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Title: Dynamic Clustering of Partial Preference Relations

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Abstract

With the rapid development of networks and the Internet, Electronic commerce (EC) has appeared as a convenient and flexible new mode of business. To determine fair exchanges between trading partners (e.g. a user purchasing an item from a business via a website), negotiation can be performed. Intelligent agents can be designed to negotiate on behalf of users; such systems must obtain as much information as possible about the user's preferences over possible outcomes, but without asking the user an unreasonable number of questions. A solution is to cluster users whose partially learned preference relations are similar. New preferences can then be learned by observing those of other users in the same cluster. The research consists of three phases: developing a novel method for computing the distances between different preference relations, clustering these possible preference relations, and drawing some conclusions about the preferences of a user based on those of users in the same cluster. During the research process, I have also examined an existing method called probabilistic distance for computing the distances between preference relations, and will compare it with my method in terms of accuracy and efficiency. Preference relations are clustered using the Y-means algorithm, which is an improvement of the K-means clustering method that does not require the number of clusters to be specified in advance. Several experiments are being conducted to test our method's ability to correctly infer the preferences of simulated users, given a small subset of their preference information.