
The problem tackled in this paper is as follows: consider a set of n interacting points in a two-dimensional space. The levels of interactions between the observations are given exogenously. It is required to cluster the n observations into p groups, so that the sum of squared deviations from the cluster means is as small as possible. Further, assume that the cluster means are adjusted to reflect the interaction between the entities. (It is the latter consideration which makes the problem interesting.) A useful property of the problem is that the use of a squared distance term yields a linear system of equations for the coordinates of the cluster centroids. These equations are derived and solved repeatedly for a given set of cluster allocations. A sequential reallocation of the observations between the clusters is then performed. One possible application of this problem is to the planar hub location problem, where the interacting observations are a system of cities and the interaction effects represent the levels of flow or movement between the entities. The planar hub location problem has been limited so far to problems with fewer than 100 nodes. The use of the squared distance formulation, and a powerful supercomputer (Cray Y-MP) has enabled quick solution of large systems with 250 points and four groups. The paper includes both small illustrative examples and computational results using systems with up to 500 observations and 9 clusters.