A New Hybrid Recommender System Using Dynamic Fuzzy Clustering

In this paper, a new hybrid system is proposed for combining collaborative and content-based approaches that resolves some limitations of them. Specially, by the proposed system, the novelty and diversity of recommendations improve remarkably. Furthermore, the precision and recall of the proposed system is slightly less than those of the best existing hybrid system (collaborative via content) so that employing this system is justifiable. By this approach, the items that have not been yet rated by any user can be recommended. Collaborative and content-based systems utilized by this work, use a hybrid method based on fuzzy clustering model (fuzzy subtractive clustering) that combines model and memory-based approaches so that its precision is comparable with the precision of the memory-based approach and its scalability is comparable with the scalability of the model-based approach. Furthermore, in this work, a dynamic fuzzy clustering algorithm was proposed in which a measure is presented to determine the stage at which a complete reclustering is required. By applying this algorithm, the system is able to adapt to the dynamic and changing environment in a much less expensive manner in terms of computation times and resources.

Keywords: Recommender system, Content-based recommender, Collaborative recommender, Hybrid recommender, Relational fuzzy subtractive clustering, Dynamic clustering.