**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. 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.

**Index Terms**—E-business, fuzzy preferences, recommender systems, tree matching, web-based support system.