Abstract

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Combining R-Tree and B-Tree to Enhance Spatial Queries Processing

Abstract—The search process in the spatial database consumes much time for the user. The size of the database determines the efficacy and speed of information retrieval. The potency of spatial query in Geographic Information Systems (GIS) is of paramount importance. It depends heavily on the query processing algorithms. When the database size increases, the processes of data retrieval gets complicated. This paper employs two types of data structures Rectangle-Tree (R-tree) and the Balanced-Tree (B-tree) which is called aRB-Tree. These two types have been formerly merged by researchers to facilitate the retrieval of data as quickly as possible while providing efficient results. The same idea has been adopted in this paper where the aRB (aggregate RB) accelerates executing complex queries and minimizes the time consumed in searching, editing, deleting and updating any record in the spatial database. In this paper a web application was developed to test the efficiency of using both data structures. This web application utilises a medical institution database that contains locations such as addresses of physicians, clinics, hospital, labs, and radiology centres. Results of aRB-Tree are more sufficient and accurate than using each index alone. Keywords— Spatial indexing aRB- Tree GIS R-tree B-Tree