuracy on testing dataset and 99.66% for training dataset. Following is the confusion matrix of our results:

Vector-array used for content-based filtering:



Dataframe used for collaborative-based filtering:

```
array([[1.          , 0.08838835, 0.05892557, ..., 0.02512595, 0.02777778,
        0.          ],
       [0.08838835, 1.          , 0.0625      , ..., 0.02665009, 0.          ,
        0.          ],
       [0.05892557, 0.0625      , 1.          , ..., 0.02665009, 0.          ,
        0.          ],
       ...,
       [0.02512595, 0.02665009, 0.02665009, ..., 1.          , 0.07537784,
        0.04828045],
       [0.02777778, 0.          , 0.          , ..., 0.07537784, 1.          ,
        0.05337605],
       [0.          , 0.          , 0.          , ..., 0.04828045, 0.05337605,
        1.          ]])
```

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- [4] Pinata Winoto and Tiffany Y. Tang. The role of user mood in movie recommendations. *Expert Systems with Applications*, 37(8):6086–6092, 2010.

movieId	5	11	12	13
movieId				
5	1.000000	0.031113	0.000000	0.000000
11	0.031113	1.000000	0.000000	0.000000
12	0.000000	0.000000	1.000000	0.034441
13	0.000000	0.000000	0.034441	1.000000
14	0.065761	0.185475	0.000000	0.000000
...	...	...	...	...
426067	0.000000	0.000000	0.083297	0.000000
426469	0.013457	0.000000	-0.009038	0.000000
433715	-0.031842	0.000000	-0.083964	0.000000

## References

- [1] Ahmad Hassan Afridi. Transparency for beyond-accuracy experiences: a novel user interface for recommender systems. *Procedia Computer Science*, 151:335–344, 2019.
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- [3] SRS Reddy, Sravani Nalluri, Subramanyam Kunisetti, S Ashok, and B Venkatesh. Content-based movie recommendation system using genre correlation. In *Smart Intelligent Computing and Applications: Proceedings of the Second*