



SEARCH LOCATION-DEPENDENT DATA IN BROADCASTING ENVIRONMENT

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ABSTRACT—Location-based services (LBSs) provide the information based on location information as specified in a query. Queries that support LBS are called Location-Dependent Queries (LDQ). LDQ contain: range query, nearest neighbor (NN) query, k-nearest neighbor (KNN) query and reverse nearest neighbor (RNN) query. Examples of mobile LBSs include location-dependent information access (e.g., traffic reports and attractions) and nearest neighbor queries (e.g. finding the nearest restaurant). While LDQ is well studied in the traditional wired, disk-based client-server environment, it has not yet been tackled in relation to a wireless broadcasting environment. In this paper, the issues involved with organizing location-dependent data and answering LDQ queries on the air, are investigated. The linear property of wireless broadcasting media and the power conservation requirement of mobile devices make the problem particularly interesting and challenging. An efficient data organization, called Jump Rdnn-Tree, and the corresponding search algorithm are proposed. The performance of the proposed Jump Rdnn-Tree and other traditional indexes (enhanced for wireless broadcasting) is evaluated by using both uniform and skew data. The result shows that Jump Rdnn-Tree substantially outperforms the traditional indexes.

Key Words: index structure, data broadcast, energy management, mobile computing