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COLLABORATIVE AND HYBRID RECOMMENDER SYSTEM

- By Team PyCoders

Submitted to: Professor Mohammad Saiful Islam

TEAM PYCODERS

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PRODUCT INTRODUCTION

The project's primary objective is to create a sophisticated recommendation system by leveraging two powerful techniques: Collaborative Filtering and Sentiment Analysis.

Through this innovative approach, we aim to significantly enhance the user experience and engagement within the realm of movie recommendations. By combining user preferences and sentiments, our system provides personalized suggestions that resonate with each individual user.

Our team is excited to showcase the impact of this project and the ways it can revolutionize the way users discover and enjoy movies.



COLLABORATIVE FILTERING OVERVIEW

Collaborative Filtering is a technique that predicts user interests by collecting preferences from multiple users. One key method within Collaborative Filtering is Singular Value Decomposition (SVD), which involves reducing dimensionality in user-item rating matrices.

By applying SVD, we uncover underlying patterns in the data that allow us to make accurate movie recommendations based on user behavior and preferences.



COLLABORATIVE RECOMMENDER SYSTEM RESULTS

Our Collaborative Filtering model achieved an RMSE score of 2.8344. RMSE (Root Mean Squared Error) is a critical metric for evaluating model accuracy. A lower RMSE indicates better performance in predicting user preferences.

This score reflects the precision and effectiveness of our Collaborative Filtering technique in generating recommendations that align with user ratings.

COLLABORATIVE RECOMMENDER SYSTEM FINDINGS

Figures for:

Top 10 Movies with Highest Predicted Ratings for All Users, 10 Top Recommended Movies, 10 Least Recommended Movies

Top 10 Movies with Highest Predicted Ratings for All Users:

	item_id	movie_title	Average Predicted Rating
49	50	Star Wars (1977)	2.101643
99	100	Fargo (1996)	1.824366
180	181	Return of the Jedi (1983)	1.731883
257	258	Contact (1997)	1.661843
126	127	Godfather, The (1972)	1.575842
285	286	English Patient, The (1996)	1.549842
97	98	Silence of the Lambs, The (1991)	1.505015
0	1	Toy Story (1995)	1.467114
287	288	Scream (1996)	1.457047
173	174	Raiders of the Lost Ark (1981)	1.451527

Top 10 Recommended Movies:

	item_id	movie_title	Predicted Rating
0	12	Usual Suspects, The (1995)	5.0
1	50	Star Wars (1977)	5.0
2	96	Terminator 2: Judgment Day (1991)	5.0
3	98	Silence of the Lambs, The (1991)	5.0
4	168	Monty Python and the Holy Grail (1974)	5.0
5	175	Brazil (1985)	5.0
6	183	Alien (1979)	5.0
7	202	Groundhog Day (1993)	5.0
8	216	When Harry Met Sally... (1989)	5.0
9	268	Chasing Amy (1997)	5.0

10 Least Recommended Movies:

	item_id	movie_title \
1681	1682	Scream of Stone (Schrei aus Stein) (1991)
1351	1352	Shadow of Angels (Schatten der Engel) (1976)
1363	1364	Bird of Prey (1996)
1648	1649	Big One, The (1997)
1647	1648	Niagara, Niagara (1997)
1639	1640	Eighth Day, The (1996)
1432	1433	Men of Means (1998)
1459	1460	Sleepover (1995)
1636	1637	Girls Town (1996)
1492	1493	Modern Affair, A (1995)

Average Predicted Rating

1681	0.0
1351	0.0
1363	0.0
1648	0.0
1647	0.0
1639	0.0
1432	0.0
1459	0.0
1636	0.0
1492	0.0



HYBRID RECOMMENDER SYSTEM

Our Hybrid Recommender System seamlessly integrates Collaborative Filtering with Sentiment Analysis.

In addition to user ratings, we harness the power of Sentiment Analysis to incorporate insights from YouTube comments. By factoring in sentiment, we further refine recommendations to reflect not only numerical ratings but also the emotional resonance of movies with users.



DATA FETCHING: YOUTUBE VIDEO IDS AND COMMENTS

Data acquisition is a crucial aspect of our project. We employed the YouTube Data API to fetch essential information for our recommendation system.

Fetching YouTube Video IDs and Comments:

- We fetched YouTube video IDs and YouTube comments for movies using relevant search queries.
- Our system leveraged multiple API keys to ensure comprehensive data collection.

Our diligent data fetching process lays the foundation for a recommendation system that is both accurate and emotionally resonant.



SENTIMENT ANALYSIS OVERVIEW

Sentiment Analysis involves gauging emotions and opinions expressed in text. For this project, we employed two techniques: TextBlob and VADER.

These methods help us extract sentiments from YouTube comments related to each movie. By quantifying user sentiments, we gain valuable insights into the emotional connection between users and movies.

SENTIMENT ANALYSIS

Figures for:

Movies with Average Sentiment Scores using TextBlob and VADER

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Movies with Average Sentiment Scores (TextBlob):
```

	movie_title	Average Sentiment (TextBlob)
0	Toy Story (1995)	0.000000
1	GoldenEye (1995)	0.000000
2	Four Rooms (1995)	1.000000
3	Get Shorty (1995)	0.750000
4	Copycat (1995)	0.308333
...
1677	Mat' i syn (1997)	-0.019048
1678	B. Monkey (1998)	0.000000
1679	Sliding Doors (1998)	0.100000
1680	You So Crazy (1994)	0.285714
1681	Scream of Stone (Schrei aus Stein) (1991)	-0.400000

```
[1682 rows x 2 columns]
```

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Movies with Average Sentiment Scores (VADER):
```

	movie_title	Average Sentiment (VADER)
0	Toy Story (1995)	0.000000
1	GoldenEye (1995)	0.000000
2	Four Rooms (1995)	0.57190
3	Get Shorty (1995)	0.82250
4	Copycat (1995)	0.90720
...
1677	Mat' i syn (1997)	0.78450
...
1680	You So Crazy (1994)	0.41840
1681	Scream of Stone (Schrei aus Stein) (1991)	-0.54230

```
[1682 rows x 2 columns]
```



HYBRID RECOMMENDER SYSTEM RESULTS

Our Hybrid Recommender System achieved an RMSE score of 2.8344, mirroring the performance of the Collaborative Filtering model.

This score underscores the integration of Sentiment Analysis into the recommendation process. By considering both user ratings and sentiments, our Hybrid System provides comprehensive and emotionally resonant movie suggestions.

CONCLUSION

In conclusion, our Collaborative and Hybrid Recommender System project has successfully demonstrated the potential of combining Collaborative Filtering with Sentiment Analysis.

Through this synergy, we've developed two types of recommendation systems that not only predicts user preferences based on ratings but also incorporates the emotional connection users share with movies, as revealed through sentiments.

Our project opens avenues for enhancing the way users discover and engage with movies, showcasing the significant role technology plays in personalizing and enriching user experiences.



THANK YOU

- Project by **Team PyCoders**

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