**A Fuzzy Preference Tree-Based Recommender System for Personalized Business-to-Business E-Services**

**ABSTRACT:**

The Web creates excellent opportunities for businesses to provide personalized online services to their customers. Recommender systems aim to automatically generate personalized suggestions of products/services to customers (businesses or individuals). Although recommender systems have been well studied, there are still two challenges in the development of a recommender system, particularly in real-world B2B e-services: 1) items or user profiles often present complicated tree structures in business applications, which cannot be handled by normal item similarity measures and 2) online users’ preferences are often vague and fuzzy, and cannot be dealt with by existing recommendation methods. To handle both these challenges, this study first proposes a method for modeling fuzzy tree-structured user preferences, in which fuzzy set techniques are used to express user preferences. A recommendation approach to recommending tree-structured items is then developed. The key technique in this study is a comprehensive tree matching method, which can match two tree-structured data and identify their corresponding parts by considering all the information on tree structures, node attributes, and weights. Importantly, the proposed fuzzy preference tree-based recommendation approach is tested and validated using an Australian business dataset and the MovieLens dataset. Experimental results show that the proposed fuzzy tree-structured user preference profile reflects user preferences effectively and the recommendation approach demonstrates excellent performance for tree-structured items, especially in e-business applications. This study also applies the proposed recommendation approach to the development of a web-based business partner recommender system.

**EXISTING SYSTEM:**

* The three main recommendation techniques are collaborative filtering (CF), content-based (CB) and knowledge-based (KB) techniques.
* The CF technique is currently the most successful and widely used technique for recommender systems.
* CB recommendation techniques recommend items that are similar to those previously preferred by a specific user.
* The KB recommender systems offer items to users based on knowledge about the users and items

**DISADVANTAGES OF EXISTING SYSTEM:**

* The fuzzy preferences models mentioned previously, which are represented as vectors, are not suitable to dealing with the tree-structured data in a Web-based B2B environment.
* Excessive amounts of information on the Web create a severe information overload problem
* When the number of rated items for the CS user is small, the CF-based approach cannot accurately find user neighbors using rating similarity; therefore, it fails to generate accurate recommendations.
* The major limitations of CB approaches are the item content dependence problem, overspecialization problem, and new user problem
* The KB approach has some limitations, however, for instance, the KB approach needs to retain some information about items and users, as well as functional knowledge, to make recommendations. It also suffers from the scalability problem because it requires more time and effort to calculate the similarities in a large case base than other recommendation techniques.

**PROPOSED SYSTEM:**

* This study proposes a method for modeling fuzzy tree-structured user preferences, presents a tree matching method, and, based on the previous methods, develops an innovative fuzzy preference tree-based recommendation approach. The developed new approach has been implemented and applied in a business partner recommender system.
* This paper has three main contributions. From the theoretical aspect, a tree matching method, which comprehensively considers tree structures, node attributes, and weights, is developed.
* From the technical aspect, a fuzzy tree-structured user preference modeling method is developed, as well as a fuzzy preference tree-based recommendation approach for tree-structured items. From the practical aspect, the proposed methods/approaches are used to develop a Web-based B2B recommender system software known as Smart BizSeeker, with effective results.

**ADVANTAGES OF PROPOSED SYSTEM:**

* The evaluation results on the Australian business dataset. It can be seen that the proposed recommendation approach in this study has the lowest MAE, the highest precision, high recall, and highest F1 measure.
* The results indicate that the fuzzy tree-structured user preference profile effectively reflects business users’ preferences, and the proposed approach is well-suited to the business application environment.

**SYSTEM ARCHITECTURE:**



**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

* System : Pentium IV 2.4 GHz.
* Hard Disk : 40 GB.
* Floppy Drive : 1.44 Mb.
* Monitor : 15 VGA Colour.
* Mouse : Logitech.
* Ram : 512 Mb.

**SOFTWARE REQUIREMENTS:**

* Operating system : Windows XP/7.
* Coding Language : JAVA/J2EE
* IDE : Eclipse -- Galileo
* Database : MYSQL