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A Survey on Recommender System

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Abstract: This work proposes a literature survey on Recommender systems which are applied in a variety of applications like movies, music, research articles, social tags and restaurants etc. as these systems have become extremely common in recent years. Providing the good recommendations to the customer based on their usage patterns is the major focus of every recommendation system's study. Prior research has reported that desired property of recommendation algorithm is the stability and has important implications on user's trust and acceptance of recommendation. Two scalable , general purpose meta algorithmic approaches can be used in conjunction with different traditional recommendation algorithms to improve their stability are introduced in[1]. Recommendations based on user's usage patterns would also be the another interesting direction in research of recommendation system's algorithm.

Keywords: Recommender Systems, Recommendation Stability, User's Usage Patterns

I. INTRODUCTION

Recommender system plays an important role in Ecommerce. Many companies, including Amazon, Netflix, and Pandora, use recommender systems to suggest alternative or cross selling products to their customers. Recommender systems represent technologies that help users in finding a set of interesting or relevant items, typically by predicting the rating given by users to an item they had not considered yet. Recommender system collect the rating from user for seen items then analyses patterns of users past ratings and predicts users preferences for unseen items.

Once ratings for the unseen items are estimated, the items with the highest estimated rating(s) can be recommended to the user. But evaluating performance of recommendation algorithms and recommendation accuracy has always been a key issue, in developing evaluation metrics. Based on how unknown ratings are predicted, recommendation techniques can be classified into three general categories: Content-based, Collaborative filtering, Hybrid techniques [2]. Among different recommendation approaches, collaborative filtering techniques have been most widely used, largely because they are domain independent, require minimal, if any, information about user and item features, yet they can still achieve accurate predictions.

II. LITERATURE REVIEW

G. Adomavicius and A. Tuzhilin, provide the review of current generation of recommendation methods that are categories into the following three main categories:
Content-based recommendations: The user will be recommended items similar to the ones the user preferred in the past. Collaborative recommendations: The user will be recommended items that people with similar tastes and preferences liked in the past. Hybrid approaches: These methods combine collaborative and content-based methods. This paper also describes various limitations such as new user and item problem and possible extensions of current recommendation methods. These extensions include of understanding of users and items, incorporation of the contextual information into the recommendation process, support for multicriteria ratings, and a provision of more flexible and less intrusive types of recommendations that are useful to improve recommendation capabilities and make recommender systems applicable to an even broader range of applications [1].

G. Adomavicius and J.Zhang focuses on the consistency of recommendation system predictions. Here the author investigates an issue that some popular recommendation algorithms can suffer from a high degree of instability [3].
G. Adomavicius and J. Zhang, Stability of recommendation algorithms suggest that stability is an interesting theoretical and desired property of recommendation algorithms, because unstable recommendations can potentially decrease users trust in recommender systems and, as a result, reduce user's acceptance of recommendations. In this article, author also provides an extensive empirical evaluation of stability for six popular dataset [1].

C. Basu, H. Hirsh, and W. Cohen, Recommendation as classification: Using social and content-based information in recommendation, provide inductive learning approach to use both rating information and other information about artifact for stable prediction and user preferences [5].
M.Deshpande and G. Karypis present a class of model-based recommendation algorithms that first determines the similarities between the various items and then uses them to identify the set of items to be recommended. The key steps in this class of algorithms are (i) the method used to

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compute the similarity between the items, and (ii) the method used to combine these similarities in order to compute the similarity between a basket of items and a candidate recommender item [6].

J. L. Herlocker, J. A. Konstan, K. Terveen, and J. T. Riedl, Evaluating collaborative filtering recommender systems, review the key decisions in evaluating collaborative filtering recommender systems: the user tasks being evaluated, the types of analysis and datasets being used, the ways in which prediction quality is measured, the evaluation of prediction attributes other than quality, and the user-based evaluation of the system as a whole [7].

D. Lemire and A. Maclachlan, Slope one predictors for online rating- based collaborative filtering, give Slope one algorithms are easy to implement, efficient to query, reasonably accurate, and they support both online queries and dynamic updates, which makes them good candidates for real-world systems. The basic SLOPE ONE scheme is suggested as a new reference scheme for collaborative filtering. By factoring in items that a user liked separately from items that a user disliked, author achieves results competitive with slower memory based schemes over the standard methods [8].

J. Neville and D. Jensen, Iterative classification in relational data, present an iterative classification procedure which uses simple Bayesian classifiers in an iterative fashion, dynamically updating the attributes of some objects as inferences are made about related objects. Inferences made with high confidence in initial iterations are fed back into the data and are used to inform subsequent inferences about related objects.The author evaluate the performance of this approach on a binary classification task.Experiments indicates that iterative classification significantly increases accuracy when compared to a single-pass approach [9].

I. Pilaszy and D. Tikk, Recommending new movies: Even a few ratings are more valuable than metadata, investigate the value of movie metadata compared to movie ratings in regards of predictive power. We compare our solely CBF approach with a simple baseline rating-based predictor. We show that even 10 ratings of a new movie are more valuable than its metadata for predicting user ratings[11].

III.CONCLUSION

Thus, above literature survey concludes that, stability of recommender system is the major issue. So, to improve stability and to offer good recommendation two meta-algorithmic approaches based on the bagging and iterative smoothing technique that can be used to improve stability of a wide variety of state-of-the-art recommendation algorithms. Another interesting direction would be to perform user behaviour studies to investigate the value of stable recommendations (as opposed to unstable recommendations)on users' usage patterns and acceptance of recommender systems.

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