

Implementing Rigid Temporal Geometries in Moving Object Databases

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1 Abstract of the Presentation

Various applications process geospatial trajectories of moving objects, such as cars, ships and robots. There is thus a need for a common conceptual framework to model and manage these objects, as well as to enable data interoperability across tools. The International Organization for Standardization ISO[®] has responded to this need and created the standard ISO 19141–Schema for moving features. Among its types, it defines a schema for rigid temporal geometries, which represent the movement of spatial objects translating and rotating over time, while preserving a fixed shape. Despite the abundance of these objects in real-world, there exists no reference implementation of this type of data in a common system, which causes them to usually be represented using temporal points without taking into account their spatial extents and shapes. We aim to provide an implementation of rigid temporal geometries into MobilityDB, an open-source moving object database, that extends PostgreSQL and PostGIS. We provide a data model for rigid temporal geometries and propose efficient algorithms for the data management operations defined in ISO 19141. A use case on real AIS ship trajectories is illustrated to validate the proposed implementation. Finally, we review the standard from an implementation point of view and provide insights on possible improvements or modifications.