APPLICATION OF RECOMMENDATION SYSTEMS IN E-COMMERCE

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ABSTRACT

The most recent patterns in electronic commerce assumes a vital role in the technological development via improvement by means of web and the accessibility of present-day gadgets and their high-level applications, for a great many people, have prompted an increment in the extension. The enormous number and variety of goods displayed on websites make the clients to feel exhausted and make it hard to find the right product. These circumstances increase the rivalry between global commercial sites, which builds the need to work proficiently to increment financial profits.

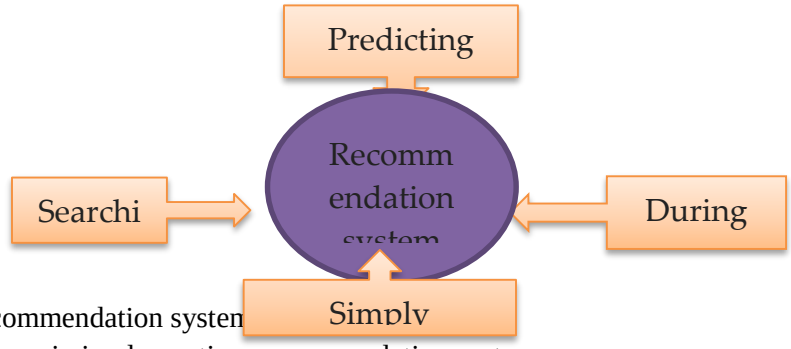
Implementing the recommendation systems (RS) will results in high conversation rate, Maximization the profit, More customer satisfaction, Greatest personalization, Discover new purchasing behaviors' of the customers, Best promotional activity, Improved users experiences, Time saving, Economy, better designed marketing campaigns.

Key words: ***Recommendation system - Algorithms –Internet – Customer Data -Apache Mahout***

INTRODUCTION

E-commerce systems (EC) have seen a critical growth in the volume of salesin recent times, particularly with the incredible technological advancement and progress in the services provided by the Internet.Recommender systems (RS) that predictwhat your clients would need analyzing their behavior which contains data on past preferences.

Recommender systems software (RSS) has emerged to help users navigate throughthis increased content, often leveraging user-specific data that is collected from users. RSS works based on the user's past preferences as well as the preferences of other users. There are different RSS algorithms like User-User Collaborative and Item-Item Collaborativefiltering using the open-source library Apache Mahout. The purpose of RSS algorithms is to evaluate the behavior of these collaborative filteringalgorithms, with a focus on recommendation quality and time performance.



Objectives

- ✓ To study the recommendation systen
- ✓ To reveal the issues in implementing recommendation system
- ✓ To assess various recommendation system models
- ✓ To highlights the benefits of recommendation system
- ✓ To know how recommender systems behave in real world applications.
- ✓ To create awareness of Win-Win Strategy
- ✓ To develop a recommendation system to solve the problems in the existing e commerce system

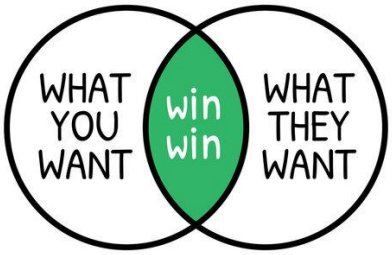
Revie of Literature

The recommendation systems expect to further develop the e-commerce systems performance by facilitating the clients to track down the suitable items as indicated by their preferences **(M.Sharma 2007).** There are lots of recommendation system algorithms that are implemented for this purpose.Notwithstanding, most of these algorithms experience the following issuescold start, sparsity of user-item matrix, scalabilityand changes in user interest. **Neha (2012).** Development of recommendation system helpful to accomplish high real-world forecast outcomes,this is done by building the system based on the customers' behavior and cooperating with the statistical analysis to support decision making, to be employed on an e-commerce site and increasing its performance. **Hyeyoung Ko 1, Suyeon Lee 2, Yoonseo Park 1 and Anna Choi (2022).** Recommendation system improves the decision-making that is employed to increase the accuracy of recommendation lists suggested to the customers **V. K. Yash Jain, Amita Sharma and S. Chaudhary(2012).**

Uses of Recommendation System (RS)

Breadth of Data	The existed system will not work when the customers behave in different way during their purchase and search of product in internet. Humans are still obviously superior to machines in the area of learning from a few examples. In such cases, Recommendation System (RS) use its logic, qualitative and quantittative understanding of customers to make accurate recommendations.
Depth of Data	Intense data about customers online activities and offline purchases can guide accurate recommendations.
Auto Analyze	Recommendation System (RS) collect customer data and auto analyze this data to generate customized recommendations for your customers. These systems depend on both inherent data such as browsing history and purchases and specific data such as ratings provided by the user.

Resolving Dilemma	Recommendation System (RS) plays an important role in resolving their dilemma of 'choice overload' and retaining customers
A True Win-Win Situation	Recommendation systems (RS) also improve user experience and customer satisfaction, leading to higher sales and growth – a true win-win situation for both users and businesses.
Better User	In general, recommendation systems are a sub-class of information filtering systems that manage information overload. Recommendation systems are better user engagement, especially when presented at different levels – in home pages, product pages, search pages, out-of-stock pages and cart pages.
Suggestion of Items	Recommendation systems (RS) suggest items for purchase based on what was purchased by similar users, where user similarities can be evaluated through their buying patterns and user specific features.



A win-win situation is a resolution to a negotiation where both parties benefit from the outcome. Win win situation are an ideal situation where both users and e- commerce sites benefits mutually. The users are satisfied due to more recommendation of products related to their search preferences. The e-commerce sites are getting more profit and high volume of sales due to more purchase of products based on the recommendation system.

To reach win –win situation, the recommendation system remember, store and analyse the date of users purchasing behavior and RS provides best alternatives and do automation.

How a recommender system can help?

Recommendation system (RS) are a fundamental element in our computerized world, as clients are frequently overwhelmed by choice and need help finding they're searching for. The Recommendation system (RS) works based on the date and history of the purchasing behavior of the users. Whenever the user search their preference in e commerce sites and similar other online platform, RS is used to stores their browsing history and recommend the relavent items or criteria's once the users visit back to the online in similar platform.

Example : In Youtube if we search cooking shows , the details will be saved by RS, and used to recommend the items during their searching and logged in as well.

Categorization of Recommendation Systems (RS)

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information overload. Recommendation systems are better user engagement, especially when presented at different levels – in home pages, product pages, search pages, out-of-stock pages and cart pages.

Product recommendation examples for websites and email:

- Homepage (just arrive, trending now, you might also like)
- Product Pages (recently viewed)
- Search Page
- Category Page(most popular in this category, bestseller, top rated)
- Shopping Cart Page
- Checkout page
- 404 Page
- Pop-ups
- Email Marketing

Implementation of recommendation systems

The identification of unique levels of products or a group of products – especially as businesses deal in multiple product levels.For example, a laptop contains many hardware components (screen, processor, hard-drive, touchpad, keyboard etc.). All these elements can be identified uniquely the potential purchaser is interested in the final combination of these elements. Hence, recommendations should be provided at a full product level of the laptop, rather than at independent component levels.

The Mahout library contains several commonly used RSS.

- NearestNUserNeighborhood
- Pearson Correlation Coefficient Similarity
- Cosine Similarity
- Log Likelihood Ratio Similarity algorithms
- k-Nearest Neighbour
- Matrix Factorization
- Euclidean Distance Similarity

Conclusion

Recommendation system (RS) playsa essential strategy to gain more profit and enlarge sales with less marketing effort. It is an automation system which will work effectively after the successful implementation any E-Commerce company. RS act as a shortest path to reach high volume of sales, also helping users to get variety of products and brands in recommendation paths based on their searching and browsing history. RS is customer loyalty towards your e commerce site in terms of predicting the future purchase items of your customers. With the help of RS you can sustain your existing customers of your site and attract the new visitors of the concern online platform. By recommending more products and brands to users, you can motivate the customer to spend more time on the particular e-commerce website.

Recommendation system (RS) is a prominent tools to engage your users of your website. Besides it also act as a promotional strategy for showing more new brands /products to the users. RS is assisting to announce the upcoming offers, discounts, coupon codes and arrival of new category of products related to the users searching and browsing history. Amazon, Google , and Youtube are the successful

leaders in the implementation of Recommended system with many research, experiments with different algorithms.

Users have a propensity to view the new recommended items always during their browsing. Because they the customer demand is always changing as per the new trends. However, at the time of leaving the browser, the RS is saving the users history and recommends you the same and relevant content once you logged in the same browser. Since Recommended systems (RS) act as a sole person to many of the users because its gives you the experience of personal referrals like recommendations offered by the friends and family members. RS is good at recommending things and is what recommendation systems try to model. The ecommerce site can use the data accumulated indirectly to improve your website's overall services and make sure that they are suitable according to a user's preferences. In return, the user will be placed in a better mood to purchase your products or services through by sites.

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