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DEVELOPING A SPATIO-TEMPORAL
DATABASE FOR MOVING OBJECTS

Miniaturization of computing devices, advances in wireless communication, and development of positioning systems created a wide range of database applications such as location-based services, tracking and transportation systems that has to deal with Moving Objects. Various types of queries could be posed to moving objects, including past, present and future queries. The key problem is how to model the location of moving objects and enable a Database Management System (DBMS) to predict the future location of a moving object. It is obvious that there is a need for an innovative, generic, and application-independent approach for spatio-temporal data handling.

This paper presents behavioral aspect of the spatio-temporal databases for managing and querying moving objects. The objectives of this paper are to evaluate the current states of the Object-Relational Database Management System and extend the selected system in such a way to support modeling and querying moving objects. More than thirty five parameters have been identified to evaluate the existing DBMSs namely; Oracle10g, DB2, MS SQL Server, MySQL, and Postgre SQL. Spatial and Temporal data models are assessed and the needs for a novel spatio-temporal data model has been recognized. An extension to the selected DBMS has been developed using C++ language that support spatio-temporal objects that change position or extent continuously as well as all pure spatial and temporal data types. In order to examine the developed system, the queries posed by fleet management companies are selected. The results have been evaluated and showed the superior functionalities of the system.