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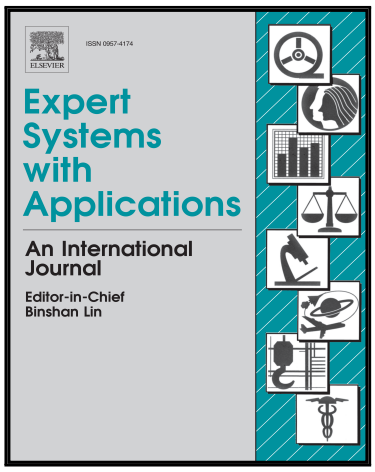

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ACCEPTED MANUSCRIPT

Personalized Recommender System based on Friendship Strength in Social Network Services

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Abstract

The rapid growth of social network services has produced a considerable amount of data, called big social data. Big social data are helpful for improving personalized recommender systems because these enormous data have various characteristics. Therefore, many personalized recommender systems based on big social data have been proposed, in particular models that use people relationship information. However, most existing studies have provided recommendations on special purpose and single-domain SNS that have a set of users with similar tastes, such as MovieLens and Last.fm; nonetheless, they have considered closeness relation. In this paper, we introduce an appropriate measure to calculate the closeness between users in a social circle, namely, the friendship strength. Further, we propose a friendship strength-based personalized recommender system that recommends topics or interests users might have in order to analyze big social data, using Twitter in particular. The proposed measure provides precise recommendations in multi-domain environments that have various topics. We evaluated the proposed system using one month's Twitter data based on various evaluation metrics. Our experimental results show that our personalized recommender system outperforms the baseline systems, and friendship strength is of great importance in personalized recommendation.

Keyword

Personalized recommender system, Social network services, Friendship strength, Social behavior, Collaborative filtering (CF)

1. Introduction

Recently, considerable real-time data have been generated because of the increase in the use of social network services (SNSs). Through SNSs, users can express their opinions in an unconstrained manner, and share their interests with others. This spontaneous participation of users in SNSs results in the generation of enormous amounts of data with various characteristics, called big social data (Cambria et al., 2013). Big social data have been used in various studies in many research fields because of their massiveness and variety (Manovich, 2011). In these fields, active research on personalized recommender systems has been conducted to provide appropriate information to users according to their demands and preferences (Guy, 2013).

Traditional personalized recommender systems employ mainly a collaborative filtering (CF) algorithm. A CF provides recommendations to users by analyzing their individual characteristics in order to utilize the information of other users who are highly similar to them (Herlocker et al., 1999). Big social data enable us to

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