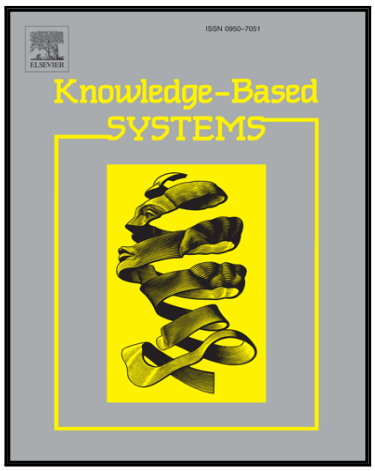

Personal Price Aware Multi-Seller Recommender System: Evidence from eBay

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Personal Price Aware Multi-Seller Recommender System: Evidence from eBay

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Abstract

Many e-commerce sites use recommender systems, which suggest products that consumers may prefer to purchase in order to increase site revenue. Though recommender systems have achieved great success, they have not reached their full potential. Most current systems share a common weakness: they fail to take into account dynamic properties of the offering which could dramatically improve the effectiveness of a recommendation; these characteristics include the product price, promotion indication, and seller's reputation. Particularly, in a multi-seller platform (e.g., eBay, Amazon), where competing firms sell products differentiated mainly by the seller's reputation and product price, modelling consumer's sensitivity to these dynamic properties and incorporating it into a recommender system will optimize sellers' revenue and market penetration.

In this research, we introduce a novel approach for a personal price aware multi-seller recommender system (PMSRS) which implicitly models a consumer's willingness to pay (WTP) for a specific product, taking into account discount indication and seller reputation, and incorporating it within a context-aware recommendation model to improve its effectiveness. We use six months of transactional data from eBay.com to test the proposed approach and prove its validity and effectiveness. Our result show that the proposed approach provides a good estimation of the consumer's WTP based on transaction history, and that incorporating the consumer's WTP and seller's reputation into a recommender system significantly improves its prediction accuracy (F-score improvements of 84%).

Keywords: Context aware recommender system; personalized pricing; e-commerce; consumer behaviour

1. Introduction

Recommender systems have achieved much commercial success, and they have become a popular choice for a wide variety of e-commerce sites [1]. Existing studies largely assume that the properties of products are static. However, as marketing research has shown [2], an e-commerce company could tailor some properties of a product for a particular consumer, and this could dramatically improve the effectiveness of a recommendation. We contend the following two points: 1) price is a controllable property which should be incorporated by the recommender system, and 2) the personalized price sensitivity can be implicitly modelled by tracking consumers' online behavior. For example, a consumer might like a recommended