A Deep Learning Approach for Product Recommendations with consolidated Analysis

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*Abstract :*Recommender system is a strategy in e-commerce, which recommends items based on the user's interest. It has the capability to predict whether a particular user would prefer an item or not based on the user's profile. Recommender systems are useful for both e-commerce service provider and users. So it should be required for a recommendation system to provide most preferable items to the user's interest. This presents a dynamic recommendation system to provide recommendations on the user's interest. In this dynamic recommendation system first of all the web usage information is utilized to find the user's behavior and then similar user behavior score is computed. In the second, product information is collected on the basis of current search information about the user through which sentiment score and social media popularity score are computed. On the other side coefficient matrix is used to calculate user's purchasing power. These three factors- similar score behavior, sentiment score and popularity score are used to calculate the combined weight for the particular product. Then a coefficient matrix and the computed weights are used to calculate the possible recommendation of the product for theuser.

IndexTerms **– Product Recomenndations**

I. INTRODUCTION

A recommendation system is a decision maker strategy for e-commerce environments. It predicts a particular e- commerce user and provides the recommendations to the user which makes easy to purchasing items on e-commerce sites. It reduces transaction cost in an online shopping environment. It has also proved to improve the decision making process and quality. E-commerce recommendation systems are one kind of recommender systems, which can automatically recommend items that are more interesting to a particular user based on the user's current web navigation behavior. A recommender system is a software solution for personalized service in an e- commerce environment. Based on the customer preferences, it helps to find the products they would like to purchase by providing recommendations and it is particularly useful in e-commerce services that offer millions of items for sale. E-commerce ssssrecommender system usage user's web navigational behavior, past experiences and the same kind of user's behaviors which enhance the performance of recommendation system and it would provide good quality of recommendations to the user on theirinterest.

E-commerce recommendation system is mainly based on web usage mining where user's preferences and behavior are analyzed and predicting by web usage mining. Analysis and prediction is done by web log files. Customers click stream data can act as a very rich source of information. Click stream indicates the user's path through a website. Web log files store and maintain all click stream data. This data can be very helpful in providing the effective recommendation. Good quality recommendation systems will not only help in satisfying customer's preferences for a product but also in improving sales and attracting new consumers.Indigentqualityofrecommendation,resultsin false negative peculiar errors and false positive peculiar errors. False negative peculiar errors: these are the items not recommended even though the customer likes it. False positive peculiar errors: those items are recommended which even though the customer dislikes it. In an E-commerce domain the most important error that need to be handled and circumvented are false positive errors, which can result in unsatisfied customers in minimize their possibility to revisit the site once again .

II. LITERATURE SURVEY

Customized Bundle Recommendation by Association Rules of Product Categories for Online Supermarkets ,2018 pp. 472-475

- The basic principle in this paper is to combine association rules of product categories and personal recommendation techniques by customized bundle.
- Advantage : The customized bundle reduce the time spent on choosing products for customers, convenient to pre-optimize the storage and reduce the cost for order fulfilment.

- Disadvantage : Cannot adapt proposed method to large scale problem.

Product Recommendation System for small online retailers using Association Rules Mining, 2014 pp. 71-77[3]:

- This paper presents product recommendation system for small retailers. This explains how each part was designed to handle the problems using lowcomputing resources and small data pools.
- **Advantage :** Execute relatively quickly and effectively work with small data set and satisfies the needs of small online retailers that executes relatively quickly.
- **Disadvantage :**It has Less product prediction criteria and lower recommendation accuracy , and not applicable to large data set.

A Hybrid of Sequential Rules and Collaborative Filtering for Product Recommendation , 2007 pp. 210-217[2]:

- This paper proposes a novel hybrid recommendations method that combines the segmentation-based sequential rule method with the segmentation-based CF method.
- Advantage :Proposes a hybrid method that considers customers' purchase sequences over time and their purchase data for the current period. It improves the quality of recommendations.
- Disadvantage : This Hybrid method just outperforms traditional methods .

III. EXISTING SYSTEM

- In Existing system, Recommendation is based on the User preferences which will be used to recommend the products based on the previous purchases of the customer.
- This Method will filter the information presented to the user by using information about the other user preferences.
- The Existing Problem faced is Data Sparsity, i.e., If any data is missing the dataset then the data is said to be sparsed.

IV. PROPOSED SYSTEM

This project paper aims for developing a Product Recommendation system for recommending the products to the customers.where the user will get the recommendations based on the purchases he/she has done before. This helps in marketing their products which indirectly helps in their economic growth in the society.
These recommendations are with respect to individual and possible combinations of the customers(frequent visitors) and also new customers with associated products down line. Once the deep learning is exhaust and all the customers with recursive learning recommendations will be proposed.

Fig 1describe the system architecture.The Neural networks take one event as input and compute a conditional probability of the other event that are likely to associate two events.This Model is used to calculate the similarities between different items and output the top recommendations which Improves the Learning tendencies of the customer profile and also improves the accuracy.

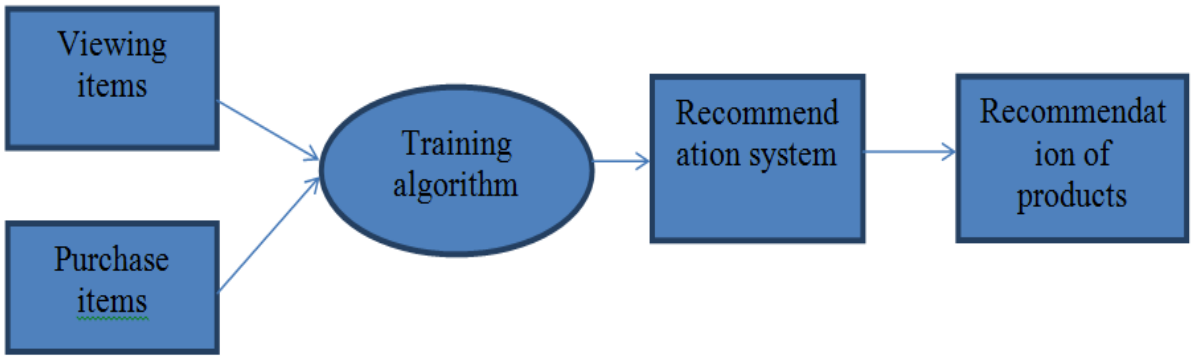

Fig 1.System Architecture.

V. MODULES

The modules described here as follows:

A. Data Preparing

1. **Functionality**:- Machine Learning algorithms will learn from data. This Function will select the data ,preprocess the data and Transform the data .

2. **Input**:- The dataset with its attributes will be given as Input.
3. **Output:**- Selects the subset of all available data and then it will format , clean and sample the data , and finally it will transform the processed data where the data is ready for machine learning.

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B. Data Converting

1. **Functionality**:- Data conversion is the conversion of computer data from one format to another. Throughout a computer environment, data is encoded in a variety of ways.
2. **Input**:-The dataset with .xslx extension is given as Input.
3. **Output**: - The dataset in table form is extracted to java file using POI-API where the dataset is converted and read by the java file.

C. Association Rules of Product Categories

1. **Functionality**:-Association rule learning is a rule-based machine learning method for discovering interesting relations between variables in large databases. It is intended to identify strong rules discovered in databases using some measures of interestingness.
2. **Input**:- The products and product categories are given as input.
3. **Output**: - Suggestions are given based on the frequency of the products that the customers have purchased previously with the more support and confidence .

VI. RESULT

The Recommender System is a subclass of information filtering system that seeks to predict the rating or preferences a user would give to an item. One Approach to design recommender System is hybrid approach that uses both collaborative filtering technique and content based filtering technique which helps in improving the accuracy of the system. Since it is a deep learning technique , where machine learns the patterns by itself where it will used in recommending the products for customer .This technique can be used to do work effectively due to its great-added accuracy which will results the quality improvement in the work.

Machine Learning is the scientific study of algorithms and statistical models that computer system use to efficietively perform a specific task without explicitly being programmed. Machine Learning is subset of Artificial Intelligence. Machine Learning is closely related to computational statistics, which focuses on making predictions using computers.

In this Paper, we focus on providing good quality product recommendations to all the users of an e- commerce site. Recommender system is a part of machine learning, which automatically learns from the experience rather than the predefined data. The rapid expansion and rising popularity of E-commerce has forced the existing recommendation system to handle large number of customers and to provide them with high quality of the recommendation. 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 searchinformation. Hence our proposed methodology is going to enhance the performance of recommendation system using weight- basedtechniques.

VII. CONCLUSION AND FUTURE SCOPE

The Recommender Systems helps the users to get personalized recommendations , and helps the user to take correct decisions in their online transactions, increase the sales and redefine the users web browsing experience , retain the customers ,enhance their shopping experience.

The Product Recommendation System is implemented to recommend products to the customers based on the early purchases and also newly arrived products with increased accuracy using Machine learning. The proposed system make use of Neural networks that takes one event as input and compute a conditional probability of the other event that are likely to associate two events. This Model is used to calculate the similarities between different items and output the top recommendations. And improves the Learning tendencies of the customer profile and also improves the accuracy. The recommendations are with respect to individual and possible combinations of the customers (frequent visitors) and also new customers with associated products down line.

We can use this system for many applications like twitter, instagram, and many shopping websites. Just by changing the implementation of algorithm using sentiment analysis we can use it in facebook ,instagram and many other social-media platform for recommending the user based on their choices . With reduced time delay we can have faster operation and quick response from the customers , When peoples are shown that they like they would purchase the item that increases the sales and as well user will purchase the item that the customer like the most.

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