

Alhijawi B., Al-Naymat G., Obeid N., Awajan, A., 2021. Novel predictive model to improve the accuracy of collaborative filtering recommender systems, *Information Systems*, Volume 96, 2021, 101670, DOI 10.1016/j.is.2020.101670. (ISI, Scopus).

Abstract

The recommendation problem involves the prediction of a set of items that maximize the utility for users. Numerous factors, such as the filtering method and similarity measure, affect the prediction accuracy. We propose a novel prediction mechanism that can be applied to collaborative filtering recommender systems. This prediction mechanism consists of a novel adaptable predictive model, called inheritance-based prediction (INH-BP), and a suitable heuristic search algorithm. INH-BP enables the customization of the predictor to suit the user context. It helps in defining a user interest print (UIP) matrix and employs an optimization algorithm such as a genetic algorithm. The UIP matrix should reflect the degree of user satisfaction based on the concept levels instead of the instance level. The optimization algorithm is used to determine the optimal predictor for each user. A set of experiments were conducted to compare INH-BP with Resnick's well-known adjusted weighted sum. Two benchmark datasets, MovieLens-100K and MovieLens-Last, were used. Both prediction methods were employed using different collaborative filtering techniques. The results demonstrate the superiority of INH-BP and its capability to achieve an accurate prediction irrespective of the number of k-neighbors and their quality. In addition, the results show that INH-BP alleviates the cold start and sparsity issues.