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PII: S1877-7503(18)30170-4
DOI: https://doi.org/doi:10.1016/j.jocs.2018.08.007
Reference: JOCS 909

To appear in:

Received date: 19-2-2018
Revised date: 13-8-2018
Accepted date: 16-8-2018

Please cite this article as: Yousef Kilani, Ahmed Fawzi Otoom, Ayoub Alsarhan, Manal Almaayah, A Genetic Algorithms-Based Hybrid Recommender System of Matrix Factorization and Neighborhood-Based Techniques, *<![CDATA[Journal of Computational Science]]>* (2018), https://doi.org/10.1016/j.jocs.2018.08.007

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A Genetic Algorithms-Based Hybrid Recommender System of Matrix Factorization and Neighborhood-Based Techniques

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Abstract

Recommender system (RS) is the current applications' main choice to guide the customers in choosing their favorite items. A collaborative filtering (CF) RSs use either the neighbourhood or the latent factor models to recommend items for the active user (customer). The matrix factorization method are widely used in the latent factor model to find the high-expected rated items and hence highly favoured items by the active user. Navgaran' et al. build a genetic-based matrix-factorization RS to make recommendation for the active user. In this project, we build a novel genetic-based CF RS that hybridizes both the neighbourhood and the latent factor models to predict items for the active user. The main difference between our RS and Navgaran' et al. RS is that, we only consider the users and items that are related to the active user rather than considering the whole users and items.

Using three different datasets: MovieLens, FilmTrust, and CiaoDVD, we experimentally show that our model improved Navgaran' et al. RS in term of MAE, precision, and recall. We show that our model is at least 15.2 times faster and has at least 87% less MAE value than Navgaran' et al. RS. In addition, it has better recall and precision values in MovieLens and CiaoDVD datasets.

Keywords: Hybrid model, neighborhood based model, latent factor model, matrix factorization, collaborative filtering, genetic algorithms, recommender system.

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