Chapter 5
A Classification Framework Towards Application of Data Mining in Collaborative Filtering

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ABSTRACT

Recommendation making is an important part of the information and e-commerce ecosystem. Recommendation represent a powerful method that filter large amount of information to provide relevant choice to end users. To provide recommendations to the users, efficient and cost effective methods needs to be introduced. Collaborative filtering is an emerging technique used in making recommendations which makes use of filtering by data mining. This chapter presents a classification framework on the use of data mining techniques in collaborative filtering to extract the best recommendations to the users on the basis of their interests.

INTRODUCTION

In everyday life, process of recommending choices to the user is very commonly used. Anyone who knows the likes and dislikes of other person can recommend the things which he likes and ignore the things which he dislikes. Recommendation system assists the process of making recommendations to help the people in different fields such as movies, books, restaurants etc. Recommender systems are either based on the content based recommendations or collaborative recommendations. Content based recommendation tends to recommend the items that lookalike to the user preferences. Collaborative filtering suggests recommendations on the basis of the preferences given by the other users with the

same interests or similar tastes. Collaborative filtering is more popular than content based filtering as in many domains it is very difficult to find out the useful features from the items which is the prerequisite for content based filtering.

This present work aims to provide a wide survey on the collaborative filtering. Various types of collaborative filtering are: Memory based collaborative filtering, Model based collaborative filtering and hybrid collaborative filtering. The chapter discusses the types of collaborative filtering approaches. The chapter provides a classification framework for the collaborative filtering approaches and the application of data mining in it. Authors have studied various techniques to make efficient recommendations in less time and cost. Data Mining is most emerging and useful technique in the filtering process for making recommendations to the users.

Data Mining is an approach to extract the significant, previously unseen information out of the data. Data mining finds application in model based collaborative filtering process to suggest the recommendations and to reduce the effort, cost and time spend on the recommendation process. Data Mining includes clustering, classification and association analysis which will be explained in detail later on in the chapter. This chapter focuses on the study of the various types of collaborative filtering and the role of data mining in order to improve the filtering process.

Organization of the chapter is as follows: firstly, the authors provide the research methodology used by them and various factors that motivated the authors to carry out this study. Then this chapter provides the introduction to collaborative filtering, different types of the collaborative filtering and their functionalities. Next the authors discussed the introduction to the data mining process and its various techniques. Afterwards chapter deals with the classification and describes the methods based on data mining to improve the collaborative filtering based recommendations. Subsequent section provides implications of our work to the research domain. Finally concludes the chapter and highlights some future enhancements that can be done in this field.

RESEARCH METHODOLOGY

In this chapter, various collaborative filtering techniques are studied for improving the quality of the recommendation process. The research starts with the study of recommender systems namely: Collaborative Filtering, Content Based filtering, Hybrid Recommender, Demographic based filtering and Utility Based Filtering. The features and properties of recommender system are overviewed. Then we identified collaborative filtering as the most promising approach towards recommender systems. Collaborative filtering is an approach to make the recommendations based on the user and other persons past behavior and predict the items on basis of their interest. Collaborative filtering is further classified as memory based filtering, model Based filtering and hybrid filtering. Various application areas of collaborative filtering include: Books, Social Networking Sites, Movies, Music, Images, and Shopping etc. (Figure 1).

Best recommender system used collaborative filtering based on Data Mining approach. Data mining is the process of discovering interesting knowledge from large amounts of data stored in databases, data warehouses, or other information repositories" (Han & Kamber, 2001). Finally, authors come up with a broad classification framework showing the use of data mining in collaborative filtering for effective recommendations to the users. Figure 1 shows the research roadmap that has been followed in the chapter.

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