



Addendum to: An Approach to Hierarchical Clustering via Level Surfaces and Convexity

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ABSTRACT

This article is an addendum to the 2001 paper [1] which investigated an approach to hierarchical clustering based on the level sets of a density function induced on data points in a d-dimensional feature space. We refer to this as the "level-sets approach" to hierarchical clustering. The density functions considered in [1] were those formed as the sum of identical radial basis functions centered at the data points, each radial basis function assumed to be continuous, monotone decreasing, convex on every ray, and rising to positive infinity at its center point. Such a framework can be investigated with respect to both the Euclidean (L2) and Manhattan (L1) metrics. The addendum here puts forth some observations and questions about the level-sets approach that go beyond those in [1]. In particular, we detail and ask the following questions. How does the level-sets approach compare with other related approaches? How is the resulting hierarchical clustering affected by the choice of radial basis function? What are the structural properties of a function formed as the sum of radial basis functions? Can the levels-sets approach be theoretically validated? Is there an efficient algorithm to implement the level-sets approach?

KEYWORDS

Hierarchical Clustering, Level Sets, Level Surfaces, Radial Basis Function, Convex, Heat, Gravity, Light, Cluster Validation, Ridge Path, Euclidean Distance, Manhattan Distance, Metric

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