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Data Mining Based Recommendation System in Social Networking

V. S. Bindu[1], V. Deepika[2]
[1]*M. Tech., Department of CSE, NHCE, Bangalore, India*
[2]*Senior Assistant Professor, Department of CSE, NHCE, Bangalore, India*

***Abstract*: social networking is an online podium where individuals use to form social relations with others who share personal, career interests, activities, and real-life connections. Recommendation systems excess data and use them from social networking sites for solving common problems. This paper terms a standalone recommendation system that finds link between user's connections on social networking sites and items which are preferred by users. The designed recommendation system collects the data and transforms it within social networking sites of individuals, applying content based filtering and collaborative filtering recommenders. For example, to recommend books, the system obtains data from Facebook. This shows that these relationships of collecting data and applying recommender techniques enhance the quality of proposed recommendation.**

Keywords: **-Recommendation system, social networking sites, data mining, collaborative filtering, content based filtering.**

1. Introduction

Recommendation systems is a subclass of information filtering system that seeks to predict the rating or preference a user would give to an item. Whenever people do shop online, browse, stream music, and even typing a note on a smartphone, people are contributing in producing data and are indirectly been used by recommendation system. A few decades back, people typically relied on their friends, family or experts to advise them on what books they should read, movies they should watch, or restaurants they should try. But these days, we are much more likely to rely on taste-making algorithms to help guide which purchases we make. And we rely on these algorithms so often and so naturally that we may not even notice we're doing it anymore. We add a book to our cart on Amazon and then bam another suggested book pops up on the screen and we think, "Hey, that one actually looks pretty interesting, too" and we add it to our cart. Recommendation systems with strong algorithms are at the core of today's most successful online companies such as Amazon, Google, Netflix and Spotify. By endlessly recommending new products that suit their customers' tastes, these companies provide a personalized, attentive experience across their brand platform, effectively securing customer trustworthiness. Data mining algorithms extract knowledge from unstructured data and perform manipulations by using methods like collaborative filtering, content filtering, association rules, and clustering. The algorithms used are based on machine learning and these algorithms provide ability to learn without extensive programming. Social networking sites allow users to create a public profile, through which they can connected with other users, share connections, and even to view the list of their profile links. Nowadays, Social networking sites have become popular like Facebook, Twitter, My Space, Microblog vchat, instagram. In order to provide personalization, Data from Social networking sites is incorporated in almost all recommendation systems. For instance, the online Social Network Recommender System (SNRS) based on data from user's preferences, items acceptance, and friend's information. Recommendation systems are less accurate in case of unavailability of users' data or new item, and tend to over personalize information as well. Social Network Recommender System is based on the fact that friends aim similar items and rate them similarly. Recommendation techniques are also affected by link predictions, visualizing connection network, and finding the strength of each connection. SNS offer advertisements on their home pages, for example: the right panel of Facebook page shows local ads of clothes, jewellery, or even a mobile connection. Thus, a standalone system can recommend the most relevant and personalized information to users.

2. Background

Initially recommendation systems were based on predictive modeling and correlation statistics. Extracting tags from SNS also increases recommendations. To recommend items, relationship between users, and items is built using people, tags, and items information. Data from Board Game Geek Website5 is used to design a recommendation algorithm based on user's history and relationship information. Thus, Web based recommendation systems make suggestions from a vast collection of data available across multiple Web sites, e.g., items suggested on Amazon, movies on Netflix, and Newsfeed on Facebook. Wise Social Network Recommendation System (WSNRS) is designed for identification and filtration of resources based on users' social interactions. SNS can be used to provide users location information. Information related to travel of user and its social interactions is extracted to provide location based recommendations. Entry of new user makes it difficult to recommend item due to unavailability of

information about user. This is known as cold start problem which can be solved by collaborative filtering of SNS. In consequence, embedding SNS data in a recommended system entails several advantages. When a user is new within SNS, data of his/her friends avoid the cold start problem to make recommendations in a sparse environment. Thus, the scalability is not a problem for a large dataset.

3. User recommendation system

The first algorithm we could use would be recommending books similar to the last few he enjoyed. This is a fairly intuitive algorithm: we first find out what books he recently read and liked then we find similar books based on what we know about those books. Factors we'd consider include the topic, genre, year of publication, author, price, and so forth. The technique is pretty simple and you don't need much data you just need to have a list of all the books available in the store along with the key characteristics and then you could run a similar items search. However, this approach has a few drawbacks. By only recommending similar items, you never open up customers to different types of books that they might be interested in. Let's say, for instance, that Bob tells you he just finished and loved All the Light You Cannot See, a popular, Pulitzer-prize winning novel. A similar items search might recommend other war fiction as opposed to, say, other Pulitzer-prize winning or literary novels, which could be a better fit for Bob.

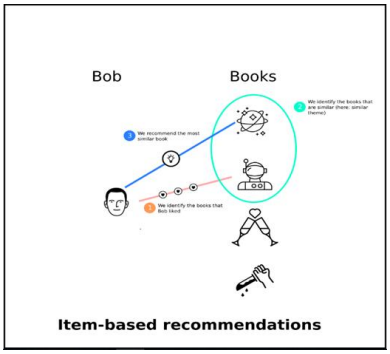

Fig. 1. Item based Recommendation System

Finding similar customers and recommending what they liked. Using algorithm, we can store and then access customers' reading histories and use their collective tastes to inform recommendations to customers who've read and liked one or more of the books in those reading histories. In many ways this algorithm is stronger than the first one as the books recommended don't necessarily have to include any of the same factors as the books we are using as the basis for our recommendation like topic, genre, and year of publication, author, and price. In order to find out what previous customers liked or disliked, you must have a rating system such as the number of stars a product gets on Amazon. The constraint of relying on a rating system is that products without user ratings won't be included in the collaborative filtering process. Therefore, you'd have to either force recommendations through push surveys or add a few dummy ratings to an unrated product in the system. Downside is that this kind of algorithm tends to form groups of users that look alike and that will, over time, get the same recommendations meaning suggested products therefore become less personalized over time. User recommendation system (URS) incorporates users' relationships from SNS, offering recommendations according to users' choices. URS calculates nearest neighbors, termed as friends. Next, collaborative content filtering is applied to friend's items. The basic architecture of URS comprises four modules: Data Collection, Data Preprocessing, Information Filtering, and User Interface.

A. Data Collection Module, DCM

The initial step is to collect required data from SNS, and store them in the local Database. DCM assures security of the stored data, and requires implementation of authorization of SNS. DCM retrieves information about users like profile, location, education, and work history. To calculate nearest neighbors, it is required to retrieve the relationships among users. Items liked by user's friends are collected for suggesting similar ones.

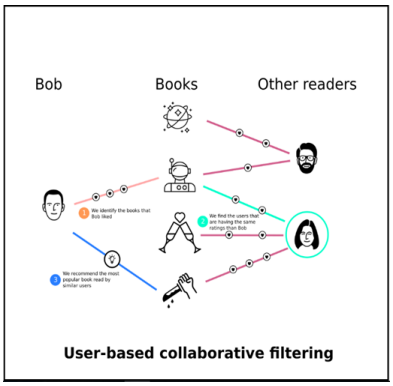

Fig. 2. User based recommendation system

B. Data pre-processing module, DPM

Data Pre-processing Module converts data into standard format for generating recommendations. USR treats no transformed categories as different categories, e.g., standardization of Book, book, or books entail book. Idem for removing HTML tags and encoding from data.

C. Information filtering module, IFM

Information Filtering Module is based on the assumption that user's choices are closely related to near friends. The recommended items of all categories for a particular user are stored in the Database, that is the output of IFM that consists of collaborative filtering (CFM) and content filtering (CF) Collaborative filtering module, (CFM) finds nearest neighbors within SNS, using data profile of user and friends (nearest neighbors). There exist four kinds of candidate groups for nearest neighbors (fi), mentioned as close friends, family members, friends with similar education and job, as well as, same education and home town. The basic idea is to assume that

when a group of friends like a particular item, more than once, this item will be also liked by the user.

D. User interface module, UIM

UIM offers a communication mechanism to user for interaction with all modules. User can select modules by clicking through user interface. It provides an authentication mechanism of URS. Once a user is logged in URS, he can select modules to complete recommendation steps. Modules operate sequentially and provide a list of recommended items to user. URS enhances the usage of data from SNS for our daily usage in other fields. It reduces user's efforts to look for his friends recommended items on SNS.

4. Conclusion

The User Recommendation System, which uses collaborative and content based filtering to provide suggestions. Accuracy issues of recommendation system, in case of cold start and over-personalization are resolved by utilizing data from SNS. URS is a standalone recommendation based on friend's choices, which eliminates the overhead of search for items liked by friends on SNS. Using social networking sites, the data can be mined and can be used for other sites to recommend data. The data of book to be read by individual is selected and is recommended to a person. As part of future work, accuracy of URS can be enhanced by using feedback from user as additional input in further recommendations.

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