International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 05 | May - 2021 ISSN: 2582-3930

Collaborative Filtering Based Movie Recommendation System

Swapnil Kosare, Pushpendra Tiwari, Geetesh Gudhikar, Akshay Kanoje
Prashant.R. Rothe
Department of Electronics & Telecommunication Engineering,
Priyadarshini College of Engineering, Nagpur, India

Abstract— Now-a-days recommender systems are used in our day to day life. However, they are distant from flawlessness. In this work, we will try to understand the various types of recommendation systems also compare their output with other smaller datasets. We will be attempting to develop a scalable model to perform statistics. We commence by developing and comparing the different kinds of prototypes on a smaller dataset of 1000 ratings. Then, we try to gauge the system so that it is able to handle 200 ratings by using MS SQL server. It is found that for a brief dataset, actualizing user-based collaborative sifting comes about with way better and effective yields.

Key Words: Recommendations systems, Collaborative filtering, Content Based Filtering prototype, SQL server.

1. Introduction

A suggestion framework could be a sort of data filtering framework which challenges to expect the needs of a client, and make proposals on the premise of user's needs. Gigantic run of applications of proposal frameworks are given to the client. The ubiquity of proposals frameworks have slowly expanded and are as of late actualized in nearly all online stages that individuals utilize. The substance of such framework contrasts from movies, podcasts, books and recordings, to colleagues and stories on social media, to commodities on e-commerce websites, to individuals on commercial and dating websites. Frequently, these frameworks are able to recover and channel information approximately a user's inclinations, and can utilize this intel to progress their proposals within the up and coming period. For an occurrence, Twitter can analyze your collaboration with a few stories on your divider so as to comprehend what sorts of stories if you don't mind you. Numerous a times, these frameworks can be ad libbed on the premise of exercises of a expansive number of individuals. Due to the progresses in recommender frameworks, clients ceaselessly anticipate great comes about. They have a moo edge for administrations that are not able to create appropriate proposals.

If a music streaming application is not able to foresee and play song that the user prefers, then the user will just stop using it. This has driven to a tall significance by specialized enterprises on refining their proposal structures. In any case, the issue is more complicated than it shows up. Each client has distinctive likes and loathes. In expansion, indeed the taste of a single client can contrast depending on a huge number of viewpoints, such as temperament, season, or sort of movement the client is performing. For an occurrence, the sort of music one would incline toward to tune in amid working out shifts fundamentally from the sort of music he would tune in to whereas planning supper. They must find unused zones to decide more around the client, while still deciding nearly all of what is as of now known approximately of the client.

Two basically critical strategies are broadly utilized for recommender frameworks. One is content-based filtering, where we endeavor to shape the clients inclinations utilizing information recovered, and recommend things based on that profile. The other is collaborative filtering, where in we attempt to cluster alike clients together and utilize information almost the gather to form suggestions to the client.

Introduction to Collaborative Filtering

The fundamental strategy of collaborative filtering frameworks is that these undetermined appraisals can be credited since the taken note evaluations are regularly exceedingly connected over a few clients and things. For an occurrence, accept two clients named David and Albert, who have exceptionally comparable tastes. In the event that the evaluations, which both have expressed, are exceptionally comparable, at that point their resemblance can be decided by the basic calculation. In such cases, there's a tall likelihood that the evaluations where in fair one of them has definite value, are moreover likely to be comparable. This closeness can be utilized to create translations approximately mostly expressed values. Nearly all the ventures for collaborative filtering accentuation on leveraging either item associations or user associations for the calculation procedure. Numerous of the models execute both sorts of relationships. Furthermore, a few mock-ups utilize wisely outlined optimization strategies to produce a preparing show in much the comparable way a classifier creates a preparing demonstrate from the mentioned or specified information. This model is afterward utilized for doling out the truant values within the network, within the comparable way that a classifier allots the missing test labels. There are two types of methods which are frequently implemented in collaborative filtering that are denoted to as memory-dependent procedures and model-dependent procedures.

Introduction to Content Based Filtering

Content Based Suggestion method checks for the adores and aversions of the client and makes a User-based Profile. For creating a client profile, we check for the item profiles and their comparable user rating. The user profile is the combination of sum of the item profiles where combination being the ratings customer or user has evaluated. After profile of the client has been created, we assess the likeness of the client profile with all the things within the database, which is considered utilizing cosine likeness between the user created profile and item profile.

Benefits of Content oriented strategy is that other user's data or information isn't basic, and the recommender framework can praise unused commodities or anything which are not assessed by and by, all things considered the recommender framework will not prescribe the things exterior the sort of things the client has given appraisals of.

2. Literature Survey

Kim Mucheol et al. [1] described an interactive RS. This paper projected a theoretical model and sample of the projected interactive movie RS. This proposed method constructs adapted suggestion of movies in online community systems. The presented method develops the grouping conscious community network model which is considered as the approach that is capable to confine the dynamics of socially-mediated information communicated in communal networks. This proposed replica may examine the fondness of user methodically and which can show the quick and constant change in social network.

Noguera et al. [2] proposed a mobile 3D-GIS hybrid RS for tourism. In this paper, dimensional GIS architecture is designed and implemented in the RS. This RS grants tourists to take advantage from novel characteristics such as a 3D map-based interface. Evaluation of user experience is also presented in this work.

Nanou et al. [3] described some problems associated to the presentation of recommendations in movie domain. The present work shows the survey of former techniques and other popular RS which are focused on user opinion and approval. In this paper, different methods have been compared. The most effective method related to the user opinion and approval is “planned outline” and the “textbook and videotape” interfaces, as a strong constructive association was also originate between.

client opinion and approval in all experimental situations. Ruotsalo et al. [4] presented a mobile RS. In this work, SMARTMUSEUM has been discussed. This system employed semantic network speech in the form of facts illustration. Ontologies are basically used to make connection between semantic break, sensor inputs, and user profiles. An information retrieval framework is used in the RS to get suitable content for mobile user. Its result indicate that the system is capable to meets the user requirement.

Sharma et al. [5] this paper reviewed the several approaches used for RS. Approaches may be categorized into three parts CF, Hybrid Recommendations and Content Based recommendation. Also this paper describes the merits and demerits of the recommendation approaches. Furthermore, problem occurs in RS also discussed in this paper.

Tekin et al. [6] proposed distributed online learning in social RSs. In this work, things which are suggested to the user depends their query. Also item are suggested according to the background history of things which was bought earlier, its gender, and age. In this work decentralized sequential decision making is considered. Beel et al. [7] introduced the architecture of the RS and four datasets. The components like crawling PDF, generating use model etc are included in the architecture of the system. Moreover, the architecture including content based recommendation for calculating purpose. Ante et al. [8] presented some novel concepts which helps in choosing the information to use. It also helps to choose the technique for recognizing which appropriate information give the discrepancy ratings rely on the statistical rating. The testing is done on the real dataset of film which carry 12 individual pieces of contextual information. The simulation result demonstrated that difference in the forecast of ratings which are found as appropriate by this proposed technique and one which was found as inappropriate, spotted to the significance of the power study and the merits of the presented approach in the case of a small dataset. Chapphannarungsri and Maneero [9] presented a multidimensional approach. Moreover, an advanced RS has been presented which gives good quality of recommendations. Additionally, a method has been proposed for Multiple Criteria approach which can change the means of weighting to be more appropriate and also unease about the occurrence of the selection film features. The Multiple Linear Regression is applied to do Multidimensional technique which can study the related information of client characteristics. The result indicates that the proposed method gives more precise results than the current Hybrid RS.

Colombo et al. [10] proposed a system named RecomMetz, which includes mobile RS which depends on the context-aware knowledge. This proposed system is in the free time domain only for movie show times domain and is rely on the Semantic Web technologies. The results indicates, the competence and effectiveness of the RS

3. Working of System

The movie recommendation framework essentially works by giving recommendations to the clients by utilizing the two eminent algorithms clarified over. This movie recommendation system prescribes movies to a client by assessing IMDB appraisals.

The block diagram of Movie Recommendation System is classified into two categories namely User and Admin. The fig 3.2.1 shows the User part. It is mainly used to interface the front end of the Movie Recommendation System. Recommendations are based on user’s history in which ratings provided by users to items play an important role in understanding the taste of users. However, in real case scenarios, users rate very few items consumed by them leading to data scarcity problems which affect the accuracy of the recommendation process. The more model knows about the user, the more accurate recommendations can be made.

The validation process in the recommendation systems are important as they help them make the right choices, without having to expend their cognitive resources. The purpose of a recommendation system basically is to search for content that would be interesting to an individual.

User Profiles, create user profiles to describe the types of items that user prefers. e.g. User1 likes sci-fi, action and comedy. Recommendation on the basis of keywords are also classified under content based. e.g. IMDB.

Collaborative filtering is used to find similar users or items and provide multiple ways to calculate rating based on ratings of similar users. User-Based: The system finds out the users who have rated various items in the same way. Suppose User A likes 1,2,3 and B likes 1,2 then the system will recommend movie 3 to B.

One of the most natural ways to store a large amount of data is a relational database management system (RBDMS). These software packages use sophisticated data structures and algorithms to access data stored on disk. Programs can access the database using the structured query language (SQL), which supports a wide variety of queries. For

example, it is easy to find all of the users who have seen a certain movie or to find the movies that two users have both seen.

The system admin is always a single point of content in the data centre or network operations centre for issues related to web hosting, application and server outages, and other critical IT operations problems.

Users may initially see a default dashboard based on their user roles combined with out of the box dashboards for certain roles. They would see this when their dashboard roles are set to the defaults, that we will show below. Users can change their default dashboard, and system administrators can configure which dashboard users will see.

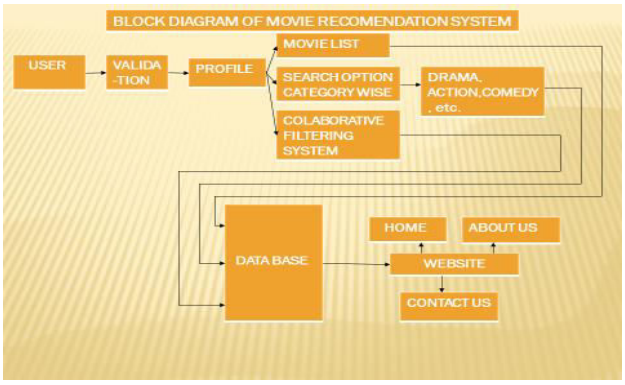

Figure 3 Block diagram of proposed system User part

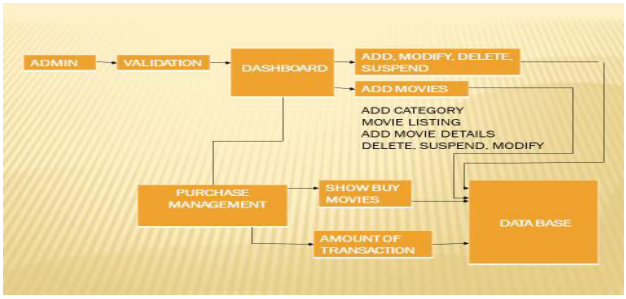

Figure 4 Block diagram of proposed system Admin part

The software and language which used for designing our interface and front end is PYTHON. For creating database, SQL Server is used.

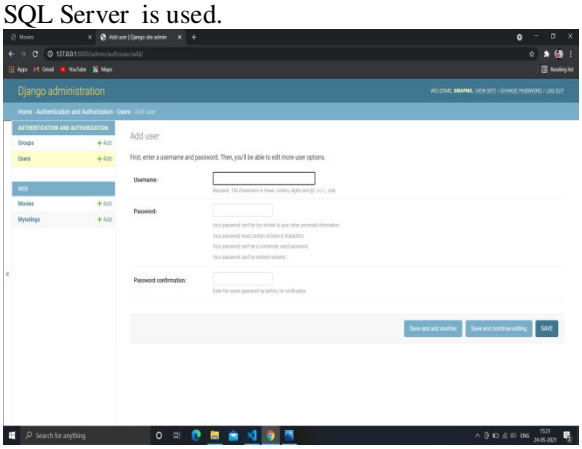

Figure 1 User Interface

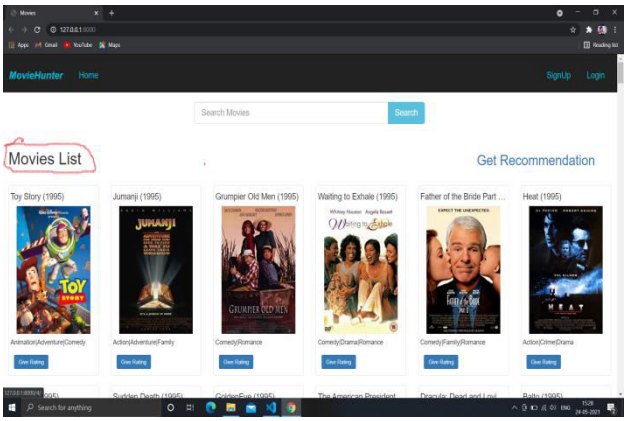

Figure 2 Library creation

This system collaborates with IMDB ratings and displays a list of movies which are highly rated by a user based on category of the movie. This approach asks the user to provide 2 inputs –

1. Category of the movie (for e.g. comedy)
2. Year in which the movie is released (for e.g. 2016)

The algorithm segregates the list of movies from the dataset according to the inputs provided by user and finally displays the list of movies. The algorithm compares the inputs with the traits of the dataset and formulates the list. A user may select more than one category according to his fancies. A bright feature of allowing the user to rate movies has enhanced the beauty of this recommender system. This is achieved by using collaborative filtering approach, where in the system will provide recommendations to other like-minded users which have the same taste.

Example-

User XYZ watches Movie "Mohabatein" of category "Romance" (1 movie may fall in more than one category) and rates 8.5/10 (8.5 is considered to be a good rating). A like-minded person which has the same taste and is searching for the same category, then he may receive "BajiraoMastani" as one of the suggestions. The only problem in this prototype is that a user can't upload/view movies online on this website

4. Result

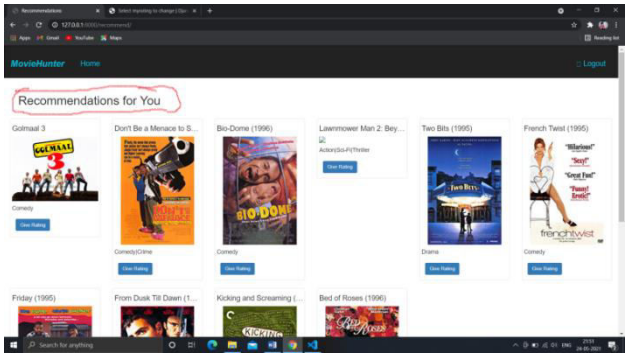

Figure 5 System displaying the Recommended Movies

Movie Recommendation systems proved themselves to be a best solution for addressing problem of the information overload. They help in taking choices by preserving time and energy. Future work will focus on enhancement of the existing methods and algorithms used so that the recommendation systems predictions and recommendations quality can be improved.

References

[1] Kim, Mucheol, and Sang Oh Park, "Group affinity based social trust model for an intelligent movie recommender system", Multimedia tools and applications 64, no. 2, 505-516, 2013

[2] Noguera, José M., Manuel J. Barranco, Rafael J. Segura, and Luis Martínez, "A mobile 3D-GIS hybrid recommender system for tourism", Information Sciences 215, 37-52, 2012

[3] Nanou, Theodora, George Lekakos, and Konstantinos Fouskas, "The effects of recommendations‟ presentation on persuasion and satisfaction in a movie recommender system", Multimedia systems 16, no. 4-5, 219-230, 2010 [4] Ruotsalo, Tuukka, KristerHaav, Antony Stoyanov, Sylvain Roche, Elena Fani, RominaDeliai, EetuMäkelä, TomiKauppinen, and EeroHyvönen, "SMARTMUSEUM: A mobile recommender system for the Web of Data", Web semantics: Science, services and agents on the world wide web 20, 50-67, 2013

[5] Sharma, Meenakshi, and Sandeep Mann, "A survey of recommender systems: approaches and limitations", Int J InnovEng Technol. ICAECE-2013, ISSN, 2319-1058, 2013

[6] Tekin, Cem, Shaoting Zhang, and Mihaela van der Schaar, "Distributed online learning in social recommender systems", Selected Topics in Signal Processing, IEEE Journal of 8, no. 4, 638-652, 2014

[7] Beel, Joeran, Stefan Langer, BelaGipp, and Andres Nürnberger, "The Architecture and Datasets of Docear's Research Paper Recommender System", D-Lib Magazine 20, no. 11, 2014

[8] Ante, Marko Tkalcic, Jurij F. Tasic, and Andrej Kosir, "Predicting and detecting the relevant contextual information in a movie-recommender system", Interacting with Computers, 2013

[9] KeittimaChapphannarungsri and SaranyaManeero, "Combining multiple criteria and multidimension for movie recommender system", in Proceedings of the International MultiConference of Engineers and Computer Scientists, vol. 1, 2009 [10] Colombo-Mendoza, Luis Omar, Rafael ValenciaGarcía, Alejandro Rodríguez-González, GinerAlorHernández, and José Javier Samper-Zapater, "RecomMetz: A context-aware knowledge-based mobile recommender system for movie showtimes", Expert Systems with Applications 42, no. 3, 1202-1222, 2015