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An Efficient Algorithm for Mining Maximal Co-located Event Sets

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A spatial co-located event sets is a set of spatial events being frequently observed together in nearby geographic space. Spatial co-location patterns can give useful information in many application domains such as business, ecology, public health and criminology. For example, mobile service provider might be interested in co-located event patterns to provide location-sensitive advertisements and recommendations. A common framework for mining spatial co-location patterns employs a level-wised search method (like Apriori) to discover co-located event sets. The Apriori-based algorithm, in order to produce a co-located event set of a length l , does search all 2^l of its subsets since they too must be co-location patterns. This exponential complexity fundamentally restricts the algorithm to discovering only short patterns. To address this problem, we propose an algorithm for mining maximal co-located event sets which concisely represents all co-located event sets. The search strategy of our algorithm integrates a depth-first traversal of the event subset tree with effective pruning mechanisms. The experiment results show that our algorithm is computationally effective in finding co-located event sets.