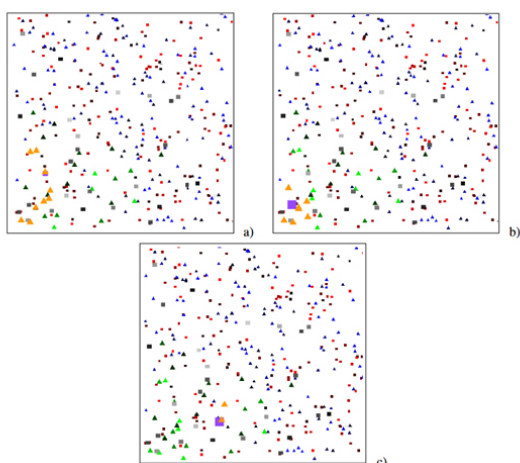


Efficient multiple bichromatic mutual nearest neighbor query processing

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In this paper we propose, motivate and solve multiple bichromatic mutual nearest neighbor queries in the plane considering multiplicative weighted Euclidean distances. Given two sets of facilities of different types, a multiple bichromatic mutual $(k, k_1 \epsilon^{\frac{1}{2}}, \epsilon^{\frac{1}{2}}, \epsilon^{\frac{1}{2}})$ -nearest neighbor query finds pairs of points, one of each set, such that the point of the first set is a k -nearest neighbor of the point of the second set and, at the same time, the point of the second set is a $k_1 \epsilon^{\frac{1}{2}} \epsilon^{\frac{1}{2}} \epsilon^{\frac{1}{2}}$ -nearest neighbor of the point of the first set. These queries find applications in collaborative marketing and prospective data analysis, where

facilities of one type cooperate with facilities of the other type to obtain reciprocal benefits. We present a sequential and a parallel algorithm, to be run on the CPU and on a Graphics Processing Unit, respectively, for solving multiple bichromatic mutual nearest neighbor queries. We also present the time and space complexity analysis of both algorithms, together with their theoretical comparison. Finally, we provide and discuss experimental results obtained with the implementation of the proposed sequential and a parallel algorithm.