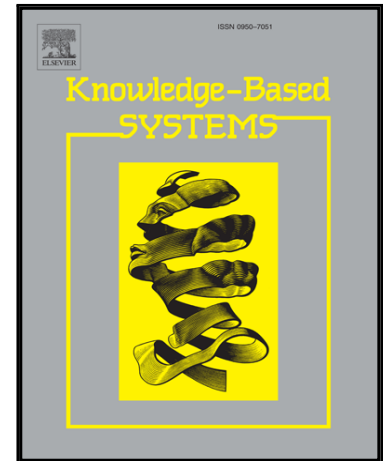


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Natural Neighbor-based Clustering Algorithm with Local Representatives

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Abstract

Clustering by identifying cluster centers is important for detecting patterns in a data set. However, many center-based clustering algorithms cannot process data sets containing non-spherical clusters. In this paper, we propose a novel clustering algorithm called NaNLORE based on natural neighbor and local representatives. Natural neighbor is a new neighbor concept and introduced to compute local density and find local representatives which are points with local maximum density. We first find local representatives and then select cluster centers from the local representatives. The density-adaptive distance is introduced to measure the distance between local representatives, which helps to solve the problem of clustering data sets with complex manifold structure. Cluster centers are characterized by higher density than their neighbors and a relatively large density-adaptive distance from any local representatives with higher density. In experiments, we compare the proposed algorithm NaNLORE with existing algorithms on synthetic and real data sets. Results show that NaNLORE performs better than existing algorithm, especially on clustering non-spherical data and manifold data.

Keywords: clustering, natural neighbor, local representatives

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