Pattern Based Recommendation

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Abstract

Loosly speaking, recommendation algorithms provide a list of recommended items to one or more users. Items can be books, movies, songs, news, store articles etc.

In recommendation algorithms, two principal strategies can be distinguished. The content based strategy is based on content descriptions of items. As an example, the content description of a movie item could contain the genre, the participating actors, the director, the year of release, etc.

The collaborative filtering strategy does not require any content description of the items. In this case, recommendations are made by finding patterns in the user-item preference data. In our current work we focus on collaborative filtering.

The training data for collaborative filtering can be represented by a matrix with the rows representing the users and the columns representing the items. A value in this matrix can be unknown or can reflect the preference of the respective user for the respective item. In our current work, we consider the setting of binary, positive-only preference feedback (BPO collaborative filtering). Hence, every value in the preference matrix is 1 or unknown. Applications that correspond to this version of the collaborative filtering problem are likes on social networking sites, tags for photo's, websites visited during a surfing session, articles bought by a customer etc.

Traditional discussions of collaborative filtering compare algorithms on a performance level. Therefore, valuable insights into the similarities between these algorithms remain overlooked. In our work, we advance the fundamental understanding of collaborative filtering algorithms by focussing on these similarities.

Central to this research is our pattern based framework that unifies many algorithms for BPO collaborative filtering. It allows us to reveal interesting similarities between exisiting algorithms, challenge well accepted beliefs and developed novel algorithms that can outperform state-of-the-art algorithms.