Intelligent Techniques for Web Personalization and Recommender Systems
AAAI Technical Report WS-12-09

A Web-Based Book Recommendation Tool for Reading Groups

Sayıl Düzgün, Ayşenur Birtürk
Computer Engineering Department, Middle East Technical University
Ankara, Turkey
sayil@metu.edu.tr, birturk@metu.edu.tr

Abstract

Reading groups domain is a new domain for group recommenders. In this paper we propose a web based group recommender system which is called BoRGo: Book Recommender for Reading Groups, for reading groups domain. BoRGo uses a new information filtering technique which uses the difference between positive and negative feedbacks about a feature of a user profile and also presents an interface for after recommendation processes like achieving a consensus on the reading list.

Introduction

Most of the current recommender systems recommend items only to individuals but in real life people often use items or do activities with groups of people in domains like movies, vacations, tourist attractions, music, and restaurants. Thus, recommenders which aim groups of people are needed in these domains. Group recommenders diverge from individual recommenders such that they need to aggregate members of the group in a joint model because of the fact that individuals with different profiles composes the group itself, and in order to do this aggregation they need a user satisfaction function. Members of a group may need to get help to decide on the items of recommendation list, therefore a group recommender should also provide a medium to groups which they can use to discuss and decide what to do with the recommended list.

Nowadays there are several reading groups to which people join to read and discuss books with other people. In general, reading groups spend a great deal of effort in choosing the books which they will read during the year. Most reading groups have a special session to choose their books before the start of the year.

(Reading-Group-Choices, 2011) presents surveys about reading groups' book selection methods. In the survey (Reading-Group-Choices, 2011), it is seen that nearly the half of the groups choose the entire booklist for the year in advance. Most of the reading groups discuss nine books in a year. They mostly do not gather during the summer holidays.

Books are suitable items for content based recommenders, because they have sufficient content information which can be used in a content-based recommendation algorithm. In this study, we propose a content based book recommender for reading groups which is called BoRGo (Book Recommender for Reading Groups). BoRGo is designed to give recommendations to groups as well as to individuals by using book, user and group profiles. BoRGo also helps reading groups to determine the final book lists which will be read throughout the year. To the date, BoRGo is the first study of group recommenders in reading group domain and the first web application which social communities can use to decide on the books to be read via internet without organizing face to face meetings.

Related Work

Group Recommender Systems aim to satisfy not only the individual person whom asks for the recommendation on behalf of the group but also the whole group members up to a certain degree. Different satisfaction functions can be chosen to determine the level of satisfaction of the group. Group Recommender Systems need to aggregate individual user preferences or models to produce a recommendation list for the group itself. These two concepts, Aggregation Methods and Satisfaction Functions, will be mentioned in the following sections.

Groups may need to discuss and accept or not accept some of the items which are recommended by the Group Recommender System. In order to do that, they need a

medium. This concept is one of the needs of group recommenders which are not addressed by most of the researches. The Mediation Techniques subsection below addresses a few studies about this topic.

Group recommenders need to aggregate individual preferences of all of the group members in order to recommend item for groups. Therefore they need a mechanism for aggregation. It can be seen from previous works that there are two main methods for aggregation process (O'Connor et al, 2001).

- Joint recommendation list: In this method, first individual recommendation lists are produced for each member. Then these recommendation lists are combined into a single joint list.
- Joint user model: In this method, individual preferences or profiles aggregated before recommendation process and a single recommendation list generated for that joint model.

PolyLens (O'Connor et al, 2001), PocketRestaurandFinder (McCarthy, 2002), INTRIGUE (Ardissono et al, 2003) uses joint recommendation list method and Travel Decision Form (Jameson, 2004), (Zhiwen et al, 2005), CATS (McCarthy et al, 2006), (Zhiwen et al, 2006), GRec-Oc (Kim et al, 2009) and (Garcia et al, 2009) uses joint user model as their aggregation methods.

Another main characteristic of group recommenders which separate them from individual recommenders is that they need a satisfaction function during aggregation process both for joint recommendation list and joint user model methods. (Masthoff, 2004) presents detailed research results on different satisfaction functions.

In group recommendation, after recommendation processes are complicated. Because for group recommendation it is not an individual decision which has to be done, but a group consensus is needed. Especially when the group members do not know each other well and the group is formed intentionally but temporarily -like in Pocket Restaurant Finder (Mccarthy, 2002) it can be hard to reach a consensus over the selection among the recommended alternatives. Even if the group members know each other well -like in PolyLens (O'Connor et al, 2001) they need to know what the others think about the possible selections.

BoRGo: Book Recommender for Reading Groups

BoRGo is a content based group recommender which recommends books for reading groups as well as individual readers. It uses content information of the books which have been rated by the user. Like all other content based recommenders, BoRGo has user and book profiles. Individual recommender finds the books which can possibly satisfy the user mostly, using the user and item profiles.

BoRGo uses explicit user modeling. User profile is constructed by the ratings which the user gave to the books which he already read. The scale of ratings is between 0 and 10. Ratings higher than or equal to 7 are considered as positive ratings and ratings less than 7 are considered as negative ratings in BoRGo. 6 and 5 could have been considered as positive ratings also, but in order to find and recommend the most relevant items it is decided to draw the line which separates positive and negative ratings a bit higher and thus 7 is chosen as the touchstone.

In BoRGo, each book can have several features which belong to different dimensions. There are 82 different dimensions like "Author", "Country", "Editor", "Genre" etc. BoRGo uses content knowledge of the books collected from the book dataset (BookDataset, 2011). This content knowledge is represented by features and their dimensions.

In BoRGo each feature has a feature score which identifies the importance of that feature. Some features are more important than others to distinguish a book. We propose that, a feature f_i will be more discriminative if fewer books in the database have it. The more features a dimension of f_i has, the more discriminative the feature f_i will be. To model these rules, we used a TF-IDF measure (Sebastiani, 2002). We calculate the feature score FS of each feature f_i with the formula (1);

$$FS(f_i) = \log(B/B_{fi}) \times \log(D_j) \quad (1)$$

In this formula, B is the total book count, B_{fi} is the count of the books which have feature f_i and D_j is the count of the features which belongs to the dimension D_j which feature f_i belongs to.

Individual Recommender

BoRGo is capable of producing individual recommendation lists. These individual lists are also the base of the group recommendation process. BoRGo differs from other content based recommenders with the filtering method used in it. In BoRGo's filtering method only the books which have more potential of being liked by the user are chosen to be candidates. We used "AbsoluteTotalWeight" of features while filtering books. We can use negative ratings in a negative manner by using "AbsoluteTotalWeight", because of the fact that we calculate the "AbsoluteTotalWeight" of a feature by subtracting the "NegativeWeight" of that feature from the "PositiveWeight" like in formula (2)

$$ATW(f_i) = PositiveWeight(f_i) - NegativeWeight(f_i) \quad (2)$$

In filtering process of BoRGo, first candidate books are found. The books which have at least one common feature with the books that were rated positively by the user are considered as candidate books.

After finding candidate books set, BoRGo first calculates the ”AbsoluteTotalWeight” of the features which are common to both the user profile and the candidate book profile. However if a user has not rated any books positively, BoRGo cannot find any candidate. This is the main drawback of the filtering method which we used in BoRGo.

After calculating the ”AbsoluteTotalWeights” of the common features, BoRGo takes the sum of the ”AbsoluteTotalWeights” of these common features to calculate a final recommendation score for that book. Then the candidate books are sorted according to their scores. Finally, a recommendation list is presented to the user.

Group Recommender

A user can ask for recommendation for the group he belongs to after he signs in to the system. Group recommendation process needs an aggregation algorithm and satisfaction function.

After a group is formed and one of the members of the groups asks for the group recommendation from BoRGo, BoRGo first generates individual recommendation lists for each member of the group as it is mentioned in previous section.

Then it aggregates individual recommendation lists into a final recommendation list for the group. As we mentioned before this method is called joint recommendation list method. With this method, it is easy to explain the final list and the order of the books in the list to the users. This is the main factor for us to choose this method in the aggregation process.

The most important drawback of this method is that it slows down the recommender when the group is too big in size. But reading groups generally consist of 5-10 people and this size is small enough to allow usage of joint recommendation list method.

We chose ”average user satisfaction” in order to satisfy the majority of the group members to a certain degree. (Masthoff, 2004) shows that using ”average user satisfaction” can upset some of the members of the group who do not rate books as much as others or who have marginal tastes. However in BoRGo, we prefer to satisfy the majority of the group instead of caring for marginal or non-contributing members.

When the user asks for recommendation for a group, BoRGo generates individual recommendation lists as mentioned before. Then group scores for each distinct book in the individual lists are calculated. The group score for each book b_i selected from individual lists, is calculated as shown in the following formula (3);

$$GS(b_i) = \sum_{j=0}^{n} IS(b_{ij})/MC \quad (3)$$

In the above formula, $GS(b_i)$ is the calculated group score for book bi, $IS(b_{ij})$ is the individual recommendation score of book bi for member j. If bi is not in one of the group members’ recommendation lists then the individual score of that book for that member is zero. MC is the member count of the group.

After group scores are calculated for each book, books are sorted according to their group scores and the first nine books are presented as the group recommendation list to the users. A final recommendation list of nine books is appropriate for our test groups and also real reading groups because of the fact that groups often do not meet during summer holidays and thus they discuss only nine books per year (i.e. one book/month).

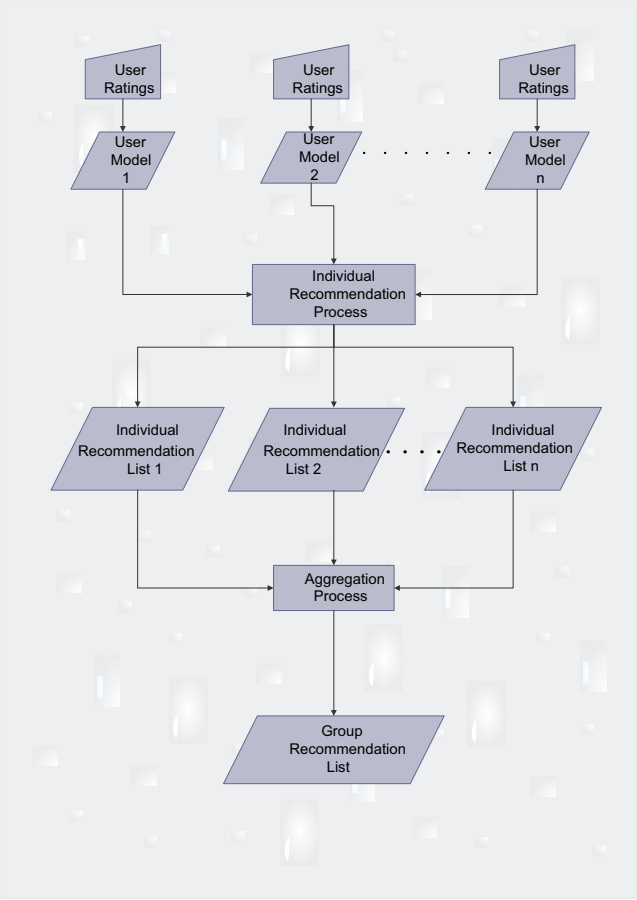

Figure 1. Group Recommendation Process

Mediator

Recommendation process does not come to an end after recommendation list is presented to the user(s). Especially in group recommendation, members of the group need to reach a consensus over the list. This is also valid for reading groups domain. In natural way of deciding which books to read -without a recommender- reading groups use some different techniques.

BoRGo -as a group recommendation tool- helps reading groups to find most relevant items for the group. In addition to finding relevant books, BoRGo also supplies a medium to the users by which they can share their thoughts of recommended books with the other group members. Also moderator of the group can ask for new recommendation only instead of the books which are not accepted by the group. These two novel features of BoRGo work as a mediator for after recommendation process.

BoRGo presents two different user interfaces for after recommendation process. First of them is the ”Edit Group Recommendation” screen that each member can see the books in the latest group recommendation list. Members can give feedback about each book in the list from this screen. After the group recommendation list is produced. Each member of the group can see recommended books from ”Edit Group Recommendation” screen. On this screen, users can see id-number, title and group score of the recommended books and specify his preferences about the book.

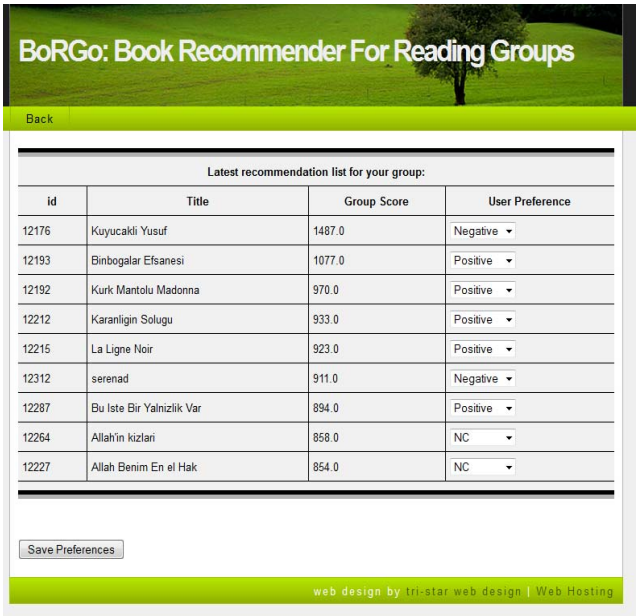

Figure 2. Edit group recommendation screen.

Default value of user preferences for the books is ”DC” which means ”I Don’t Care”. If a user leaves his preference for a book as ”DC” , it means that user does not care to read or not to read that book. Instead of ”DC” user can specify his preference about the book as ”Positive” or ”Negative” by choosing from the ”User Preference” combo for the book. When a user gives a negative feedback about a book via this screen, it changes that user’s profile information. We do not change the user profile with positive feedback because we don’t ask the user to rate the book at this step. There is always a possibility that the user does not like the book after reading it although he set his preference as positive before reading.

After selecting a preference value for each book in the recommendation list, user must save his preferences. User can see or change his preferences from same screen afterwards.

Second interface of the mediator is the screen which shows the preferences of all of the group members together. With this screen each member of the group can see each other’s thoughts for the books in the group recommendation list.

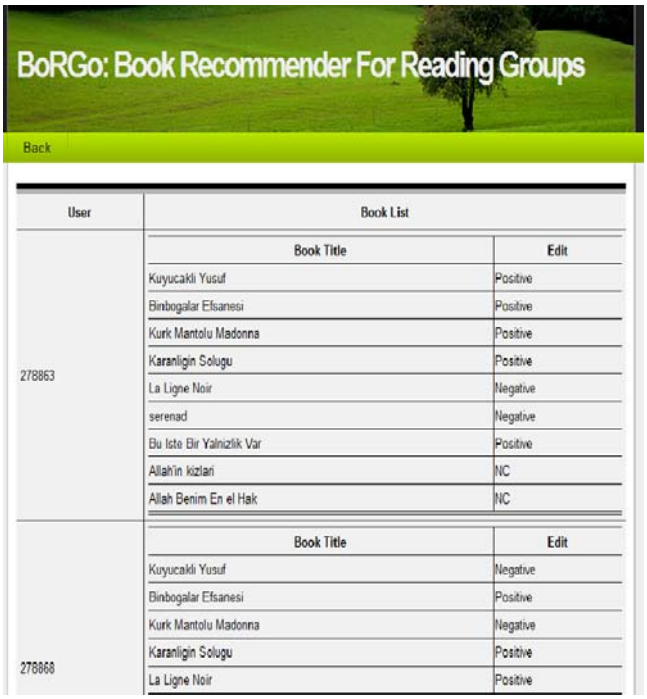

Figure 3 Member preferences screen.

”Member Preferences” screen also helps moderator to see which members of the group did not specify their preferences about the group recommendation list. Also group members can see each other’s edits via this screen.

After each member shares their thoughts about the books in the list, if it is necessary, the moderator of the group can ask new recommendations only for the books in the recommendation list for which at least half of the group members did not voted positively. This type of recommendation request does not change the whole list instead BoRGo finds the books in the list which at least half of the group members voted negatively and

recommends new books instead of them. The books which are rated positively by majority remain in the list, only the negatively rated ones change after partial recommendation. We thought that if a user really dislikes a recommended book then he will set his preference to “Negative” for that particular book. Therefore during this iterative process ”DC”s are determined as positive feedbacks for the books.

New group recommendation list is presented to the members via ”Edit Group Recommendation” screen with newly recommended books. Members can give feedback to the new books in the list via this screen. After everybody finished editing new books, if it is needed moderator can ask for new recommendation again until all of the books in the list are marked positively by the majority.

Evaluation of the System

We used combination of two different datasets -one for books and one for user ratings, in the evaluation of BoRGo. User dataset (UserDataset, 2010) contains UserID, Age and Location information about 278859 users and 1149781 ratings, scaled from 0 to 10, that are given by these users for books.

Book dataset (BookDataset, 2011) contains various information in 82 different dimensions about books from author to image caption of the book. Books are uniquely identified by ISBN numbers in both datasets. ISBN is defined as ”The International Standard Book Number (ISBN) is a 10-digit number that uniquely identifies books and book-like products published internationally.” in (ISBN, 2011). We joined two datasets by ISBN.

When we try to match up books from the book dataset to the books from user dataset over ISBN, we saw that some of the ISBNs do not match each other or some books in the book dataset even do not have an ISBN.

Although book dataset contains 12322 books and user dataset contains 1149781 ratings originally, combination of these two datasets contains only 17270 users whom rated at least one book and 54017 ratings for 3230 different books because of lack of ISBN matching problem.

BoRGo has a database which includes books, users and the ratings that are assigned to the books by the users. It is a sparse database in terms of the ratings. In all of the following experiments except user studies we calculated the rating of book b for the group as in the formula (4);

$$R_{group} = (R_1 + R_2 + \ldots. + R_n) / n \quad (4)$$

In this formula R_n is the rating given for that book by the member n. If a member did not rate that book, it would not affect the group’s rating for that book. In other terms we only considered existing ratings to calculate the rating of the book b for the entire group.

We did 3-fold cross validation in order to evaluate BoRGo in each experiment. We randomly took 1/3 of the books as our test group in each validation, and tried to see which of those books would be recommended to the group. We considered the books whose group’s ratings were positive (actual positive) and recommended to the group (predicted as positive) as true positives (TP), the books whose group’s ratings were positive (actual positive) but were not recommended to the group (predicted as negative) as false negatives (FN), the books whose group’s rating were negative (actual negative) and were not recommended to the group (predicted as negative) as true negatives (TN) and the books whose group’s rating are negative (actual negative) and recommended to the users (predicted as positive) as false positives (FP).

Then we calculated the precision, recall, accuracy and F-measure metrics for each experiment by using the formulas in the Equations 5-8. Precision and Recall are the most common metrics used in the evaluation of recommender systems (Billsus, Pazzani, 1998; Basu et a 1998; Sarwar et al 2000).

$$Precision = TP / (TP + FP) \quad (5)$$

$$Recall = TP / (TP + FN) \quad (6)$$

$$Accuracy = (TP + TN) / (TP + TN + FP + FN) \quad (7)$$

$$F\text{-}Measure = (2 \times P \times R) / (P + R) \quad (8)$$

Evaluation with Groups Formed According to Members’ Demographic Info

Initially we do not have any group information in datasets. In order to evaluate BoRGo, we needed to form the user groups. We assume that users who live in the same city probably join the same reading community. To make the test groups more realistic, we decided to group users who live in the same cities according to their age intervals. We selected the cities which contained more than fifteen users who rated at least one book. Then we grouped people in each city according to their ages. Finally we tested our system with eighteen different groups.(Table 1) shows evaluation results of these experiments.

Member Count	Precision	Recall	Accuracy	F-Measure
5	0,75	1,00	0,93	0,84
5	1,00	1,00	1,00	1,00
5	0,89	1,00	0,94	0,93
6	1,00	1,00	1,00	1,00
6	1,00	1,00	1,00	1,00
6	1,00	0,92	0,94	0,95
7	1,00	1,00	1,00	1,00
7	1,00	1,00	1,00	1,00
8	1,00	0,87	0,92	0,92
8	0,92	1,00	0,96	0,95
8	1,00	1,00	1,00	1,00
10	0,93	1,00	0,94	0,96
10	1,00	1,00	1,00	1,00
10	1,00	1,00	1,00	1,00
10	1,00	1,00	1,00	1,00
12	0,93	1,00	0,96	0,96
13	0,92	0,71	0,78	0,79
14	1,00	1,00	1,00	1,00

Table 1 Evaluation results of experiments with groups formed according to members' demographic information

The average precision value is calculated as 0.96, the average recall value is calculated as 0.97, the average accuracy value is calculated as 0.97 and the average f-measure value is calculated as 0.96 in this experiment. According to these result we can say that BoRGo is capable of finding relevant books for the groups.

Evaluation with Different Sized Groups

In order to see the performance of BoRGo we did experiments with different sized groups. For these experiments we composed ten groups with five different group sizes by randomly selecting members.

The interests of the group members within each group may not overlap because of the random member selection mechanism and ratings are very sparse for these groups. You can see the evaluation results of these experiments in Table 2.

Member Count	Precision	Recall	Accuracy	F-Measure
10	1	1	1	1
10	1	0,83	0,91	0,91
15	1	1	1	1
15	0,83	1	0,94	0,89
20	1	0,73	0,85	0,84
20	1	0,93	0,96	0,96
25	0,95	0,85	0,91	0,87
25	0,83	0,22	0,6	0,38
30	1	0,38	0,81	0,54
30	1	0,63	0,86	0,77

Table 2 Evaluation results of BoRGo with different sized groups

As the group gets larger, recall and F-measure values decrease remarkably. Accuracy also decreases but not that remarkably. Precision remains almost the same. In this experiment the average precision is calculated as 0,96 , the average recall is calculated as 0,76, the average accuracy is calculated as 0,88 and the average F-measure is calculated as 0,81.

Evaluation with Groups Whose Ratings Are Dense

We formed five different groups with members selected randomly among the users who rated highly rated books. These groups' sizes vary. The ratings are mostly very dense, and the users' tastes overlap for these group combinations.

The groups which we used in Section 4.4.1 have ratings between 11 and 186. On the other hand, the groups we used in this experiment have ratings between 589 and 1134 in total. The results of this experiment are shown in Table 3.

In this experiment the average precision value is calculated as 0,84, the average recall value is calculated as 0,08, the average accuracy value is calculated as 0,68 and the average F-measure value is calculated as 0,19. The reason behind these low recall, accuracy and F-measure values is that our recommender only shows nine recommendations to the group. For example member of one of the groups which we used in this experiment rated 510 different books. 242 of these 510 books are rated positively by the members. When we applied 3 fold cross validation for this group, in average we removed 80 positively rated books in each fold but we recommended only 9 books which means number of true positives can be at most 9 and number of false negatives can be at least 71. Therefore metrics which use true positives over false negatives in their formula, resulted low values.

Member Count	Precision	Recall	Accuracy	F-Measure
4	0,92	0,08	0,58	0,4
4	0,83	0,08	0,59	0,15
5	0,85	0,08	0,75	0,15
10	0,8	0,09	0,78	0,16
14	0,81	0,05	0,69	0,1

Table 3 Evaluation results of BoRGo with the groups whose ratings are dense.

User Studies

We asked users for book ratings via facebook (Facebook, 2011). 15 users rated 148 different books in total. We grouped these users into four groups according to their interests. Then we recommended 9 books to each group also via facebook. We asked each user if he/she would like to read each book during the year as a member of that

reading group. We assumed that if at least half of the members of a group are willing to read a recommended book, that book is accepted by the whole group. We currently have three of four groups' responses. For group one, we achieved a hundred percent success. All the books we recommended have been accepted by the group. For group two, eight out of nine recommended books were accepted by the group. The third group accepted seven of nine books. So we achieved a 0.89 average success rate.

In previous experiments we studied with user data from users who mostly read in English. But in the user studies reported here, our users are people who frequently read books in Turkish. The majority of the books in our database are written in English. This causes Turkish to be a more discriminative feature and BoRGo takes this account and recommends Turkish books to the users who may prefer an English action book to a Turkish romance book. This explains the difference between success rates of previous experiment and this user study. Importance of a feature is strongly related to the used dataset. If Turkish books were majority in our database, Turkish would not be a more discriminative feature and would not affect the recommendation list this much.

User Studies For After Recommendation Process

As it is mentioned in Section 3.2.2 we developed a mediator for BoRGo in order to help groups with after recommendation process. We performed an experiment to learn in how many cycles, members of a group reach a total consensus over the group recommendation list.

12 users participated to this study. They are randomly grouped into three different groups. Users whom participated to this study gave 151 ratings to 122 different books. BoRGo recommended to each group a list of books. There are two books which are found to be negative by the first group after all of the members identified their opinions about the books in the group recommendation list. Then moderator of the group asked for the new recommendation instead of these two books. BoRGo recommended two new items then all of the group members accepted second recommendation list with two new books.

Second group accepted the first list that BoRGo recommended to them. However Member3 is the marginal member of this group. He mostly has a negative opinion about the items in the list but this is a main side effect of the satisfaction function which we used in BoRGo. We aim to satisfy the majority of the group.

There are again two books which are found to be negative by the third group after all of the members told their opinions about the books in the group recommendation list. Then moderator of the group asked for the new recommendation instead of those two books BoRGo recommended two new books. Then all of the group members accepted second list.

In this experiment, for second group, we achieved a hundred percent success. All the books we recommended have been accepted by the group. For first and third groups, eight out of nine recommended books were accepted by the group members in the first cycle. So we achieved a 0.93 average success rate without partial recommendation.

First group accepted second list which BoRGo recommended with partial recommendation. Second group accepted the first version of the recommendation list so there was no need for partial recommendation. Finally the third group also accepted second list which BoRGo recommended with partial recommendation. So for these randomly formed three groups, a consensus is reached over the book list to read during the year with at most two recommendation cycles over the web.

Conclusion and Future Work

In this paper, a content based group recommender for reading groups –named BoRGo- is presented. Reading groups domain is a new domain for group recommender studies. This is the first contribution of our work. We aimed to develop a recommender system which can help reading groups to choose most acceptable books. The new filtering method used in BoRGo is the second contribution of our study.

After recommendation process is one of the least studied areas of recommender systems. BoRGo presents a mediator for after recommendation process. Group members can notify their opinions about each item in group recommendation list. They also can see each other's preferences about the items in the recommendation list. Moderators of the groups can ask for the partial recommendation for the items in the recommendation list which are not liked by the members in general. This is one of the major contributions of our work.

BoRGo is a content based recommender therefore it suffers from drawbacks of this method. Thresholds can be used while finding candidate books for recommendation in order to make more precise recommendations. Reading groups may define some filters while choosing the books which they will read during the year. BoRGo can filter some of the books in recommendation list according to these filters.

References

Ardissono L., Goy A., Petrone G., Segnan M., Torasso P., 2003. INTRIGUE Personalized recommendation of tourist attractions for desktop and handset devices. Applied Artificial Intelligence 17(8 9) (2003) 687 714

Basu, Hirsh, Cohen, 1998, ”Recommendation as Classification: Using Social and Content-Based Information in Recommendation”, Recommender Systems Papers from 1998 Workshop, Technical Report WS-98-08, AAAI Press.

Billsus, Pazzani, 1998, ”Learning collaborative information filters”, In Proceedings of the 15th National Conference on Artificial Intelligence.

BookDataset : http://infochimps.com/datasets/book, Last accessed on January 2011.

Facebook: www.facebook.com, accessed at 01.12.2011

Garcia I. , Sebastia L. , Onaindia E. , Guzman C, 2009. A Group Recommender System for Tourist Activities, Proceedings of the 10th International Conference on ECommerce and Web Technologies, September 0104, Linz, Austria

ISBN: http://ussan.org/standards/home/isbn/us/isbnqa.asp, at 01.12.2011

Jameson, A., 2004. More than the sum of its members: Challenges for group recommender systems. In Proceedings of the International Working Conference on Advanced Visual Interfaces, 4854

Kim J.K., Kim H.K., Oh H.Y., Ryu Y.U., 2009. A group recommendation system for online communities. In: International Journal of Information management (2009) Volume: 30, Issue: 3, Publisher: Elsevier Ltd, Pages: 212219 ISSN: 02684012 DOI: 10.1016j.ijinfomgt.2009.09.006

Masthoff J., 2004. Group Modeling: Selecting a Sequence of Television Items to Suit a Group of Viewers. In : User Modeling and UserAdapted Interaction, Vol. 14, No. 1. (1 February 2004), pp. 3785.

McCarthy J., 2002. Pocket Restaurant Finder A situated recommender system for groups. In Proceedings of the Workshop on Mobile Ad Hoc Communication at the 2002 ACM Conference on Human Factors in Computer Systems, Minneapolis.

McCarthy, Salamó, Coyle, McGinty, Smyth, Nixon , 2006. CATS: A Synchronous Approach to Collaborative Group Recommendation. FLAIRS Conference 2006: 86-91

O’Connor M. , Cosley D. , Joseph A., Riedl J., 2001. PolyLens: A recommender system for groups of users. In Prinz,W., Jarke, M., Rogers, Y., Schmidt, K.,Wulf, V., eds.: Proceedings of the Seventh European Conference on Computer Supported Cooperative Work. Kluwer, Dordrecht, The Netherlands (2001)

Reading-Group-Choices: http://www.readinggroupchoices.com/readinggroups/choose.cfm, Last accessed at 2011.

Sarwar, Karypis, Konstan, Riedl, 2000, ”Analysis of recommendation algorithms fore-commerce”, In Proceedings of ACM E-Commerce.

Sebastiani F., 2002. Machine learning in automated text categorization, ACM Computing Surveys (CSUR), v.34 n.1, p.1-47

UserDataset : http://www.informatik.uni-freiburg.de/ cziegler/BX/, Last accessed on December 2010.

Zhiwen Y., Xingshe Z., and Daqing Z., 2005. An Adaptive InVehicle Multimedia Recommender for Group Users, IEEE 61st Semiannual Vehicular Technology Conference (VTC2005Spring), pp. 28002804, IEEE Press, May 30 June 1, 2005, Clarion Hotel, Stockholm, Sweden.

Zhiwen Y., Xingshe Z., Yanbin H., and Jianhua G., 2006. TV Program Recommendation for Multiple Viewers Based on User Profile Merging, User Modeling and UserAdapted Interaction (UMUAI), Springer Press, Vol. 16, No. 1, March 2006, pp. 6382.