Rogers (2015) explained that the PageRank algorithm works by iteratively distributing importance (PageRank values) among nodes in a network based on their linking structure. The algorithm assumes that the more important pages are those that receive links from other important pages. The output is a set of normalized PageRank values representing the relative importance of each node.

Collaborative filtering (CF) predicts user preferences based on known user ratings. To improve recommendation quality, Zhang, Liu, Gui, Wei, and Ma (2014) propose a new prediction score model for memory-based CF, a differential model for matrix factorization that considers the adjustment process after training, and a hybrid CF approach that combines matrix factorization and neighbor-based methods.

Item-based CF has a problem where all users have the same weight when computing item-item similarities, even though some users' ratings may be more important. To solve this, Jiang and Wang (2010) put forward a user rank approach to calculate the weights of users based on a user correlation graph model and two ranking rules. The user rank algorithm is based on PageRank and incorporates user rank into computing item-item similarity and difference.

Guo, Zhang, and Zhang (2017) put forward a personalized approach to recommending digital resources to users in their thesis, which combines PageRank and collaborative filtering techniques in a unified framework. The approach generates and analyzes a time-aware network of user and resource relationships from historical usage data. The personalized PageRank algorithm is adapted to propagate an influential user's time-aware importance or a digital resource's importance along the associative links connecting the active user and their initially preferred resources. This approach aims to address the issues of unstable and sparse historical usage data that limit the effectiveness of traditional collaborative filtering techniques in digital libraries. Experimental results also demonstrate that the proposed approach outperforms traditional collaborative filtering methods in terms of precision rates and precision-recall curves.

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