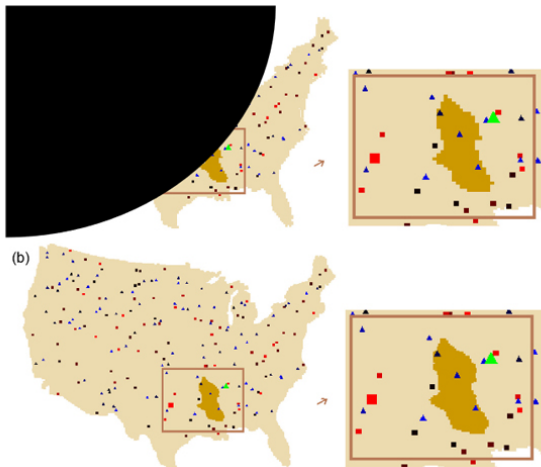


# Common influence region problems

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We introduce problems related to two competitive sets of collaborative facilities. We solve common influence region queries and location problems. We present algorithms to be run in parallel to solve the introduced problems. We provide the theoretical complexity analysis of the proposed solutions. We experimentally test the algorithms showing their efficiency and scalability. In this paper we propose and solve common influence region problems. These problems are related to the simultaneous influence, or the capacity to attract customers, of two sets of facilities of different types. For instance, while a facility of the

first type competes with the other facilities of the first type, it cooperates with several facilities of the second type. The problems studied can be applied, for example, to decision-making support systems for marketing and/or locating facilities. We present parallel algorithms, to be run on a Graphics Processing Unit, for approximately solving the problems considered here. We also provide experimental results and discuss the efficiency and scalability of our approach. Finally, we present the speedup ratios obtained when the running times of the parallel proposed algorithms using a GPU are compared with those obtained from their respective efficient sequential CPU versions.