International Journal of Application or Innovation in Engineering & Management (IJAIEM)
Web Site: www.ijaiem.org Email: editor@ijaiem.org
Volume 6, Issue 8, August 2017 **ISSN 2319 - 4847**

COLD-START PRODUCT RECOMMENDATION THROUGH SOCIAL NETWORKING SITES USING WEB SERVICE INFORMATION

Z. HIMAJA[1], C.SREEDHAR[2]

[1] PG Scholar, Dept of CSE, G Pulla Reddy Engineering College, Kurnool (District), Andhra Pradesh, INDIA.

[2] Associate Professor, Dept of CSE, G Pulla Reddy Engineering College ,Kurnool (District), Andhra Pradesh, INDIA.

ABSTRACT

Nowadays many e-commerce websites support the mechanism of the social login mechanism with their social network identities. Providing the cold start product recommendation with the knowledge extracted from the social networking sites becomes a major challenge. To overcome this challenge the linked users across social networking sites and e-commerce websites are used as a bridge to map users' social networking features to the latent features for the product recommendation. Here the demographic attributes of the user are considered to provide the recommendations to the user. The user provides the interests at the time of registering to the social site. Based on the interests the products are recommended to the users.

Keywords: Cold-start recommendation, demographic attributes, e-commerce, social media mining.

1.INTRODUCTION

In recent years the users for social networking sites was drastically increased. This drastic change creates a new way for e-commerce websites to increase their sales. The boundaries between e-commerce and social networking sites have become less distinct. The mechanism of social login with their social networking identities was supported by e-commerce websites. The product recommendations can be done by social networking sites by posting and sharing the product links on networking site when the user buys a new product. By analyzing the users profile the recommendations are made based on the user's interests and preference.

1.1 SOCIAL MEDIA MINING

The representation, analyzing and extracting of actionable patterns from the social media data is called the social media mining. Social media mining allows integrating social theories with computational methods to study how social atom (individuals) interact and how social molecules (communities) forms. For investigating massive social media data the social media mining provides the basic concepts and principals.

Social media mining can generate insights about how much someone is influencing others on the web. Social media mining can help businesses identify the pain points of its customer in real time. Identification of potential customers is a very important problem every business has been trying to solve for ages. Social media mining can help in identifying potential customers based on their online activities and based on their friend’s online activities.

1.1.1 Challenges for Social Media Mining

In social media theory, people are considered to be the basic building block of the world created on the grounds provided by the social media. Mining social media data is the task of mining user-generated content with social relations. This data presents some challenges in social media mining [1].

Big data: Social media data is undoubtedly big. If recommender would like to make relevant recommendations a little data for each specific individual is needed. The advantage provided by the social media is it helps us to aggregate information with sufficient statistics for effective mining by using its multidimensional, multisource, and multisite data.

Sufficiency: One of the commonly used methods to collect data is via application programming interfaces (API) from social media sites. Getting every piece of data on social media is impossible because the social media networks restrict the amount of information that can be accessed in a certain timeframe. So sometimes the data is not sufficient enough to generate patterns and recommendations.

Noise removal error: Preprocessing steps are more or less always required in any application of data mining. Social media data by its nature contain a large portion of noisy data. Two situations will be encountered while removing the noise in the data :(1) blindly removing noise can worsen the problem because removal can also eliminate valuable information, and (2) the definition of noise becomes complicated and relative because it is dependent on our task at hand.

Evaluation dilemma: Data mining has a standard procedure of evaluating patterns. For example, a dataset can be divided into training and test sets. Only training data is used in learning, and test data serves as ground truth for testing. Evaluating patterns in social media has become a difficult task because the ground truth is often not available in social media mining. The problem that arises is how to provide the guarantee for the validity of patterns without credible evaluation.

1.2 RECOMMENDER SYSTEMS

Recommender systems are an information-filtering technique that is used to predict the rating or preference that a user would give to an item. Recommender systems are utilized in the rating of popular applications like movies, books, research articles, search queries, music, news, social tags, and products. Recommender systems make recommendations using three fundamental steps.

- Preferences acquisition- the acquiring preference from user's input data.
- Recommendation computation- the computing of recommendation using proper methods.
- Recommendation presentation- the presenting of recommendations to the user.

1.1.1 Challenges for Recommender Systems

The extensive use of recommender systems techniques has exposed some real challenges [2].

Cold-start: Suggestions about products to the new user was somewhat difficult because the user profile does not contain any rated items yet so the interests are unknown to provide recommendations. This situation is called cold-start problem. One best solution to this problem is conducting the survey when creating a profile.

Scalability: The system needs more resources for processing information and forming recommendation with the increase of the number of user and items. By the combination of various types of filters and physical improvement of the system, there is a possibility to resolve this problem.

Data sparsity: E-commerce sites contains a huge amount of users and items but most of the user's rate just a few items. Recommendation coverage can be defined as the percentage of items that the system could provide the recommendation for the particular user. The recommender system may fail to generate the recommendations when the number of user's ratings may be very small compared with a large number of items in the system.

Privacy: The most important problem is privacy. To receive the most accurate and correct recommendation, the system must acquire the most amount of information possible about the user, including demographic data. Many online shops offer effective protection of privacy of the users by utilizing specialized algorithms and programs.

2.EXISTING SYSTEM

The recommendation of the product to the users on social sites is the facility provided by the e-commerce sites to make the users more interactive to online purchasing. On the e-commerce websites, the recommendation is done based on the user purchase history. The problem that arises when the user is new to the social site and have no purchase history. In this situation, the recommendation of products to the user becomes difficult.

3.PROPOSED SYSTEM

The product recommendation to the users can be given through social networking sites with the available web service information on the social site. The proposed system provides the product recommendation to the users by using the demographic attributes. The user provides the demographic attributes at the time of signup to the social networking site and these attributes are matched with the attributes that are given by the e-commerce website holder at the time of

product updating to e-commerce sites. Based on the matched attributes only the recommendation of the products to the users will be provided. By going through that recommendations the user can check the rating of the product given by the other users and the list of purchasers of the products. The product that user may like among the recommendations can be purchased and the user has the chance to write a review about product and rating to the product.

4. IMPLEMENTATION

4.1 MODULES

- System construction module
- Learning user & product embeddings
- Feature selection module
- Cold-start product recommendation

4.1.1 SYSTEM CONSTRUCTION MODULE

In the first module, the Online Social Networking(OSN) system was developed. The system was built with all the features of an online social networking. This module is used for new registrations and the users can login with their authentication. The user can share photos on the timeline. The user can able to send and accept friend requests. The user can give reviews to the other user's posts .

System construction module is built with all basic features of an online social networking site and also provides the option of "your recommendation" which contains the recommendation to the user. The e-commerce website is constructed with the options like product recommendations and the recommended products details.

4.1.2 LEARNING USER & PRODUCT EMBEDDING

In the second module, the embedding of the user and the product information is done. The development of feature selection is done to establish the connections between the users and the products. The user information is converted into a fixed-length vector representation for each symbol can be learned in a latent space. The product information is also converted into a fixed-length vector representation. The user and product information is converted into vector representations by using the word2vec [3]method. The training of the user and product embeddings was done by recurrent neural architecture called Continuous Bag-Of-Words(CBOW) and Skip gram[4] embedding models.

4.1.3 FEATURE SELECTION MODULE

In this module, the demographic attributes of the user such as age, gender, and the interesting areas can be used by e-commerce sites to provide the better services. The demographic attributes are extracted from their public profiles. The attributes provided at the time of product updating to the e-commerce are extracted from the e-commerce site. The learning of feature mapping functions is done by using the gradient boosting trees[5] method, which maps users attributes extracted from social networking sites onto feature representations learned from e-commerce websites.

4.1.4 COLD-START PRODUCT RECOMMENDATION

In this module, the transformed features are given as the input to the feature-based matrix factorization[6]. In the feature-based matrix factorization, the mapping of user and product attributes was done and the similar features are extracted as result. These extracted features are given to the recommender systems as suggestions and based on the suggestions the products are recommended to the user.

5.EXPERIMENTAL RESULTS

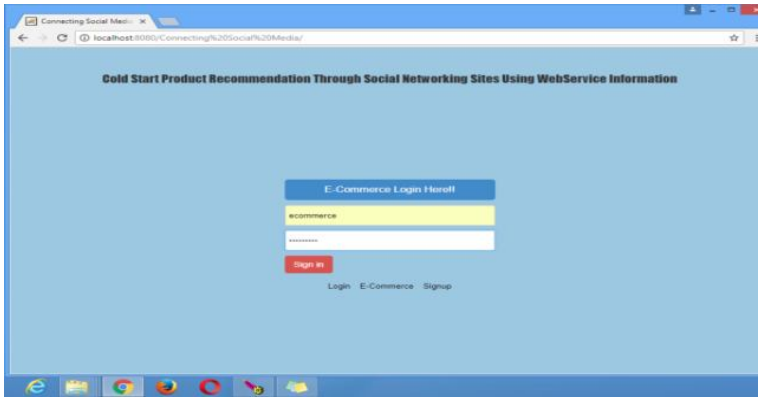

Figure 1 E-commerce login

The above figure shows the login page for the e-commerce website holder where the e-commerce website administrator login with his own login credentials to update the products on the site.

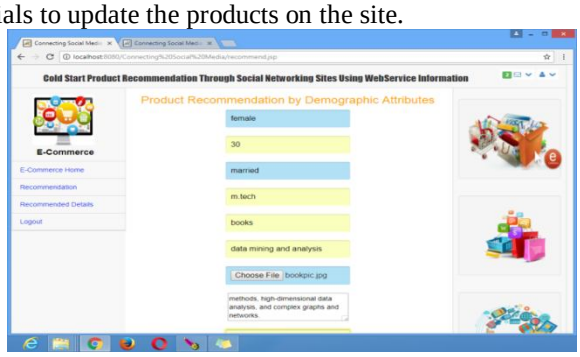

Figure 2 Recommendation page

After login into the e-commerce website, the site holder updates the products on to the site by providing the information about the product. Here the recommendation of the products is provided on the demographic attributes like age, interests, and education.

Figure 3 Recommended product details

The products that are updated by the e-commerce website holder are displayed like the this. the page contains the product serialID[SID], product images and description about the product.

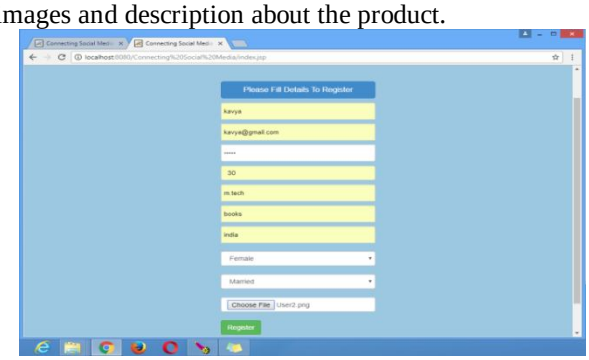

Figure 4 Registering to the social networking site

The user can sign up to the social site by providing the required demographic attributes and the interests of the user.

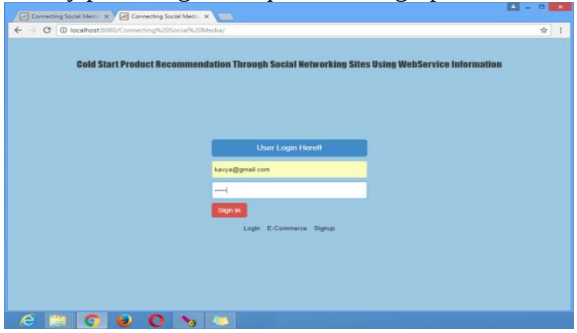

Figure 5 Login

The user gets into the social site by entering his login credentials.

Figure 6 Homepage

The homepage displays the photos that are posted by the user on his timeline. The user can view his profile and update his profile. the user can send the request to the users and find the friends to improve his circle on the social site. The posts the user shares on the timeline will be visible to the other users those are in the friend's list.

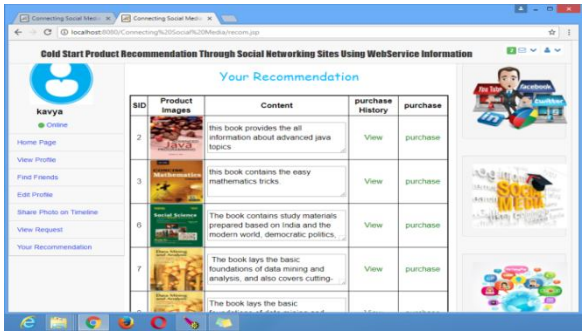

Figure 7 Recommendations to the user

Based on the demographic attributes and the interests of the user the product recommendations are given to the user. For example, if the user mentioned the "books" in the interests field at the time of signup. The user will be provided with the recommendation of books that are available on the e-commerce site.

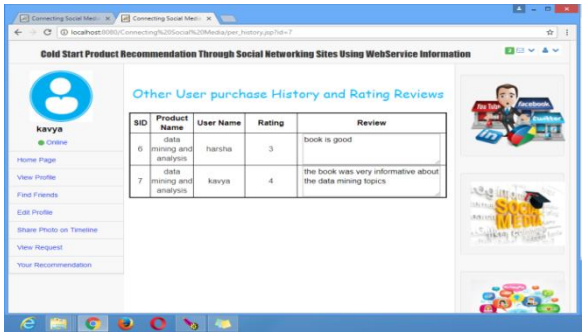

Figure 8 Other users purchase history and ratings

when we click on the "view" of the "recommendations to the user" the user can view the products that are purchased by the user. The user can see the product name, the purchaser name, rating, and review of the product given by the user.

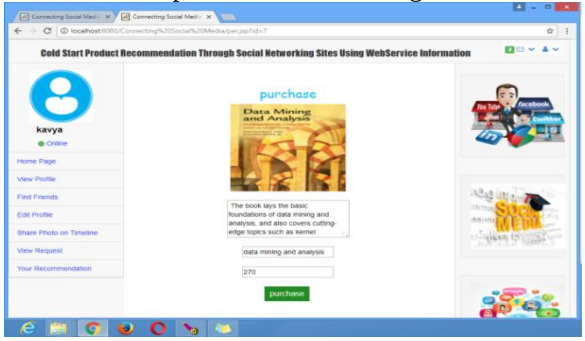

Figure 9 Purchase, review, and rating

The user can purchase the products. The user can give the review about the product and provide the ratings to the product.

5.LITERATURE SURVEY

The Y.Zang [7] present the system as a pipeline with two different modules. The first module focuses on the brands by exploring the user interests whereas the second module deals with analyzing the final brands that have to be recommended to the user. MErchanT Intelligence recommender System[METIS] was given by W.Zao[8], which detects the users purchase intents from their microblogs in real time and match them with users demographic attributes extracted from public profiles and make the product recommendations. K.Zhou[9], proposes the functional matrix factorization[FMF], which constructs the decisions tree for the initial interview with each node as question conducted to the user. By analyzing the responses given by the user the product recommendation will be done. M.Zhang[10], proposed a semi-supervised ensemble algorithm which constructs different prediction models with different contexts and the employs the co-training strategy to allow each prediction model to learn from the other prediction models. The Hybrid Recommendation algorithm [HYRED], given by an S.Choi[11], uses the Pearsons' correlation coefficient-based CF and distance-to-boundary(DTB) based CB for analyzing the data of the users on social sites. By predicting the user correlation coefficients score and the DTB score the recommendation are done to the users.

6.CONCLUSION

Our main idea is to provide the recommendation to the new users without having any purchase history. The proposed system consider the demographic attributes of the user on the social sites. Based on the interest provided by the user at the time of registration the recommendation of the products to the users will be provided. The user provides the review and rating to the product at the time of purchasing.

REFERENCES

[1] Reza Zafarani, Mohammad Ali Abbasi, and Huan Liu, “social media mining”, May 2014.
[2] Mukta Kohar and Chhavi Rana, “Survey paper on Recommendation system”, (IJCSIT), 2012.
[3] Quoc Le,“Distributed representation of sentences and documents”, Proceedings of the 31st International Conference on Machine Learning, 2014.
[4] T. Mikolov, K. Chen, G. Corrado, and J. Dean, “Efficient estimation of word representations in vector space,” CoRR, vol. abs/1301.3781, 2013.
[5] J. H. Friedman, “Greedy function approximation: A gradient boosting machine,” Annals of Statistics, vol. 29, pp. 1189–1232, 2000.
[6] T. Chen, W. Zhang, Q. Lu, K. Chen, Z. Zheng, and Y. Yu, “SVDFeature: A toolkit for feature-based collaborative filtering,” Journal of Machine Learning Research, vol. 13, 2012.
[7] Y.Zang and M. Pennacchiotti, “Recommending branded products from social media”, ACM Conf. on Recommender systems, Oct 2013.
[8] W.X. Zhao, Y.Guo, Y.He, H.Jiang, Y.wu, and X.Li, “We know what you want to buy: A demographic-based system for product recommendation on microblogs”, ACM SIGKDD, 2014.
[9] K. Zhou, S. Yang, and H. Zha, “Functional matrix factorizations for cold-start Recommendation”, ACM SIGIR, 2011.
[10] M. Zhang, J. Tang, X. Zhang, and X. Xue, “Addressing cold-start in recommender systems: A Semi-supervised Co-Training algorithm”, ACM SIGIR, 2014.
[11] S.H.Choi, Y.S.Jeong, and M.K.Jeong, “A hybrid recommendation method with reduced data for large-scale application”, IEEE Trans., Sep 2010.

AUTHORS

Zaddu Himaja was born in Andhra Pradesh, India. She received the B.Tech Degree in Information Technology department from Jawaharlal Nehru Technological University Anantapur, India in 2015 and M.Tech Degree in Computer Science and Engineering. Her research interests are in the area of Data Mining and Cloud Computing.

C.Sreedhar M.Tech[Ph.D.], was born in Andhra Pradesh, India. He is working as Associate professor in Computer Science & Engineering Department, G Pulla Reddy Engineering College, Kurnool(district), Andhra Pradesh,518007, INDIA. His research interests are in the area of security in Wireless Networks and Data Mining.