

# Review on Recommendation Systems Using Social Networking Sites

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**Abstract**-With the increasing of big data era, opportunities and challenges are appearing in industry, organization and academic area. The growth of internet made it difficult to extract the relevant information from all the available online social media. It is essential to filter the information according to user's efficiency. Recommendation system is an important way to find the more interesting data from huge repository. The different recommendation technique used like collaborative filtering, content based filtering, Hybrid recommender system, Real-time recommendation system, Single network based recommendation system, by giving the survey of all these system and problems associated with them, we can improve the quality of recommendation by using new approach i.e. Cross network recommendation system.

**Keywords** –Collaborative filtering, Content based filtering, Hybrid recommender, Real time recommendation system, Cross network recommendation, Cold start, and Sparsity issue.

## I. INTRODUCTION

The Recommendation systems used as a filtering mechanism to find the user ratings (External information) and users Preferences (Internal Information i.e. Profile of users) that user gives it to item such as music, books, movies, from the different online social media and different providers e.g. Face book, Amazon, Twitter, Netflix. In traditional approach the different recommendation systems used to find the users preferences on particular item. This system suffers from the different problems like Cold start and Sparsity. The cross network recommendations systems developed to remove all the problems which are occurs in traditional or single based recommendation system, and also improve the accuracy of recommendation. Different Recommendation systems are used in online social network, each having some advantages and disadvantages with them. These systems build particularly to solve the new user problem. Means the user who newly registered into system and having empty profile (i.e. Cold start the single network based systems not provide recommendation in such situation. Also the problem of sparsity hindered because some people gives rating to some of the item and user item interaction matrix is get very sparse. The cross network recommendations provide solution to this entire problem, i.e. cold start, sparsity, new user and provide accurate recommendation. Some Traditional recommendation systems as follows. **Collaborative Filtering** - Collaborative Filtering is the process of information filtering. The system recommends product to the user based on rating and feedback mechanism which the user gives on particular product. The system find users with similar rating they given on the same product, in such a way the group of the users created called neighborhoods, then system recommend the product to the current user which he/she does not rated in past but it is highly rated by the neighbors in the group. System built on the prediction that e.g. The user A has the same opinion as the user B gives on one of the item, then in future, system recommend the product to the user A, in which the user B gives rating. System built on the prediction that, the users will have same interest in future which they gives likes in past.

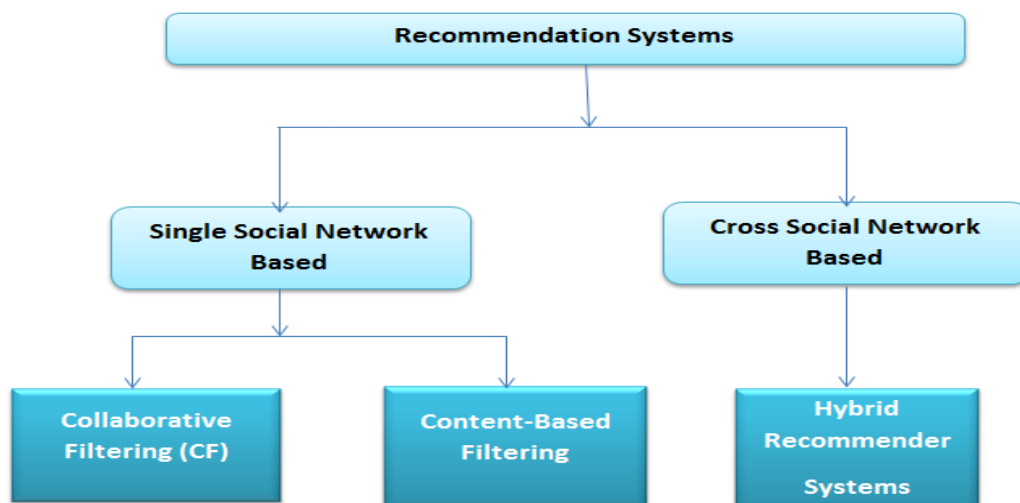


Figure 1.1 different types of recommendation systems

**Content based Filtering**-Content based recommendation system recommend an item (i.e. product) to the user based on the description of the item and profile of the user, in which user preferences are stored. The User profile created on the users own interest, which derived from users rating they gives on item. so current rated item compared with all other item which user does not gives rating, system find the similarity between the item and most similar item, and system recommend highly similar item to the user.e.g. TV programs, if user gives positive high rating to one of the TV show, then system recommend other episode of same show to user on which they does not give rating. **Traditional Recommender Systems**-The traditional recommender system analyze the data and update the model in regular interval of times i.e. few days or hours. E.g. when user posts the comment I don't like movies, these traditional recommender systems captures and updates the model after a day and miss the user instant demand. The system does not come up to or does not provide good and accurate recommendation with the user's changing preferences i.e. the some advertisement of sale which is only for few sec or hours, so this recommendation system not able to gives instant recommendation with users updating.

**Real time Recommender system**-It gives benefit over traditional recommender system. Such a system is able to capture the current instances quickly in very short time i.e. a few sec or millisecond and update the model and give accurate recommendations. **Hybrid Recommender system**-System gives advantages over the traditional single based recommender systems. The cross network recommender system combines the benefits of the both collaborative and content based filtering technique, and provide more accurate personalize recommendation. It considers the users rating as well as the users preferences, which are store in users own profile.

## II. ISSUE AND CHALLENGES IN RECOMMENDER SYSTEMS

1. Cold start - This problem occur when user newly entered into system and he's/her profile is empty. So in this case recommender system does not provide accurate recommendation. This problem basically occurs in single network based recommendation systems. Cross network recommendation system is used to address this problem, by extracting the users' rich useful information from auxiliary network.
2. Sparsity - This problem is arises when the number of items and user is presents, and user gives rating to some of the items. In this case the user item interaction matrix is very sparse and recommender system not able to provide accurate solution. Collaborative recommender system address this issue by comparing the item rated by user with all the other items present their and find the similarity between current item and all other item and the most similar items which user not gives rating such items recommend to user.
3. Scalability - In internet or on web, the number of user and items are increasing rapidly so we need to filter data according to user efficiency. Our system require large amount of resources to handle this data. Most of the system resources utilize in comparing the similarity between the user and item. Many of the filtering technique developed to address this scalability problem.
4. Positive Rating - On the social networking site the user gives rating to many of the items, this rating is either positive rating or negative rating. In such a case the recommender system does not provide the items to user on which user give negative rating. This is nothing but the problem of over fitting. Using cross network system by collaboration this problem remove by considering only known user item interaction.
5. Trust - User who has limited amount of historical data on the social network is not relevant as compare to the user having large number of historical data. Here problem of trust occurs and we cannot extract data from such user to find interest on particular product.
6. Privacy- To provide recommendation in cross network the users data on auxiliary network is extracted to find his/her interest in the target network. So while transferring the data from auxiliary network to find use interest, the privacy should be maintain for the data which users are make private on he's/her account. Such data cannot be extracted and violate the users privacy.

## III. RELATED WORK

Cross-network collaborative applications have recently attracted attentions. A cross-network user modeling, this focuses on integrating various social media activities. In [1] the real time recommender system TenCentRec is used to capture the real time users activity and update the users changing preferences in sec or in millisecond. It gives benefit over the traditional commendation system, which can update the user model in fixed interval or time so this system not helpful to capture the firstly users changing activities. eg user give comment I don't like movie, this traditional recommender system check this after a few days or months in fixed interval and update this model and miss this event, some of advertisement of sale is for hours or sec so traditional recommender system capture this fast changing event so real time recommender system is used. To produce accurate real time recommendation system use the collaborative filtering, content based filtering and demographics algorithm. In [2] the cross network recommendation system is used .with increase in number of users in social networking sites recommender system need to integrate the data of user from different OSN and boost the recommender. The combining data from the different social network the system gives the accurate recommendation to user, as compare to single network based system. The collaborative filtering technique used, it provide accurate recommendation as compare to tradition recommender systems. In [3] Collaborative system have very different patterns as compare to traditional one ie. Sparse connection, Complimentary expertise, topic skewness. This all patterns violate the traditional recommender system to address this the cross network collaborative system is used it can make the use of CTL (Cross Domain Topic Learning). In [4] In this the Social networking site, Face book is used to extract the user data for recommendation. The Online social networks are the valuable source of user's personal information and about their preferences. For cross network we can take the data from the

auxiliary network here the face book and make recommendation for target network. The data may be user rating or he's/her preferences from his/her own profile, it is the valuable source of information to find out the users interest on particular item. Cross network recommendation system gives accurate recommendation to user as compare to traditional one. In [5] Traditional recommender systems suggest items belonging to a single domain. This is not perceived as a limitation, but as a focus on a certain market. Nowadays, **user** provide feedback for **items of different types** e.g., in Amazon we can rate books, DVDs, express their opinions on **different social media and different providers** e.g., Face book, Twitter, Amazon, Netflix, TripAdvisor. cross domain recommendation system collect the data from the different online social network and provide accurate recommendation and also address the different problem which are occurs in the single network based system. In [6] Social influence plays an important role in product marketing. a new paradigm developed it can utilize the information in social network, i.e. User preferences, items general acceptance. A probabilistic model is developed to make more personalized recommendation. In this the data is extracted from large OSN, and analysis says that friend have tendency to select similar item and gives similar rating. So from this the user based approach is used to make recommendation.

#### IV. COMPARISON OF DIFFERENT TYPES OF METHODS AND ALGORITHMS IN RECOMMENDATION SYSTEMS:

Table 4.1 comparison between different types of methods and algorithms in recommendation systems.

SR NO	Title/Author/Year	Method/Algorithm	Feedback	Result obtained	Conclusion
1	Unified YouTube Video Recommendation via Cross network Collaboration/Ming Yan, jitao sang/June 23–26, 2015	1.LDA 2.Matrix Factorization	Address problems in single network based Recommendation solution.	Achieves superior performance not only in term of accuracy but also in diversity and Novelty.	cross network collaboration system removes the problems in single network New-user, cold start, data sparsity.
2	What's in a name? An unsupervised Approach to link users across communities. / Jing Liu, Fan Zhang. / ACM, 2013.	Automatically labeling Training data algorithm	SVM and Kalman filtering and particle filtering used for location estimation	Finding of rareness and commonness of user name can help user linking.	Alias disambiguation solution can address major part of user linking problem.
3	Connecting users across social media sites: a behavioral-modeling approach./ Reza Zafarani and Huan Liu./ACM2013,	MOBIUS Methodology.	Using Behavioural modelling help user to connect across communities	Advantage of this principled behavior modeling approach over earlier methods	By using MOBIUS Methodology connect the user efficiency on social media site
4	Link prediction across networks by biased cross-network sampling./ Guo-Jun Qi, Charu C Aggarwal, IEEE, 2013	1.cross network link model, 2.Baseline algorithm 3. Link transfer method	Capturing rich linkage structure in existing network predict link in target network.	It shows overall effectiveness of the Bias correction process.	use of link transfer model and the Bias in the problem removed by Re-sampling
5	Personalized Video recommendation based on cross-platform user modeling/Jitao Sang, ICME 2013.	1.Optimal combination 2. Cross platform modeling.	Using cross network find the personalized video recommendation.	On two strategy 1.profile enrichment 2.Relationship transfer	Proposed valuable method is tackled the sparsity and cold start problem issue
6	Social transfer: cross-domain transfer learning from social streams for media app./ Suman Deb Roy, /ACM 2012	1.online streaming LDA model 2. Social transfer algorithm.	Use real time social streams to build mutual connection among social media	35.1% reduction of error rate in predicting related video during recommendation	cross-domain media Recommendation Accomplished through social transfer.

7	Bieber no more: First story detection using twitter and Wikipedia/ ] Miles Osborne,/ 2012	1.topic detection 2.event detection 3.tweet monitor system	Using Wikipedia, as a Filtering mechanism improve event detection.	Easy blocking of large no of spurious events by using Wikipedia as filtering mechanism	Quality of detected event improved when considering this additional source of information
8	A deep dive into online social footprints/ Terence Chen, Mohamed Ali Kaafar,/ ACM, 2012	1.Novel evaluation 2.cross OSN analysis	Increases online social footprints	Retrieval of additional personal information from other public source is easier .	Increases the online social footprints based on cross online social network.
9	Recommender systems with social regularization./ Hao Ma,/ 2011.	1.matrix factorization framework	Improve recommendation system using friend network	approach perform other art-of-the state methods when do analysis on 2 large dataset	improve the prediction accuracy of recommender system.
10	Analyzing cross-system user modeling on the social web./ Fabian Abel, / 2011	Generic recommendation algorithm	Generate the valuable profile	result 10 times higher precision for recommendation address the cold start problem	Generated more valuable tag based profiles.
11	Solving the cold-start problem in recommender systems with social tags/chuan Liu,/2010	Algorithm based recommendation	Improving Diversity of recommendation.	solve problem in social tagging, enhance algorithm & diversity	Including social tag could be some extend, it helpful in solving cold start problem in recommendation
12	Factorization meets the neighborhood: a multifaceted collaborative filtering model./Yehuda Koren./2008	1.Collaborative filtering model 2.neighborhood latent factor model	Achieve more accurate model, by combining two methods	This method tested on netfix data, this result is better than data publish on dataset.	Model achieves the more accurate model, improve predictability, Handle new user without training .
13	Content-based recommendation systems./Michael J Pazzani and Daniel Billsus./ 2007.	Nearest neighbor method, Rochio's algorithm	System recommend item to user based on users profile.	Saved query retrieve additional/new information of interest to user.	Recommended on item to user based upon the description item & profile of user.
14	A content-collaborative recommender that exploits word net-based user profiles for neighborhood formation./marco Degemmis,/2007.	Collaborative Algorithm filtering, neighborhood formation Algorithm.	Facilitate natural social recommendation behaviour.	Improvement in the accuracy of collaborative recommendation by selecting likeminded users	This system felicitate the natural social recommendation behavior & alleviate the pressure of info overload
15	Applying associative retrieval techniques to alleviate the sparsity problem in collaborative	1.Associative retrieval framework 2.spreading activation	Using S.S.A. Extending transitive association among user.	spreading activation algorithm Removes the cold start & sparsity	S.A.A.achieves better recommendation quality than std. collaborative filtering



	filtering./Zan Huang, /2004	algorithm		problem.	
16	Modeling annotated data/ David M Blei and Michael I Jordan./ SIGIR 2003	LDA method (Latent Dirichlet Allocation)	model retrieve text based image, annotation	CORR-LDA model achieves superior condition distribution of words given an image.	CORR-LDA model we used it in automatic image annotation.

## V. CONCLUSION

The given single based recommendation systems utilize the data only from the single network. In case of new user, light user, heavy user this system not able to provide accurate recommendation. so the new cross network collaborative recommendation system used to address all the problem which are occurs in traditional single based recommendation systems, By analyzing the data from the different OSN and used it to find the user interest on particular topic by considering users rating and preferances. Also this system provide more accuracy n recommendation.

## VI. REFERENCES

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