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Summary: A new approach to fuzzy clustering is proposed in this paper. It aims to relax some constraints imposed by known algorithms using a generalized geometrical model for clusters that is based on the convex hull computation. A method is also proposed in order to determine suitable membership functions and hence to represent fuzzy clusters based on the adopted geometrical model. The convex hull is not only used at the end of clustering analysis for the geometric data interpretation but also used during the fuzzy data partitioning within an online sequential procedure in order to calculate the membership function. Consequently, a pure fuzzy clustering algorithm is obtained where clusters are fitted to the data distribution by means of the fuzzy membership of patterns to each cluster. The numerical results reported in the paper show the validity and the efficacy of the proposed approach with respect to other well-known clustering algorithms.

MSC:
62H86 Multivariate analysis and fuzziness
62H30 Classification and discrimination; cluster analysis (statistical aspects)

Software:
Qhull; DENFIS; UCI-ml

Full Text: DOI

References: