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**A FEATURE-REDUCTION FUZZY CLUSTERING ALGORITHM BASED ON FEATURE-WEIGHTED ENTROPY**

**Abstract:**

Fuzzy clustering algorithms generally treat data points with feature components under equal importance. However, there are various datasets with irrelevant features involved in clustering process that may cause bad performance for fuzzy clustering algorithms. That is, different feature components should take different importance. In this paper, we present a novel method for improving fuzzy clustering algorithms that can automatically compute individual feature weight, and simultaneously reduce these irrelevant feature components. In fuzzy clustering, the fuzzy c-means (FCM) algorithm is the best known. We first consider the FCM objective function with feature-weighted entropy, and construct a learning schema for parameters, and then reduce these irrelevant feature components. We call it a feature-reduction FCM (FRFCM). During FRFCM processes, a new procedure for eliminating irrelevant feature(s) with small weight(s) is created for feature reduction. The computational complexity of FRFCM is also analyzed. Some numerical and real datasets are used to compare FRFCM with various feature-weighted FCM methods in the literature. Experimental results and comparisons actually demonstrate these good aspects of FRFCM with its effectiveness and usefulness in practice.