Sabo, Kristian

Center-based $l_1$-clustering method


**Abstract.** In this paper, we consider the $l_1$-clustering problem for a data-points set $\mathcal{A} = \{a^i \in \mathbb{R}^n : i = 1, \ldots, m\}$ which should be partitioned into $k$ disjoint nonempty subsets $\pi_1, \ldots, \pi_k$, $1 \leq k \leq m$. In that case, the objective function does not have to be either convex or differentiable and generally it may have many local or global minima. Therefore, it becomes a complex global optimization problem. A method for searching for a locally optimal solution is proposed in the paper, convergence of the corresponding iterative process is proved and a corresponding algorithm is also given. The method is illustrated by and compared with some other clustering methods, especially with the $l_2$-clustering method, which is also known in literature as a smooth $k$-means method, on a few typical situations, such as the presence of outliers among the data and clustering of incomplete data. Numerical experiments show in this case that the proposed $l_1$-clustering algorithm is faster and gives significantly better results than the $l_2$-clustering algorithm.