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Product Recommendation Using Machine Learning

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ABSTRACT: We are in the age of advancing technology. There is increase in people's reliance on technology and internet for efficiently communicating, chatting, texting, internet surfing, playing games, and online shopping etc. When online shopping, watching movies etc. is considered today consumers are exposed to an increasing variety of products and information never seen before. This leads to an increasing diversity of consumers' demand, turning into a challenge for a retail store to provide the right products accordingly to customer preferences. Due to this perpetual rise in online shopping demand and watching movies, the organizations are relying on machine learning based technologies which are helping them in seeking the actual targeted users with less efforts as compared to earlier methods of advertisement. We are developing this Technology which helps us to understand the requirements and gives recommendation for the product searched by the user by comparing their previous history. The purpose of this recommendation system is to compare various machine learning algorithms for recommendation of various product buying pattern by users and gives more accurate result related to search.

KEYWORDS: Machine learning, recommendation systems, Supervised, Strategies.

I. INTRODUCTION

Machine learning is an important component of the growing field of data science. Machine learning is application that provides systems with the ability to learn and improve automatically from experience of explicit coding. Machine learning focuses on creating computer programs that are able to access information and use it to learn on their own

Product recommendation in Machine Learning refers to the task of recommending product(s) to a customer based on their purchase history. A product recommender system is an ML model which suggests some items, content or services that a specific user would like to buy or indulge in. Improving the discovery process, this helps users find what they are looking – and sometimes products they don't even realize they are looking for. In doing so, businesses can learn more about each user's unique preferences and interests, optimizing performance in real-time while simultaneously refining their testing roadmaps for the long-term.

And when it comes to product recommendations, there is no archetypal strategy marketers should use for every widget. Different strategies must be applied for different users, depending on the amount of information available about the customer, their behavior, and the context of products on a site. This includes site behavior, status, geo-location, time of day, past purchases, and more.

II. LITERATURE SURVEY/ RELATED WORK

The Ref[1] paper, provides the study of a novel problem, cross-site cold-start product recommendation, i.e., recommending products from e-commerce websites to microblogging users without historical purchase records. Our main idea is that on the e-commerce websites, users and products can be represented in the same latent feature space through feature learning with the recurrent neural networks. Using a set of linked users across both e-commerce websites and social networking sites as a bridge, we can learn feature mapping functions using a modified gradient boosting trees method, which maps users' attributes extracted from social networking sites onto feature representations



learned from e-commerce websites. The mapped user features can be effectively incorporated into a feature-based matrix factorization approach for coldstartproduct recommendation. We have constructed a large dataset from WEIBO and JINGDONG. The results show that our proposed framework is indeed effective in addressing the cross-site cold-start product recommendation problem. We believe that our study will have profound impact on both research and industry communities.

The Ref[2] paper, provides a brief discussion on designing ideas of the proposed approach using learning scheme as well as the detailed survey of the literature in further sections. The discussion section of this paper provides a proper summary of the proposed scheme with implementation ideas in proper way with clear specifications. The proposed learning principle is called as BigData Assisted Modified Learning Strategy (BMLS), in which it is derived from the mining scheme called Apriori and the Deep Learning approach. This paper survey several literatures to identify the existing problems in this domain and provide a proper resolution to the recommendation system in fine manner. The logic of BigData is applied to handle the huge volume of data in simple way as well as the specific technology provides congestion free data management over the server end.

Types of User Data

Being able to access the following types of user data can help power smarter recommendations:

- **Location data:** The country, region, or city a user is located in
- **Tech data:** The type of device a user is accessing a site from, the browser-type they are using, their operating system, and more
- **Demographic data:** A user's gender, age, marital status, etc.
- **Behavioral data:** Actions a user takes on-site, including clicks, add-to-carts, hovers, number of pages viewed, etc.
- **Affinity-based data:** The interests and preferences displayed by a user on-site
- **Online and offline purchase data:** The products a user purchased on-site or in-store
- **Traffic source data:** The source of traffic a user is visiting from, including direct traffic, paid traffic, social traffic, and referral traffic
- **3rd-party data:** Information about a user from outside sources, onboarded through a DMP.

The strategies behind recommender systems

Recommendations can provide key insights and the opportunity to better understand who a customer is in order to delight them, add value, and improve the overall relationship with a brand. And when it comes to the strategies behind each of them, there are three primary tiers:

- Global recommendation strategies
- Contextual recommendation strategies
- Personalized recommendation strategies

Global strategies:

These strategies tend to be the easiest to implement, simply serving any user – both known and unknown – the most frequently purchased, popular, or trending products in a recommendation widget.

Contextual strategies:

These strategies rely on product context, assessing product attributes, such as color, style, the category it falls under, and how frequently it is purchased with other products, to recommend items to shoppers.

Personalized recommendation strategies:

Personalized strategies, the most sophisticated of the tiers, don't just simply heed context, but also the actual behavior of users themselves. They take the available user data and product context into consideration to surface relevant recommendations for each user on an individual level. This means, in order to effectively deploy them, a brand must have access to behavioral data about the user, such as purchase history, affinities, clicks, add-to-carts, and more.

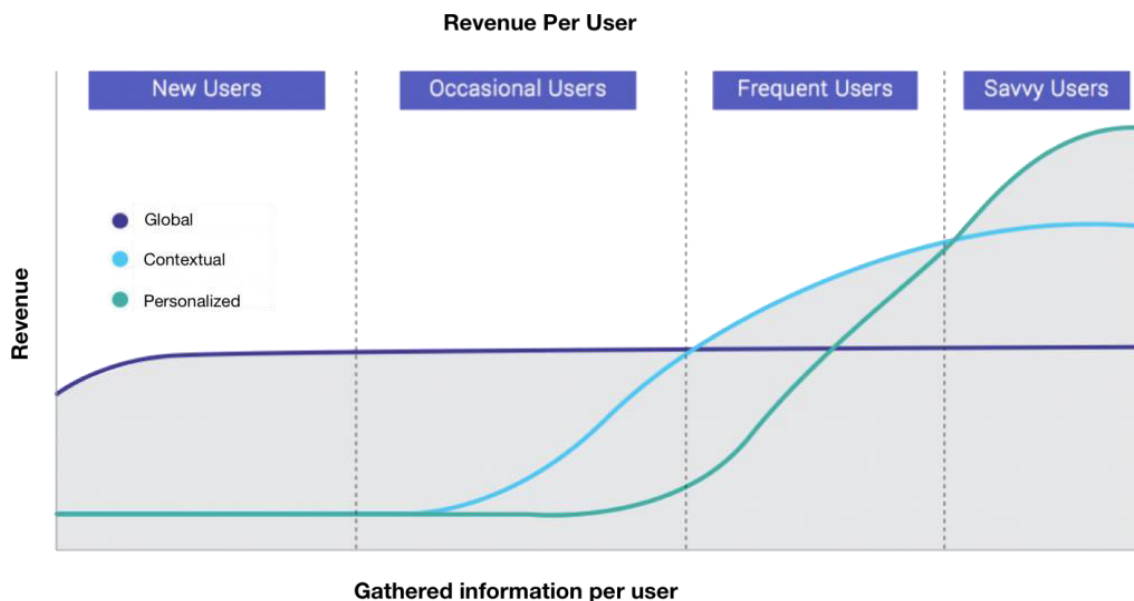


Fig. 1: Revenue per User

III. RESULT AND DISCUSSION

Recommendation System have become increasingly popular in recent years, and are utilized in a variety of areas including movies, music, news, research articles, search queries and products in general. Mostly used in the digital domain, majority of today’s E-Commerce sites like Amazon, Flipkart, Ajo, Myntra etc. make use of their proprietary recommendation algorithms in order to better serve the customers with the products they will surely like. With the growing amount of information on the internet and with a significant rise in the number of users, it is becoming important for companies to search, map and provide them with the relevant chunk of information according to their preferences and tastes.

All this is only possible with a Recommendation engine which is basically a data filtering tool that make use of algorithms and data to recommend the most relevant items to a particular user.

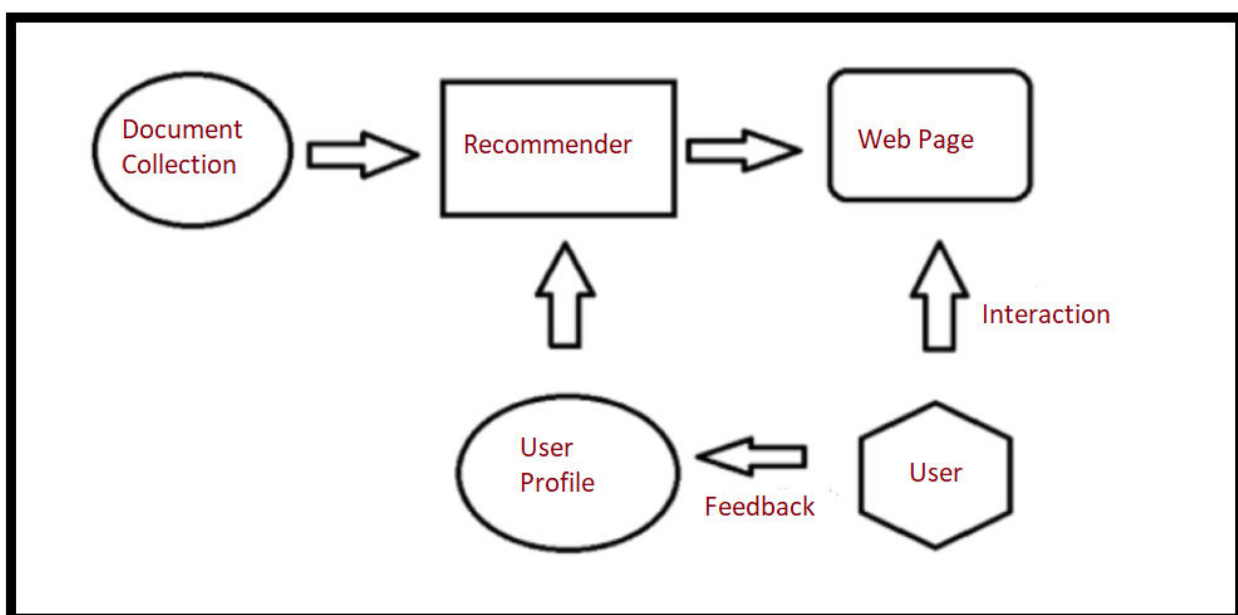


Fig.2: Recommender System



IV. CONCLUSION

We all interact with product recommendation systems nearly every day as internet users during Google searches, when using movie or music streaming services, when shopping online, when browsing social media, and when using things like dating apps. Product recommendation systems are one of the most successful and widespread applications of machine learning in businesses. When it is set up and configured correctly, it can significantly boost sales, revenues, conversions etc. This is achieved with personalizing product or content recommendations to a particular user's preferences creates a positive effect on user experience. Recommendations can provide key insights and the opportunity to better understand who a customer is in to delight them, add value and improve the overall relationship with a brand. And this, in turn, translates into metrics that nonetheless of great importance to online businesses and also very convenient and time saving for the costumers and users.

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