SEMINARIO

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Mixture model modal clustering

Abstract: The two most extended density-based approaches to clustering are surely mixture model clustering and modal clustering. In the mixture model approach, the density is represented as a mixture and clusters are associated to the different mixture components. In modal clustering, clusters are understood as regions of high density separated from each other by zones of lower density, so that they are closely related to certain regions around the density modes. If the true density is indeed in the assumed class of mixture densities, then mixture model clustering allows to scrutinize more subtle situations than modal clustering. However, when mixture modeling is used in a nonparametric way, taking advantage of the denseness of the sieve of mixture densities to approximate any density, then the correspondence between clusters and mixture components may become questionable. In this paper we introduce two methods to adopt a modal clustering point of view after a mixture model fit. Examples are provided to illustrate that mixture modeling can also be used for clustering in a nonparametric sense, as long as clusters are understood as the domains of attraction of the density modes. Finally, a simulation study reveals that the new methods are extremely efficient from a computational point of view, while at the same time they retain a high level of accuracy.

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