

# Personalised Recommendation System for Commercial Websites

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## ABSTRACT

Earlier, the selection of data was done manually. But now, owing to the upcoming needs of various recommender systems the automatic segregation of data, based on information which is available at various social and commercial websites, has become possible. These Recommendation systems have been recommending various kinds of products to the users based on their past experiences. These generalized recommendations are not beneficial for everyone. Thus, the recommendations are not accurate. With a very high raise in the popularity and usage of social networks, a large number of people share their views by means of ratings and reviews. The major factors of social network include interpersonal interest and influence which brings various challenges to the recommender systems. In our system, we make use of these social factors to increase the accuracy of recommendations and enhance every user's experience. The problem of cold start users can also be solved by allowing these users to show interest in the products shared by their friends. Accordingly, these cold start users will also get recommendations specific to their interests. We make use of Natural Language Processing to make recommendations to different category of users.

**Keywords:** Social Network; Interpersonal Influence; Cold Start Filtering; Recommendation System; Natural Language Processing.

## ARTICLE INFO

### Article History

Received: 10<sup>th</sup> May 2016

Received in revised form :

10<sup>th</sup> May 2016

Accepted: 12<sup>th</sup> May 2016

**Published online :**

14<sup>th</sup> May 2016

## I. INTRODUCTION

Recommendation Systems basically are systems implemented to make recommendations of data or product to users to meet their individual needs. In commercial websites like Flipkart or Amazon, these systems are used to handle the mass scale of information which is then used to recommend preferred products and products to users. According to a recent survey it has been found that a minimum of 20% of sales in Amazon are the results of recommender systems. Thus, it can be easily concluded that, the use of recommender systems have had a major impact in the growth of business of commercial websites. Collaborative filtering algorithms have been used in the past in various recommendation systems to predict what user's interests are [1]. Recommendation systems based on collaborative filtering techniques like correlation have been very popular. These techniques may up to certain level of accuracy but these are computationally expensive and can only be implemented in static off-line environment. The recommendations provided by those systems were more generalized as they did not refer to individuals and their interests.

The two most distinct but related problems are (1) new user and (2) new product problems. A new user with smaller number of recommendations becomes very difficult to be recognized by the recommender systems. In the same way, a new product with smaller number of ratings i.e. products which has been rated by only a small number of users also poses a major problem to the recommendation system while deciding the users to whom if the product is recommended, it actually would be an efficient and personalized recommendation. To have accurate and reliable recommendations, users need to rate sufficient or large amount of products as this is the basic need to achieve desired content-based recommendations. The system won't be able to provide good and appropriate recommendations if the user has rated only a small amount of products as the system do not have enough information to aid in the recommendation process. The recommendations performed by collaborative recommendation systems are based on user preferences, so new products must be rated by a large number of people for efficient recommendation.

There are huge numbers of products that are sold over e-commerce websites. The different categories of products may affect the way customers deal with variety of information available and it may affect their decisions about purchasing certain products. The categorization of these attributes is done on the basis of two attributes which are search and experience. The variation in the results of experienced and searched products may result in a different level of problems in acquiring information related to product when customers make any purchase decisions. In comparison with the search products, the searching cost of these experienced products is comparatively higher due to the problems in analyzing these products using this kind of product. Hence, customers look for more kind of recommendations which users can use to make their purchase decisions.

Many factors have been studied and investigated by a number of researchers and these factors may have a very strong influence on the usage of online recommendations by online customers. The present research is focused on trying to achieve trustworthiness, personalization and perceived usefulness and on the efficiency of recommendations.

## II. PROPOSED SYSTEM

In the recent past, a wide variety of Recommendation systems based on techniques like Collaborative Filtering Content filtering have been developed. In order to better these techniques, a recommendation system based on the three social factors user interest, interpersonal similarity and interpersonal influence have been developed. This system focuses on improving the efficiency and accuracy of recommendations by providing recommendations based on the three social factors mentioned above.

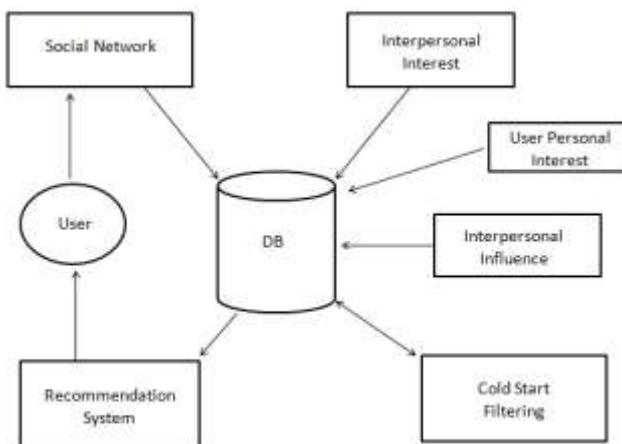


Fig.1 Recommendation System Architecture

Our system has been identified to have the following important sections:

1. Social Network
2. Interpersonal Influence
3. Cold Start Filtering
4. Recommendation System

## 1 Social Network

The ability to create a Profile page—this is your main “home” on the network. Different networks offer varying abilities to personalize your page in terms of look and feel. They may also differ in terms of the types of information you would include, such as name, Date of Birth, Photo, etc. Facebook, for example, asks for your relationship status (because it’s more “social”), while on LinkedIn, which is primarily for professional use, does not.

*A way to find and link to “friends” or connections:*

The purpose of a network is connections, so facilitating a members’ ability to find and connect to other people is important. Each network offers different types of search capabilities and once you’ve located a potential friend, you must send a “friend request” to invite them into your personal network.

*Privacy Controls:*

In most networks, your ability to access more detailed information about a person is based on their status as one of your connections; “friends” can see much more information than those who are not your “friends.” You can control who is actually in your personal network by effectively managing who you invite into your network and whose friend request you accept.

## 2 Interpersonal Influences

This aspect of our system focuses on how a user can influence his/her friends to receive proper and precise recommendations. It is very likely that a group of friends may have similar interests. Thus, if a friend recommends an item or a product to their friends, there is a high possibility that the recommended item is going to be useful and would be of interest to another user.

The social network will allow any user to provide their personal interest enabling the recommendation system to provide user specific recommendation. It allows one user to share their interests with their friends and influence them about the different category and quality of products and places that are in offer.

## 3 Cold Start Filtering

Cold start is a potential problem in computer-based information systems which involve a degree of automated data modelling. Specifically, it concerns the issue that the system cannot draw any inferences for users or items about which it has not yet gathered sufficient information.

In our system, we try to provide a solution to this problem by allowing users to show interest in the products shared by their friends. Each cold start user need to only browse through their newsfeed in the social network and like or dislike the products. System will provide the right recommendations based on the products they like.

## 4 Recommendation Systems

Recommender systems or recommendation systems are a subclass of information filtering system .that seeks to predict the 'rating' or 'preference' that user would give to an item. The recommender system compares the collected data to similar

and dissimilar data collected from others and calculates a list of recommended items for the user. This system often requires a large amount of existing data about a user in order to make accurate recommendations.

### III. ALGORITHM

#### Natural Language Processing

Natural language processing (NLP) is a technique which is a part of computer science. It is highly used in artificial intelligence. It deals with ways of interactions between humans and computers. One of the major challenges of NLP includes understanding of natural language. It means computer should be able to interpret human language and respond accordingly.

#### Steps for personalized recommendation:

Step1 – Get the list of positive words and negative words.

Step2 – For experienced users, select data (category of interest) for personal interest which is shared by him from user interest cluster and for cold start users select data from interpersonal influence shared by him.

Step3 – If particular user has shared his personal interest with the system identify him as an experienced user else he is a cold start user with no background history with the system.

Step4- For an experienced user, select all the category details data from website ones, website two, website three which is of user personal interest.

For ex- If user has a personal interest in restaurant then all the details from different website from restaurant category is collected.

Step5- If selected data size is greater than zero then apply NLP approach which creates tokens of the feedback comments i.e. one of the details collected from websites.

Step6- Using NLP applies postage which creates part of speech of feedback comment which helps in comparing positive feedback comments.

Step7- Using NLP create list of sentences from feedback comments. Then check if sentence from the list contains positive words from the positive votes list or not. If contains then maintain the count.

Step8- Insert the sentence count into the database table with positive word and its count.

Step9- Select the sentence with having max positive word count from the table.

Step10- Find recommendation details like name, category, and link belonging to sentence which is selected in previous step.

Step11- Insert recommendation details selected in step10 into recommendation table for particular site.

Step12- Show recommendations for experienced user and for cold start user show recommendation from each site with respect to his area of influence and interest similarity.

### IV. RESULTS

In this paper, we have implemented a recommendation system based on the three crucial social factors which includes user personal interest, interpersonal similarity and interpersonal influence. Following pictures gives an illustration of our system.

This is the home page of the social network. It allows admin as well as user login. User can create their profiles and connect with their friends.



Fig 2. Home page

The following picture provides a view of how a user can input their personal interest into the system. A user can select a category from the many categories available, add a picture, rate it and provide useful comments about it.



Fig 3. Personal interest information page

This is an example of the interests shared by users. It allows the cold start users (users with no information in the system) to like these products and interests. Based on what a cold start user likes or dislikes, appropriate recommendation of corresponding category is given to the user.

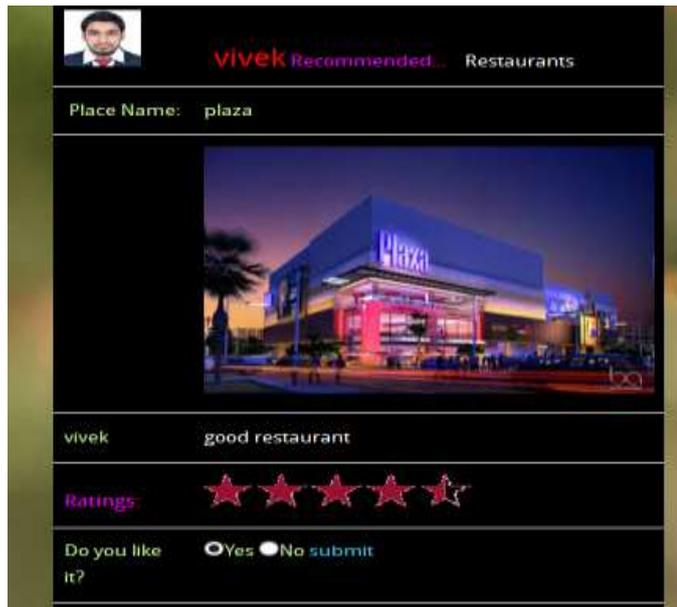


Fig 4. Interests of selected product

This picture shows the items that have been recommended to a user. These recommended items are a result of the personal interest provided by the user and the items liked by the cold start users.



Fig 5. Items that have been recommended to a user.

This is the result of clicking on any recommendation that has been given. It takes you to the page on the web where one can get further information related to that recommended product or place.



Fig 6. Result of clicking on any recommendation

## V. CONCLUSION

In this paper, we have learnt how a recommendation system works. We have made use of the three social factors user interest, interpersonal similarity and interpersonal influence to develop a system that can provide recommendations which are accurate and specific to every individual user. We have tried to provide proper recommendations to even a cold start user which refers to the users about whom the system has no information at all. These recommendations have been largely dependent on the comments a user made about any product. Products with good comments get recommended more often. This system can be improved in the future by taking user's location information to provide recommendation of real time items.

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