

Optimizing Recommendation system using web usage mining and social media for e-commerce

Anurag singh

research scholar, Department of CS

Dr AKhilesh A. Wao

HOD (CS/IT) , AKS University, Satna

Abstract:

Social media plays a important role in all online aspects now, including personal communication, business and economics. E-commerce websites are the major emerging trends in current era, which provide online product selection, purchase and sales. The increasing popularity of the web has greatly attracted the web mining and data mining technology. Web usage mining is the application of data mining to discover usage patterns from web data. To providing users what they are looking for in websites is the ultimate aim of web usage mining. In this proposal focus on providing good quality product recommendation to all the users of an e-commerce site. Several kinds of recommendation systems such as content based, collaborative and hybrid methods were proposed over the last decades. We focused on issues faced by recommendation system and proposed methodology that makes use of web usage mining, user's current search information, social media popularity, sentiment score and previous search information and demographic approaches. The proposed methodology is going to optimize the performance of recommendation system using measurement scale with demographic analysis.

Keywords: web usage mining, social media, collaborative filtering, Demographic analysis, Sentiment analysis.

I. Introduction:

Now a days recommendation systems play a key role in promoting strategy attributable to increasing on-line sales. This modified the method of doing business during a typical method. Recommendation may be a wide used technique to guide user to choose the correct product on-line as a result of it becomes the essential feature for a much better e-business, these days variety web users victimization net to perform day to day transaction are increasing[1]. The recommendation system utilizes data processing techniques and tools to predict user's preference by utilizing their

previous searching information's and choosing merchandise among the tremendous quantity of accessible things of the users [2]. Some folks pay a lot of quantity of your time for looking a product in on-line websites, and generally customers can have a lot of decisions that end in a lost state and confusion. It's become a significant drawback to seek out what product the user is looking for. A well answer to beat this drawback is recommendation system that gives and advises the client with the sort of things they're interested in [2]. E-commerce recommendation systems are a form of recommender frameworks, which might naturally suggest things that are to boot charming to a specifics user supported the user's current net navigation behavior[3]. A recommendation system obtains the interest and preference of shopper and performs recommendations consequently, therefore it's loosely utilized in each e-commerce websites, , several social networking websites has become an area of the our life, thanks to this giant amounts of transactional knowledge and reciprocal knowledge is made day by day. So, to urge some productive data from this knowledge, recommendation system are introduced.

E-commerce recommendation system is generally supported net usage mining wherever user's inclinations and behavior are examined and foreseeing by net usage mining. Analysis and prediction is finished by blog files. Customers click stream knowledge will act as a really nice supply of knowledge. Click stream indicates the user's path through a web site. Blog files store and maintain all click stream knowledge. This knowledge are often terribly useful in providing the effective recommendation. Nice quality recommendation systems won't simply facilitate in fulfilling client's inclinations for associate item however additionally in enhancing feels and attracting new buyers [4].

Collaborative Filtering:

Collaborative filtering is a mean of recommendation based on user's past behavior. It is based on user's history in the form of rating given by the user to an product as their information[5]. Collaborative approach can be of two kinds, i.e., item based recommender system and user based recommender system. Item based recommenders compare item similarities, and the user based recommendation instead compare similarities in the recommendation process.

Collaborative filtering method based on the standard computation, let S_{ij} denote the similarity or Pearson correlation to compute the similarity between two users[6][7]. For arbitrary users and the number of common product shared by them can be defined as

$$C_{ij} = \sum_{l=1}^n a_{il} a_{jl}$$

Generally for standard cosine similarity computation, let S_{ij} denote the similarity between u_i and u_j and let $k(u_i)/k(u_j)$ denote the degree of the user u_i/u_j , namely, how many objects are collected by this user ?. So, we can formulate the expression as

$$S_{ij} = \frac{c_{ij}}{\sqrt{K(u_i)K(u_j)}}$$

Demographic analysis:

Demographics is that the study of a population supported factors like age, racial and sex. It's the gathering and study of information relating to the final characteristics of specific populations. It's oftentimes used as a business selling tool to see the most effective thanks to reach customers and assess their behavior. Segmenting a population by using demographics permits firms to see the dimensions of a possible market. The utilization of demographics helps to see whether or not its products and services area unit being targeted there to company's most vital consumers[13]. In our proposed work demographic knowledge are collected through facebook, twitter.

Sentiment analysis:

It is conjointly called opinion mining that is designed supported user's feeling with numerous classes like positive, negative, neutral and mixed. It's accustomed get people's read and angle towards something with services and products.

II. Review of Literature:

The term Web usage mining, was first employed by cooley et al., and it focuses on predicting and learning the user preferences on the internet[10]. There are completely different approaches and techniques were developed by the researchers for effective product recommendations.

F.O. Isinkaye et al.[11] mentioned the two typical recommendation techniques like content primarily based and collaborative techniques. Many styles of crossing methods are accustomed enhance the performance of two typical recommendation techniques. Recommendation models are generated by using innumerable learning algorithms. The performance and quality of advice algorithms are evaluated by evaluation metrics.

Jianfeng Hu[12] planned product recommendation supported the collaborative filtering, in specific user primarily based collaborative filtering, that starts by finding a group of shoppers who have purchased and rated similar things with the target users buying history. Items from these similar customers, and therefore the ratings from alternative similar users are being aggregate by the algorithm rule planned, to predict the ratings from this user. In user to user cooperative filtering, it suggests things supported similarities of shoppers, that starts by finding a group of shoppers who have purchased and rated similar things with the target users buying history.

P. Lops and B. Roy[1] planned the action primarily based relative recommendation system. This recommendation system created for all registered or unregistered visitors of the web site. It created use of lexical patterns to get recommendations and compared the results of the proposed system with the user's techniques and merchandise based technique that showed that the planned system reduced the restrictions of the normal

recommendation system and provides smart quality accuracy.

Hwang,San-Yih,et al[14] studies the dynamic web service choice downside in a very failure –prone atmosphere, that aims to work out a set of web services to be invoked at runtime thus on with success orchestrate a composite web service. The matching service can be one service or composition of registered services. This suggested system automates personalization on the online, sanctioning individual personalization for every client supported demographics.

III. Proposed Work:

The proposed approach is to optimize recommendation system using web usage mining and social networking for e-business. The propose work is studied to optimize the normal web based mostly recommendation system for e-commerce application, during this context a replacement quite recommendation model is projected for style and development.

Three completely different recommendation systems are projected. Branded product based mostly recommendation , Unbranded based mostly recommendation and New product by small scale industries.

In this approach users interacts with web portal and users click stream information is maintain in raw log file. Multiple preprocessing and data cleaning task area unit performed to extract valuable information from raw log files and remodel it in structured type.

The projected system developed a optimized recommendation system supported the three recommendation system, one is collaborative filtering ,second is demographic approach and last is sentiment analysis.

Collaborative filtering is suggested on the premise of user’s past behavior. There are two kinds of collaborative approach, i.e. item based recommender system and user based recommender system. Item based recommenders compare item similarities and therefore the user based recommendation compare similarities within the recommendation method. Through demographic

approach we will collect demographic data of user’s from facebook, twitter.

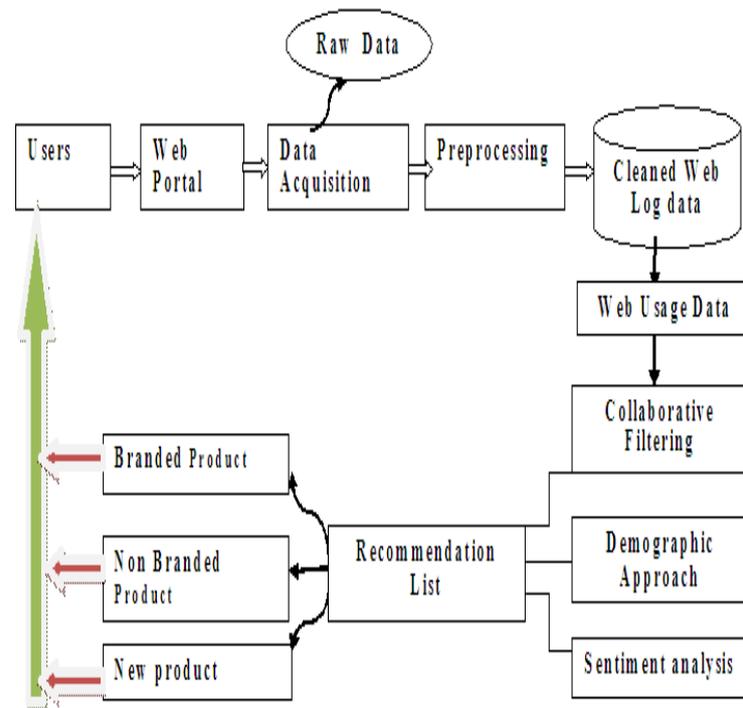


Fig. Optimized Recommendation System

IV. Conclusion:

Recommendation systems play a important role in marketing strategy because of increasing online sales. In this paper , different approaches like Collaborative Filtering, Demographic Approach and Sentiment analysis are described and we focus on providing good quality product recommendation to all the users of an e-commerce site with help of different approaches. Recommendation system is a part of machine learning, which automatically learns from the experience rather than the predefined data. Hence our proposed methodology is going to optimize the performance of recommendation system using Collaborative Filtering, Demographic Approach and Sentiment analysis.

V. Future Work:

We can work on models to improve their accuracy and involves in discovering an advanced combination of data mining techniques that provide good results than existing combination.

Reference:

- [1] P. Lopes and B. Roy, "Dynamic Recommendation system using web usage mining for e-commerce users", *Procedia Computer Science* 45, pp 60-69, 2015.
- [2] P.V.R.D Prasada Rao et al. "A comparative study on recommendation system using hybrid approach", pp.75-82, *IJMET*, vol.9, ISSN 0976-6340, 2018.
- [3] J. WEI, J. He, K. Chen, Y. Zhou and Z.Tang, "Collaborative Filtering and Deep Learning Based Recommendation System for cold star items", *Expert System with Applications*, 2016.
- [4] T. Srivastava, P. Desikan and V.kumar, "Web mining concepts, applications and research directions.", In *foundations and advances in data mining*, Springer, Berlin, Heidelberg, pp. 275-307, 2005.
- [5] Balabanovic, Marko and Yoav Shoham, "Fab: Content based collaborative recommendation." *Communications of the ACM* 40.3, 1997.
- [6] Y.H. Cho and J.K. Kim "Application of web usage mining and product taxonomy to collaborative recommendation in e-commerce," *Expert Systems with application*, vol.26,no.2, pp.233-246, 2004.
- [7] J. Srivastava, R. Cooley, M. Deshpande, and P.N. Tan, "web usage mining", *International Journal of scientific & engineering research* volume 8, Issue9, September 2017, ISSN 2229-5518.
- [8] PAWAR A.B., Jawale M.A., and Kyatanvar "Fundamentals of sentiment analysis: concepts and methodology", Springer, 2016.
- [9] Oman Bharti, Monika Malhotra, "Sentiment Analysis", *IJCSMC*, Vol. 5, pp 625-635, 2016
- [10] YM Huang, YH Kuo, JN Chen, and YL Jeng, "NP-Miner: A real time recommendation algorithm by using web usage mining", *Knowledge Based systems*, vol. 19, no.4, pp.272-286, 2006.
- [11] F. O. Isinkaye, Y.O. Folajimi and B. A Obojkoh, "Recommendations system: principles, method and evaluation", *Egyptian Informatics Journal*. Pp 261-273, 2015.
- [12] Hu, Jianfeng, and Bo Zhang. "Product recommendation system." *CS224W Project Report*, 2012.
- [13] <https://www.investopedia.com/terms/d/demographics.asp>
- [14] Hwang, San-Yih, et al. "Dynamic web service selection for reliable web service composition." *IEEE transaction on services computing* 1.2 pp: 104-116, 2008