QuadR-tree indexing selection engine for tuning spatial database system using mobile geographical information system technology

Introduction:

The latest Mobile GIS technology is probable to manage the spatial components of daily business project, in the corporate database, and to apply proper geographic analysis efficiently in a desktop-focused application. This technology uses wireless internet for transferring process of spatial data from server to Mobile GIS or vice versa. However, the problem in wireless Internet is system bottlenecks that can slow down in the process of transferring data. One of the reasons why system bottlenecks could happen in this situation is because the spatial data is too large. The database design therefore is the most important part that must be considered. Database systems are now expected to be self-managing, self healing, and always-up. Another parts which also contribute in this problem are network, application server and web server (Kwan & Shi, 2002).

Most of previous researchers have experimented to change the structure of R-tree and Quadtree spatial data indexing method that could give better performance. However, it still leaves some issues and problems that need to solving. One of the most common issues and problems is the method only applicable to some of applications such as data arrangement, but it needs speed improvement in the transfer process and data retrieval. This chapter gives different methodology that concentrates on fine tuning of a spatial database system using R-tree and Quadtree spatial data indexing method, without changing the structure of those spatial data indexing method.

This chapter introduces the creation of indexing engine selection to tune the spatial database system. This indexing engine selection, as it call QuadRtree Engine Selection, uses Rule Base – Knowledge Base Expert System (KBES) to select between R-tree and Quadtree spatial data indexing method. Those spatial data indexing methods have different advantages and disadvantages based on the condition of the data. This engineering innovation is one of the challenges in actual global technology. The objectives of this chapter are to make an optimization in transferring data and thus to provide the latest accurate information for mobile users with a limited communication bandwidth.