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Chemical Reaction Algorithm for Expectation Maximization Clustering

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Abstract : Clustering is an intensive research for some years because of its multifaceted applications, such as biology, information retrieval, medicine, business and so on. The expectation maximization (EM) is a kind of algorithm framework in clustering methods, one of the ten algorithms of machine learning. Traditionally, optimization of objective function has been the standard approach in EM. Hence, research has investigated the utility of evolutionary computing and related techniques in the regard. Chemical Reaction Optimization (CRO) is a recently established method. So the property embedded in CRO is used to solve optimization problems. This paper presents an algorithm framework (EM-CRO) with modified CRO operators based on EM cluster problems. The hybrid algorithm is mainly to solve the problem of initial value sensitivity of the objective function optimization clustering algorithm. Our experiments mainly take the EM classic algorithm:k-means and fuzzy k-means as an example, through the CRO algorithm to optimize its initial value, get K-means-CRO and FKM-CRO algorithm. The experimental results of them show that there is improved efficiency for solving objective function optimization clustering problems.

Keywords : chemical reaction optimization, expection maimization, initia, objective function clustering
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