Crimson Publishers
Wings to the Research

Mini Review

Movie Recommender Systems: Types and Modeling

Marappan R* and Sarveshvara Raja

Senior Assistant Professor, School of Computing, India

ISSN: 2832-4463

***Corresponding author:** Marappan R, School of Computing, SASTRA Deemed University, Thanjavur, India

Submission: June 16, 2022

Published: September 27, 2022

Volume 2 - Issue 3

How to cite this article: Marappan R. Movie Recommender Systems: Types and Modeling. COJ Rob Artificial Intel. 2(3). COJRA. 000538. 2022.
DOI: 10.31031/COJRA.2022.02.000538

Abstract

Recommender systems are playing a major role in the information filtering to the users. Recently there are different recommender models developed for various artificial intelligence, machine learning and data analytics applications. This research focuses on the types of movie recommender systems and building a collaborative filtering model using Python.

Keywords: Recommender systems; Information filtering; Collaborative filtering; Machine learning; Data analytics; Artificial intelligence

Introduction

Recommender systems are filtering the required information to the users based on their interests, styles of learning, and other primary characteristics. The recommender systems such as Collaborative Filtering (CF) are also developed for movie applications [1,2]. The recommendation systems are implemented by the companies for the following main criterion:

A. Improving the retention: The users choices are continuously catered to make loyal customers

B. Increasing the sales: To increase the sales 10% to 50% due to accurate “You must also like” recommendations of the products.

C. Form habits: To provide accuracy in the contents results in developing strong habits, customers usage patterns.

D. Accelerate work: Time saving up to 80% due to specific recommendations and to support the research work.

Types of Movie Recommender Systems

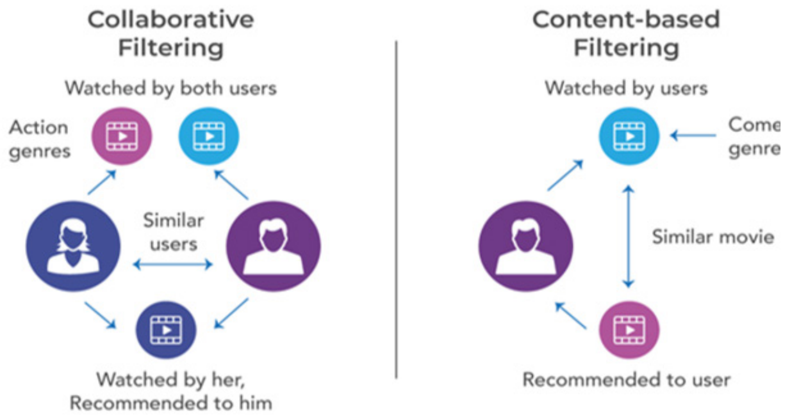


Figure 1: Types of movie recommenders.

The types of movie recommenders systems are sketched in (Figure 1) with CF and content-based filtering [3,4]. Companies such as Amazon, Pandora, and Netflix are using analytics to predict customer behaviors and provide recommendations. The companies such as Amazon, Pandora, Twitter, and Netflix track and how they use this data are sketched in (Figure 2-5).

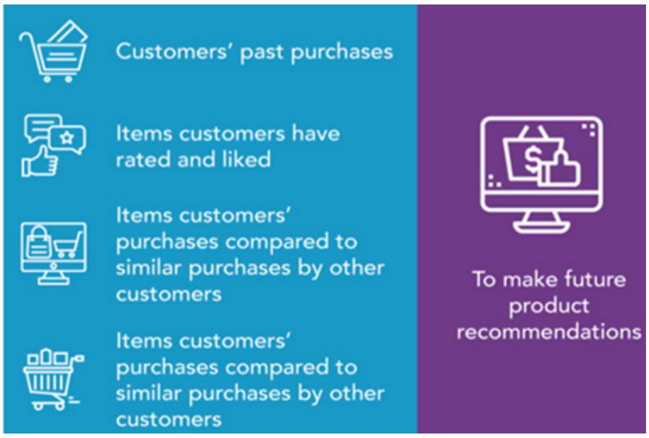

Customers' past purchases
Items customers have rated and liked
Items customers' purchases compared to similar purchases by other customers
Items customers' purchases compared to similar purchases by other customers
To make future product recommendations

Figure 2: Amazon recommender.

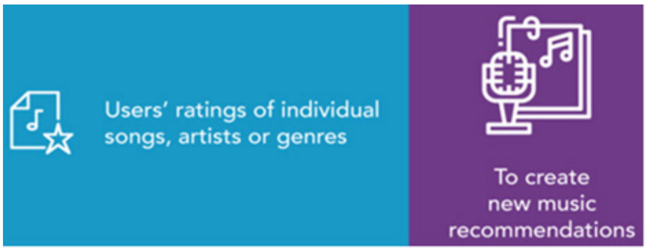

Users' ratings of individual songs, artists or genres
To create new music recommendations

Figure 3: Pandora recommender.

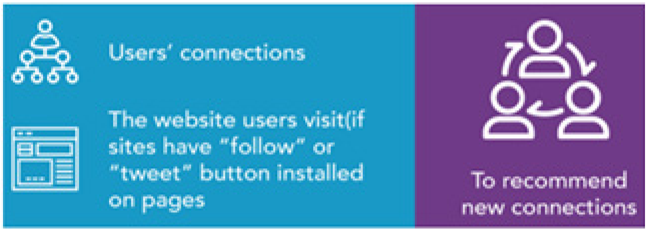

Users' connections
The website users visit(if sites have "follow" or "tweet" button installed on pages
To recommend new connections

Figure 4: Twitter recommender.

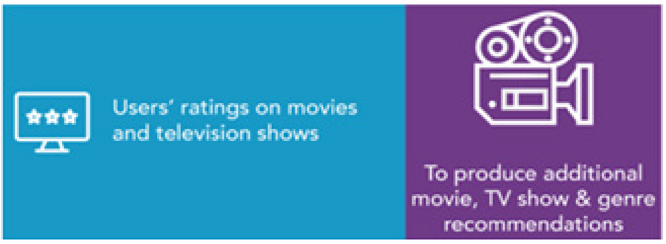
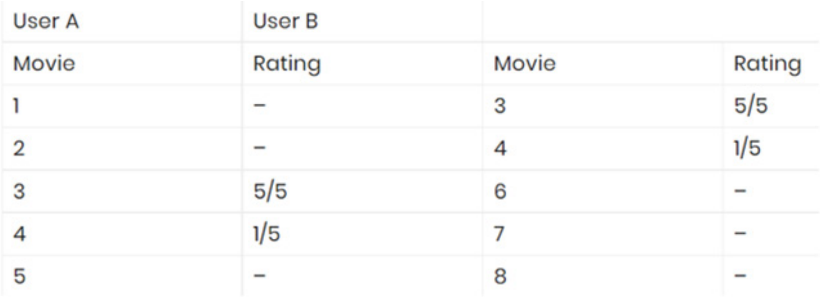

Users' ratings on movies and television shows
To produce additional movie, TV show & genre recommendations

Figure 5: Netflix recommender.

CF & Limitations

The types of CF are user CF and item CF. For the two users A and B, consider the number of movies watched with their ratings (Figure 6): Here both users have common movies and have rated similarly assuming that both users have similar styles of watching movies. The recommender will recommend the movies (1,2,5) to B and the movies (6,7,8) to A. The similarity between the users can be measured using Pearson's correlation. For the positive value of similarity, the like and ratings of user A are recommended to user B and vice versa. For the negative value of similarity, no recommendation will be the result as the users are not alike.



User A	User B		
Movie	Rating	Movie	Rating
1	–	3	5/5
2	–	4	1/5
3	5/5	6	–
4	1/5	7	–
5	–	8	–

Figure 6: CF & limitations.

Limitations of user CF

a. One can watch specific movies that no one else watches which results in no recommendation.

b. Not enough ratings to match new movies.

c. For new users, the user is not rated and watched many movies and it results in users mapping problems.

Building a user CF in python

The user CF model is developed in Python with the following steps:

a. Install and import the surprise package.

b. Load the instance ml-100k.

c. Split the data into training and testing.

d. Apply the KNN algorithm to the training set.

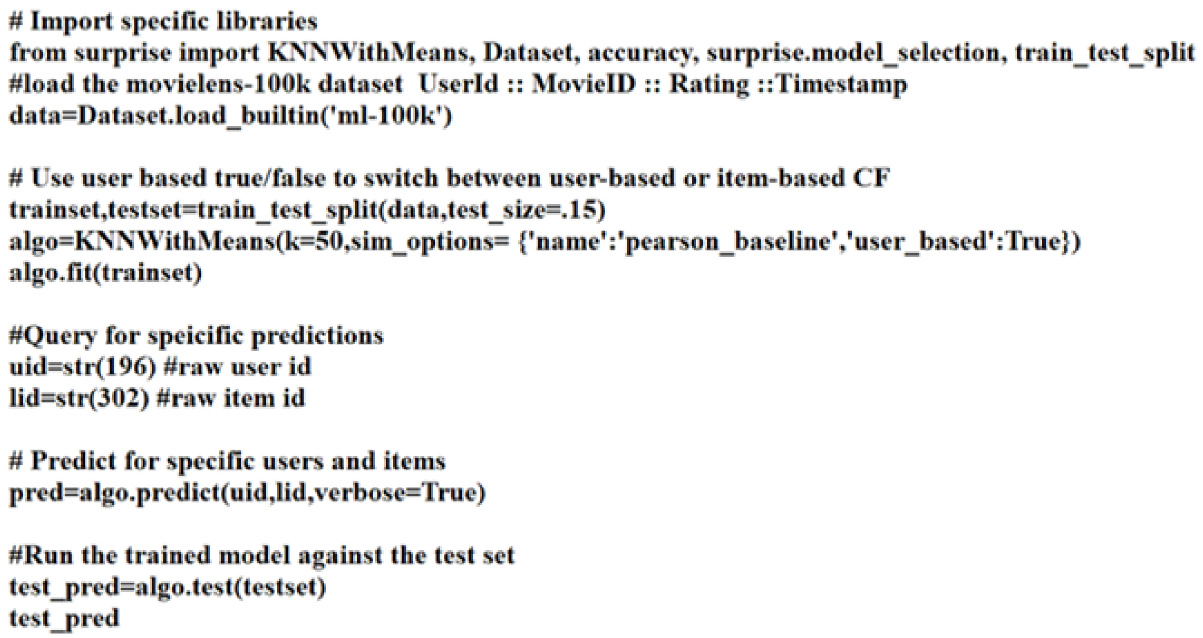
e. Display the 25 best neighbors to the user with ratings.

f. Predict the rating for a user not yet watched the movie.

g. Find the expected ratings.

h. Test using the testing dataset for every movie.

The Python implementation is as follows: (Figure 7)



```
# Import specific libraries
from surprise import KNNWithMeans, Dataset, accuracy, surprise.model_selection, train_test_split
#load the movielens-100k dataset  UserId :: MovieID :: Rating ::Timestamp
data=Dataset.load_builtin('ml-100k')

# Use user based true/false to switch between user-based or item-based CF
trainset,testset=train_test_split(data,test_size=.15)
algo=KNNWithMeans(k=50,sim_options= {'name':'pearson_baseline','user_based':True})
algo.fit(trainset)

#Query for speicific predictions
uid=str(196) #raw user id
lid=str(302) #raw item id

# Predict for specific users and items
pred=algo.predict(uid,lid,verbose=True)

#Run the trained model against the test set
test_pred=algo.test(testset)
test_pred
```

Figure 7: The Python implementation.

Conclusion & Future Work

This research analyzed the types of movie recommender systems and developed a CF model using Python for movie applications. In the future, different soft computing strategies can be used for the implementation to obtain better accuracy [5-10].

References

1. Syed MA, Rakesh KL, Gopal KN, Rabindra KB (2018) Movie recommendation system using genome tags and content-based filtering. Advances in Data and Information Sciences, Springer, USA, pp. 85-94.
2. Harper FM, Konstan JA (2015) The MovieLens datasets: History and context. ACM Trans Interact Intell Syst 5(4): 1-19.
3. Bhaskaran S, Marappan R, Santhi B (2021) Design and analysis of a cluster-based intelligent hybrid recommendation system for e-learning applications. Mathematics 9(2): 1-21.
4. Bhaskaran S, Marappan R, Santhi B (2020) Design and comparative analysis of new personalized recommender algorithms with specific features for large scale datasets. Mathematics 8(7): 1-27.
5. Marappan R, Sethumadhavan G (2021) Solving graph coloring problem using divide and conquer-based turbulent particle swarm optimization. Arab J Sci Eng 47: 9695-9712.
6. Marappan R, Sethumadhavan G (2020) Complexity analysis and stochastic convergence of some well-known evolutionary operators for solving graph coloring problem. Mathematics 8(3): 303.
7. Marappan R, Sethumadhavan G (2018) Solution to graph coloring using genetic and tabu search procedures. Arab J Sci Eng 43: 525-542.
8. Raja Marappan, Bhaskaran S, Aakaash N, Mathu Mitha S (2022) Analysis of COVID-19 prediction models: Design & analysis of new machine learning approach. Journal of Applied Mathematics and Computation 6(1): 121-126.
9. Marappan R, Bhaskaran S (2022) Movie recommendation system modeling using machine learning. International Journal of Mathematical, Engineering, Biological and Applied Computing 1(1): 12-16.
10. Raja Marappan, Bhaskaran S (2022) Datasets finders and best public datasets for machine learning and data science applications. COJ Rob Artificial Intel 2(1):