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Fuzzy clustering based on nonconvex optimisation approaches using difference of convex (DC) functions algorithms. (English) [Zbl 1301.90072](#)

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Summary: We present a fast and robust nonconvex optimization approach for Fuzzy C-Means (FCM) clustering model. Our approach is based on DC (Difference of Convex functions) programming and DCA (DC Algorithms) that have been successfully applied in various fields of applied sciences, including Machine Learning. The FCM model is reformulated in the form of three equivalent DC programs for which different DCA schemes are investigated. For accelerating the DCA, an alternative FCM-DCA procedure is developed. Experimental results on several real world problems that include microarray data illustrate the effectiveness of the proposed algorithms and their superiority over the standard FCM algorithm, with respect to both running-time and accuracy of solutions.

MSC:

[90C26](#) Nonconvex programming, global optimization

[62H30](#) Classification and discrimination; cluster analysis (statistical aspects)

[90C70](#) Fuzzy and other nonstochastic uncertainty mathematical programming

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[fuzzy clustering](#); [nonconvex optimization](#); [DC programming](#)

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