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REVIEW PAPER ON PRODUCT RECOMMENDATION SYSTEM USING DEEP LEARNING AND COLLABORATIVE FILTERING

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ABSTRACT

A product recommendation system is a software tool designed to generate and provide suggestions for items or content a specific user would like to purchase or engage with. Utilizing machine learning techniques and various data about both individual products and individual users, the system creates an advanced net of complex connections between those products and those people.

Keywords: Recommendation, Collaborative filtering, Product.

I. INTRODUCTION

As internet users, we all interact with product recommendation systems nearly every day – during Google searches, when using movie or music streaming services, when shopping online, when browsing social media, and when using things like dating apps.

As such, product recommendation systems are one of the most successful and widespread applications of machine learning in business. When set up and configured correctly, they can significantly boost sales, revenues, click-through-rates, conversions, and other important metrics. This is because personalising product or content recommendations to a particular user's preferences creates a positive effect on user experience. And this, in turn, translates into metrics that are harder to measure – customer satisfaction, loyalty, brand affinity, etc. – though are nonetheless of great importance to online businesses.

Recent Research from Monetate reveals that product recommendations can lead to a 70% increase in purchase rates, both in the initial session and in return sessions, and 33% higher average order values. A further study from Salesforce found that shoppers who click on product recommendations have 4.5x higher basket rates, make 4.8x more product views per visit, and have a 5x higher per-visit spend.

II. METHODOLOGY

Various Existing Methods

Prediction techniques have several important applications such as accurate prediction of rating of products. Different recommendation techniques are described below

Domain-sensitive Recommendation Algorithm: In this approach, a novel Domain- sensitive Recommendation (DsRec) algorithm is proposed to make the rating prediction by exploring the user-item subgroup analysis simultaneously, in which a user-item subgroup is deemed as a domain consisting of a subset of items with similar attributes and a subset of users who have interests in these items. The proposed framework of DsRec includes three components: a matrix factorization model for the observed rating reconstruction, a bi-clustering model for the user-item subgroup analysis, and two regularization terms to connect the above two components into a unified formulation. Extensive experiments on Movielens-100K and two real-world product review datasets show that our method achieves the better performance in terms of prediction accuracy criterion over the state-of-the-art methods.

Item-based Recommendation Generation Algorithm: In this approach, different item-based recommendation generation algorithms are analysed. There are two fundamental challenges. First is to improve the scalability of the collaborative filtering algorithms. Second is to improve the quality of recommendations for the users. These two challenges are in conflict since the less time an algorithm spends searching for neighbours, the more scalable it will be, and the worst its quality. Here, these issues areaddressed by applying an approach- item-based algorithm. The bottleneck in this algorithm is the search for neighbor among a large user population of potential neighbours. Item-based algorithms avoid this bottleneck by exploring the relationship between users .

Method using Contextual Signals: Time context and social context are the two contextual signals (i.e., the user's current companion). Exploiting time context has been proved to be an effective approach to improve recommendation performance, e.g. Netflix Prize. Additionally, social context has also been found as a source for improving CARS performance. Time can be represented both as continuum information (e.g. current date/time), and as periodic, discrete information. When timestamps are available, both continuous and categorical context information can be extracted and exploited. Social context is a key factor for the users' actions. One way to obtain social context signals is to take advantage of online social networks e.g. Facebook and Twitter, which help in social network-based recommender systems. However, the context information obtained in this way is used to find general preferences of related users, and generally does not correspond to the item usage/consumption context of the target user .

Comparison of Pre-filtering and Post-filtering: In this method, EPF (exact pre- filtering), Weight and Filter post-filtering methods are used. These methods are compared across two datasets and various other experimental settings for finding which method dominates the other. This implies that the comparison of the pre- and the post- filtering approaches depends very significantly on the type of the post-filtering method used. Pre-filtering, post-filtering and the contextual filtering methods are compared to choose better one .

III. MOTIVATION

Knowing what items our customers should be highly interested in is vital in many businesses. Recapping our FP Growth data mining, we experienced that quite often products are related to each other. So if one customer buys product A that customer will most likely also purchase product B, because both articles are related (for whatever reason, maybe like Beer and Diapers). Because of this association rule, we can estimate customers to purchase more than just one product within one sales transaction.

The limitations of previous system encourage designing an interface for entering business rules that can be used for explicit user feedback. For entering the strength of the rules the expectancy concept has been introduced, which is a way of representing condense of bot positive and negative rules. The methods need to analyze for combining multiple rules that can be applied to a single entity or entity pairs. The design concepts were verified by implementing a prototype that was adapted to datasets from various domains.

•The Recommender systems have been successfully used in numerous domains and applications to identify potentially relevant items for users according to their preferences (tastes, interests and goals).

•Even though the majority of recommender systems focus on a single domain or type of item, there are cases in which providing the user with cross-domain recommendations could be beneficial. For instance, large e-commerce sites like Amazon4 and eBay5 collect user feedback for items from multiple domains, and in social networks users often share their tastes and interests on a variety of topics. In these cases, rather than exploiting user preference data from each domain independently, recommender systems could exploit more exhaustive, multi-domain user models that allow generating item recommendations spanning several domains.

•Furthermore, exploiting additional knowledge from related, auxiliary domains could help improve the quality of item recommendations in a target domain, e.g. addressing the cold- start and sparsity problems.

IV. AIM AND OBJECTIVE

The Aim of proposed work is to provide recommendations based on recorded information on the users' preferences. These systems use information filtering techniques to process information and provide the user with potentially more relevant items.

This work will try to achieve some or all the following objectives:

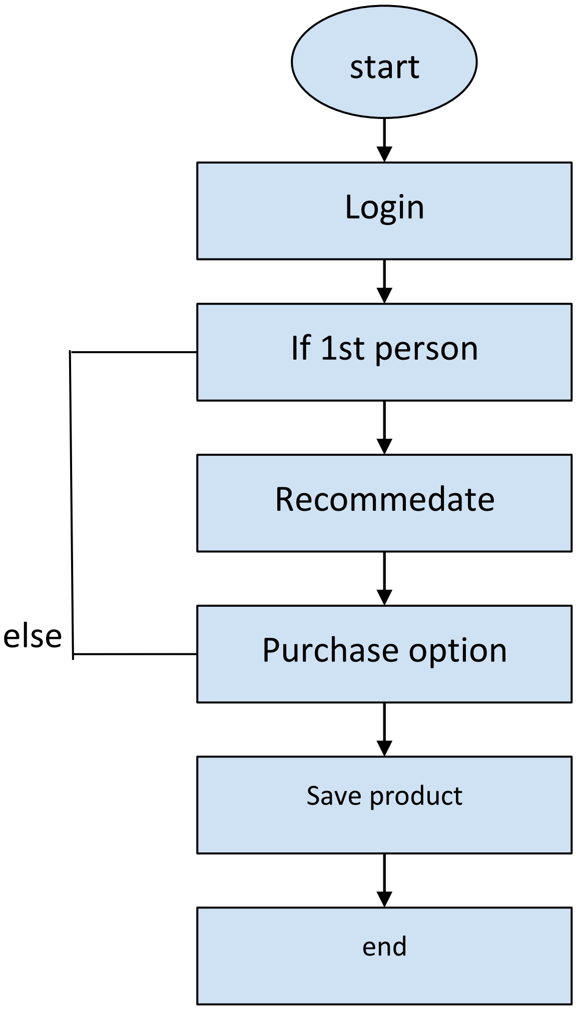
•To Write a python code which collect all the information and response according by provide suitable name

•UI based system for responsive customer response

•List all the recommendation of products and provide linkage with them.

•Analysis all the parameter of product via datasets

Proposed Methodology (FLOW CHART)



V. CONCLUSION

In this project, we used different neural network architectures to overcome the limitations of matrix factorization collaborative filtering models. We showed these models performed better than state-of-art existing models on real world datasets. Our models are simple and generic that can be applied or extended to different types of recommendation problems. This work complements the mainstream shallow models for collaborative filtering, opening up a new avenue of research possibilities for recommendation based on deep learning.

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