

## **A Simulation Application Programming Interface for Traffic Modeling**

This project aims to develop a software library for constructing the dynamic pieces of a traffic simulation. It is meant to complement a complete traffic modeling tool set that includes data import and export capabilities, traffic routing algorithms, and visualization tools. This software library provides an abstract framework for constructing event driven models of traffic dynamics. It is based on the DEVS (Discrete Event System) modeling and simulation framework, and will be implemented using ADEVS (A Discrete Event System) simulation package. There are three basic elements of a traffic model and they are represented abstractly in the modeling framework. The three basic elements of a traffic model are Traffic Sources, Traffic Sinks and Road Segments. Traffic Sources represent locations from which traffic can enter a road network. Traffic Sinks are destination locations where traffic can leave a road network. Road Segments represent traversable pieces of a road network. A Road Segment can represent an intersection, a one way street, a multi-lane highway, or any other navigable piece of the road system. The road system is navigated by population units. Population units are characterized by a size (e.g., number of people or number of vehicles) and a destination. Population units originate at Traffic Sources and are ultimately deposited at Traffic Sinks. They travel from Source to Sink through a Road Segment graph. The paths taken by the population unit, and the time required for a population unit to traverse a road segment, are determined by the user of the modeling framework. The modeling framework provides event scheduling, feedback for modeling congestion, and other time and structure related services that are needed to perform the actual simulation.

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