

Public Abstract

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Title:A New Adaptive Framework for Collaborative Filtering Prediction

There is an increasing trend in using computationally intelligent methods and data mining techniques in commercial companies and non-profit organizations to provide the customer or user with more specific recommendation of their products or services that fits his/her needs. Collaborative filtering (CF) is one of the most successful techniques for recommendation systems and has been used in many commercial services provided by companies like Amazon, TiVo and Netflix. Collaborative filtering uses a user-item interaction matrix (ratings given by users on items) to calculate the similarities between users or items. Then, the system recommends new items to a user that are most similar to the items that the user liked. Existing CF techniques work well on dense data but poorly on sparse data. To address this weakness, we present new techniques that makes CF more accurate on sparse data. A new adaptive framework that encapsulates various CF algorithms and the relationships among them is presented. An adaptive CF predictor is developed that can self adapt from user-based to item-based to hybrid methods based on the amount of available ratings. The experimental results show that the new predictor consistently obtained more accurate predictions than existing CF methods, with the most significant improvement on sparse data sets. When applied to the Netflix Challenge data set, The method performed better than existing CF and singular value decomposition (SVD) methods and achieved 4.67% improvement over Netflix's system.