

# **Personal Recommendation System for E-commerce Users**

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**Abstract-** Today internet has made the life of human dependent on it. Almost everything and anything can be used for discovering useful knowledge or information from the internet. Recommendation systems are defined as the techniques used for predict the rating of the social entity or items. These items can be music, videos, books, movies etc. To predict the user's interest from only past preference is not give particular result. The main objective of area is to solve challenges and issues regarding to finding proper recommend items for users. In this used personalized recommendation system is for finding particular user's browsing information to recommend the products. Web usage mining is the area of data mining which deal with the discovery and analysis of usage pattern from web data, in order to improve web based recommend the product for the users. In this used action based rational, user similarity and

item similarity approaches are used for better recommend the products to users.

**Keywords** – Web mining; Recommendation system; Content based approach; Collaborative approach; User similarity approach; Item similarity approach

## **1. Introduction**

Data mining is a process of extract useful information into a large dataset. The massive information available on the World Wide Web has search for data. To discover useful information from the web is called a web mining. The availability of internet on mobile devices with social networking generate large amount of data. This data is useful for produce innovative business patterns to improve the business. Today number of users is used web for day to day transaction. There is also increasing

number of companies on web for selling their service and product. For the E-commerce business there are problem for customers as well as companies. On the web more number of products available, so to selecting the product is challenging for customer. Companies have also challenging to know customer's interest. To solve above problem used Recommendation system. Recommendation systems apply data mining techniques and prediction algorithms to predict user's interest on information and products among the large amount of available items. This is used to predict the 'preference' or 'rating' of an item for users. Recommender systems are become more popular in recent years and it is applicable for different types of applications. The mostly popular applications are music, movie, books, news, search queries, research articles, product and social tags etc. There are two types of Recommendation system [1]: Content based filtering system and collaborative filtering system. Content based recommendation systems recommend an item to users based on a description of the item and a profile of the user's interests. Collaborative filtering technique based on user's history in the form of rating given by the user to an item as their information source.

There are two ways to collect the data from users: Implicitly and explicitly [2]. When data is collected by asking the questions to the customers then it is known as explicitly. When collect the data through tagging, clicking or

linking from the website it is known as implicitly. Recommendation system suffers from many issues like scalability, number of customers and products are increasing on the web to managing it becomes challenging. Another problem is some time website recommends the product that is not liked by customer at that time performance well be decrease.

Web usage mining is the process of extracting user's behavior that is stored in web log files. Web usage mining is also known as web log mining. In recommendation system there is two types of error occur false positive and false negative. False negative means product is liked by user but not recommend by company. False positive means product is not liked by user but recommend by company.

This paper purpose a user similarity and item similarity based approach for better recommend the product to users. Rest of the work is organized by following sections II provide the information about related work of this research. Section III defines the proposed work. Section IV defines the system analysis and design. Section V gives the conclusion of research work.

## **2. Related work**

Aprojyoti Lopes, Bididha Roy[3] considered the research challenges in collaborative filtering is used user's past data for finding user's behavior. Authors suggest that used action based rational

technique that provides recommendation as per changing user's behavior.

XI-Ze Heng zhang, present paper[4] considered the problem of user's past preference is only used for recommendation. So authors proposed a personalized recommendation system using association rule mining and classification (CBA-CB). CBA-CB classifier is used to predict the item labels for new customer's requirement and then assigns the class labels to the new customers.

Ya-min,Xue-ling,Xiao-wei LIU[5] considered the problem that case base reasoning is not giving accurate result for matching past and present cases. So authors suggest that used case based reasoning with web log mining for improving performance.

Mahdi Khosravi , Mohammad J. Tarokh[6] find out the problem that To find the user interests are difficult and difficult also to track user navigation pattern. In this paper to find the user's navigation behavior used naïve bayesian method.

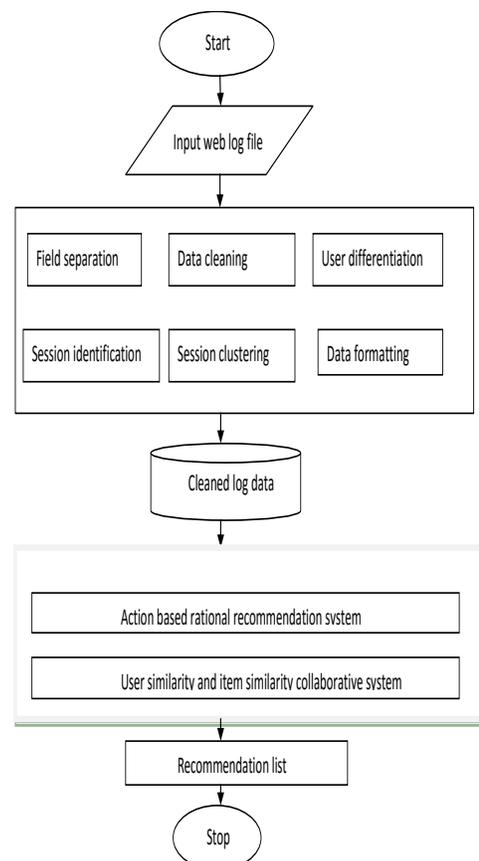
Xia Min-jie, Zhang Jin-ge[7] considered the problem of information overload in the websites. So customers are face the problem that which product will I select or not. So authors suggest the new methodology is used user ID-URL associated matrix and distance matrix to cluster users into groups. Based on visitor's browsing patterns, the site can efficiently and

automatically dynamic adjust web page's content and recommend right items.

### 3. Proposed work

Personal recommendation system for E-commerce users that used user's access pattern from the web logs. And based on access pattern recommend the better product to the users.

Fig.1 describes the flow of the proposed work.



**Fig1: Proposed Recommendation system**

**3.1 Input web log file:** first step of the process is find out the proper log file of user's behaviour

from the website using GET and POST methods.. This log file is used for the recommendation process.

**3.2 pre-processing web log file:** In the web log file there are many inconsistent and noisy data are stayed. So this noisy data are affected to our final output. So pre-processing is done for removing inconsistent and noisy data from the web log file.

In the phase of field separation stage focus on differentiate one attribute from another by making use of separator character such as space.

In the phase of data cleaning, we remove the incomplete data. We check for URL suffixes such as gif, jpeg, tif, jpg are discarded. All the records having failed http status code are removed.

In the phase of user differentiation stage differentiate users by unique user ID to each IP address. Using this unique user ID registered users to differentiate one customer to another.

In the phase of session identification stage construct session for particular user. In this phase we group together session belonging to unique users. Session cluster made using user's IP address and session ID. Session provide us to complete activities done by particular user in specific time period.

**3.3 Recommendation technique:** In this phase used action based recommendation system and user similarity and item similarity collaborative

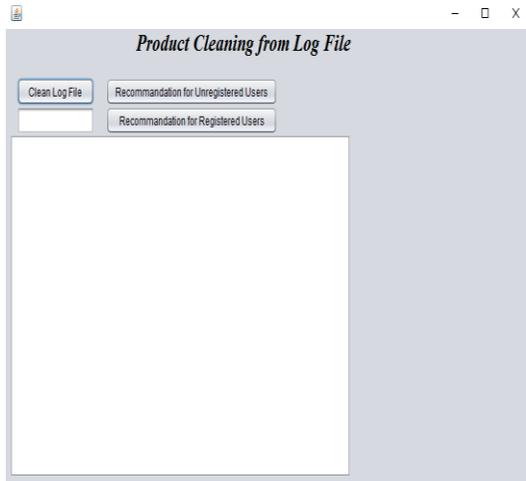
filtering, Action based recommendation system is used for recommended the product based unregistered users. In this take data for unregistered user based on IP address. In result is getting based on user's latest navigation history. Take a navigation data of last 3 or 4 session. And find out the recommended product for user. But in this technique there is a problem of in this used only latest navigation history for user to recommended product. So less number of products will be selected for recommended. So accuracy will be become low.

So improve the accuracy of action based rational technique we used user similarity collaborative filtering. User similarity collaborative filtering is used for finding the similarity between different users based in past user's behaviour. Using this scenario we can recommend more item to users. And accuracy will be improved. This scenario used user-item rating matrix to find out the similarity between users. And select which items are recommended based on nearest neighbour algorithm. Using this algorithm we can find out the most similar users and recommended whatever similar product to the user. So user feels a satisfaction according the recommended product.

Item similarity process done by product's features. Recommend the product based on selected same features. Using this approach more effective products are recommended to the customers.

#### 4. System analysis and design

The proposed work is implemented in java environment and takes dataset of books from Amazon kindle website. Below fig. 2 display the GUI of our proposed work.



**Fig. 2 GUI of proposed work**

First we take a book dataset and then remove the unwanted data using pre-processing approach from the dataset and then get the cleaned log file. Then apply the recommendation technique on cleaned log file to recommend the better product to the users.

#### 4.1 Performance measurement:

Performance is measured by precision, recall, f-measure and accuracy. These parameters are measured by following matrix.

	product select by system	product not select by system
Expected product	True Positive(TP)	False Negative(FN)
Not Expected product	False Positive(FP)	True Negative(TN)

**Table 1 Recommendation matrix**

Precision, Recall, F-measure and Accuracy measured by following equations:

Precision: It gives the result of exactness value.

$$\text{Precision} = \frac{TP}{TP + FP}$$

Recall: It gives the result of completeness value.

$$\text{Recall} = \frac{TP}{TP + FN}$$

F-measure: It is the harmonic value of recall and precision. The value of F-measure is between 0 and 1.

$$\text{F-measure} = \frac{2 * \text{Recall} * \text{Precision}}{\text{Recall} + \text{Precision}}$$

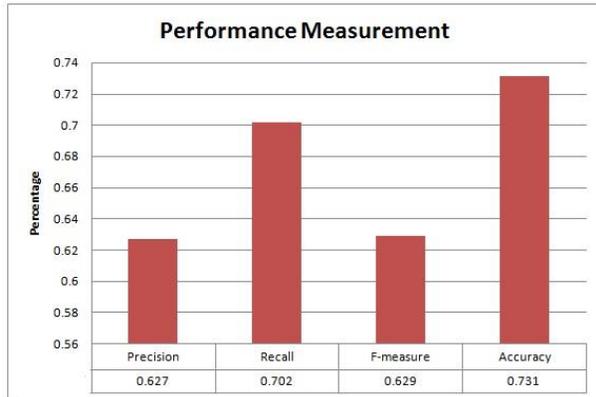
Accuracy: It is measure the correctly classified value.

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

To calculating the value of TP, TN, FP, FN for our work and then below matrix.

	product select by system	product not select by system
Expected product	0.702	0.298
Not Expected product	0.32	0.75

Below graph represent the performance measurement of the work based on precision, Recall, F-measure and Accuracy.



**Fig.3 Performance measurement**

## 5. Conclusion

This research presents the best quality of product recommendation to all users like registered and unregistered for E-commerce website. In this products are recommended to the users based on action based rational technique and item and user similarity collaborative filtering approaches. It give accurate recommend result to the users. It is helpful for E-commerce organization and users for selling and buying the products. This proposed work will also used for testing the music or movie dataset.

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