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FUCL mining technique for book recommender system in library service

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Abstract

Recommender systems are important tools in library websites that assists the user to find the appropriate books. With the rapid development of internet technologies and the number of books has varied which waste of time and difficulty for finding from library searching system. This research presents a book recommendation system for university libraries to support user interests which are related in the same topic and faculty. The main motive of this research is to develop the technique which recommends the most suitable books to users according to the faculty of the user profile with book category, and book loan or FUCL technique. This is based on the combined features of association rule mining. The results show that FUCL mining technique is suitable to apply for the recommender book tool in the library and has a higher accuracy value than other technique.

Keywords: Recommendation System; data mining; association rule; user profile.

1. Introduction

The use of internet to search information is likely to increase. Particularly, searching books in university library. There has been a continual development of the recommender system in library systems to increase effectiveness of information searching to meet users' satisfaction at the highest level. This technique is applied to recommend

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information which yields more relevant results to users' needs resulting in enhancing users' satisfaction when searching for books in the library.

This research is interested in developing the book recommendation system to serve individual needs from each faculty. In addition the association rule technique was applied to identify relationships between books that the users in each faculty are interested in and the availability of books in the system in accordance with book categories and book loan. This could facilitate the users when searching for books, and give better searching results. The book recommendation system not only enhanced effectiveness of library system but also helped reduce cost of keeping. Additionally, it facilitated users when searching through a wide range of books on shelves and could develop users' reading habits.

The paper is structured as follows: related works are summarized in Section 2. The proposed recommendation mechanism is presented in Section 3. Association rule model are explained in Section 4. Consequently Experimental Setting are describes in section 5 and Experimental result is explained in Section 6. Finally, Section 7 describes conclusions and future work.

2. Related Work

Recommender systems have been proposed for recommending books in literature [1-4]. Systems make use of different information filtering approaches for recommending books depending upon the context and domain in which these systems are developed such as, LIBRA [5] is a CB book recommender system that uses book information taken from the Amazon.com web pages. User profile was learned and title recommendations using ratings provided by users. It also applies text categorization to semi-structured data that is obtained through information extraction from Amazon.com web pages. Yan-ge Ma [6] proposed a recommendation algorithm which takes the interconnected characteristic of books by content similarity into account, and considers the information attributes of one book.

The K3Rec [7] book recommender is developed for K-3 readers. It examines book content, topic suitability and other features in order to recommend books to children that best fit with reading choices and readability levels of K-3 students. K3Rec is limited in assessing the quality of items if the contents lack enough information about items being recommended. In that case, K3Rec is unable to differentiate between user likes and dislikes. Other problems associated with this method include overspecialization and new user problems.

Hybrid recommenders have been developed such as combination user demographic information with CB and CF approaches in recommending books [8]. This way sparsity and cold-start problems have also been resolved which lead to the worst predictions [9]. To cope with performance and quality related issues, NOVA [10] combines different features of CF, CB, and context-aware recommender systems. In comparison with traditional approaches, NOVA shows a comparatively greater performance and quality than others. In the design of recommender systems, several data mining techniques are used to mine interesting rules useful in recommendations from large datasets. For example, a system presented in [11] uses a k-means clustering technique to make clusters of system users by using the transaction history of users and recommending personalized book lists to users within these clusters. However, due to not considering the actual book contents, the recommended books are poor representatives of the users needs. Mobasher et al. [12] presented a system for web personalization based on association rules mining. Their system identifies association rules from page views co-occurrences based on users navigational patterns. Another system is presented in [13] that makes use of library loan records and applies association rule mining techniques to recommend books in the digital library by using the association rule mining system to make inferences and derive interesting rules. Rules are made interesting such as computer students are more likely to take interest in computer and math books rather than geography hence improves recommendation quality. This approach is limited in finding interesting rules that meet the interest of users who do not visit libraries frequently and perform transactions with the system. Up to now, most of the algorithms recommend items based on the rank or score given by users, whereas in libraries' book-loan logs, no such data was available. Yan et al. [14] discussed the users' behavior from the library book-loan log, but the study mainly concentrates on the knowledge dependency of different majors. This study discusses book recommendations based on the book loan data, but their method of association rules, and the paper, only proposed a service mode without experiment on the algorithm [15].