

Abstract

Intelligent Transportation Systems (ITS) are envisioned to improve road safety, traffic efficiency, sustainable transport and information services, through multi-modal means of transportation and its integration across an Information and Communications (ICT) platform. In this sense, many location-based services demand the support of specific source of georeferenced data and its modeling. Due to the nature of the spatial data, *Geographic Information Systems* (GIS) and techniques are required for the analysis and manipulation of geodata. Moreover, given the intrinsic relationship between ITS and the geo-sciences, the terms GIS-T or Geo-ITS have been coined in the last years.

Major challenges regarding the transport networks generation include the heterogeneity of the data and the diversity of the sources, as well as, different content and formats. In addition to this, the geodata require accuracy and precision, particularly for simulation purposes and real-world implementations. In this context, the spatial data are key components for the simulation and the spatial processing engines in the ITS sphere. Nevertheless, one problem is the few available geotools for management and visualization of the data, for one of the most used simulation formats: the OpenDRIVE standard.

OpenDRIVE is considered the standard de-facto for the driving simulation community, however, few management tools have been provided to facilitate the manipulation and visualization of these data. For this reason, this master thesis focuses on the conceptualization, modeling and implementation of the *XODR-Driver*; a geo-processing toolbox for the OpenDRIVE data format. The *XODR-Driver* provides the functionality to translate the OpenDRIVE files to the standard GIS vectorial representation. *XODR-Driver* also enables the general GIS framework and its inherit vectorial operations for the OpenDRIVE format.

The contribution of this work is the *OpenDRIVE XODR-Driver*, a functional software module, with a modular architecture which implements the mathematical models for the road layout descriptions of the reference line or track.