Implementing 3D Visualization and Editing for an Open Source Traffic Simulation Software Package

Figure 1: Example screenshot from a proprietary simulation software package

**Context**
SUMO is a free and open source traffic simulation software package which is widely used in academia. However, due in part to its lack of 3D visualization capabilities, it is often characterized as being less user-friendly and unsuitable for commercial applications, where such visualizations are important for illustrating findings to a non-technical audience. However, since the focus of the core developers is on modelling itself, very little has been done towards building 3D capabilities into the software. A very basic 3D view for running simulations has been implemented using OpenSceneGraph (OSG), however there are problems with the generated geometry and with the user interaction, and no 3D capabilities whatsoever have been incorporated into the editing tool NetEdi.

**Tasks**
The main tasks for this project are:

- Contact SUMO developers to develop a plan for how the new 3D capabilities should be incorporated into the software to accommodate future development.

- Improve existing 3D simulation visualization.
  - Navigation (orbiting, zooming)
  - Improved road geometry generation
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- Improve visualization of vehicles
- Representation of lane markings, traffic lights, and other relevant objects.

- Implement 3D features in the scenario editing tool NetEdit.
  - Visualization (see previous points)
  - Object insertion, selection, and editing

In addition, corresponding documentation should be written for the new features.

Requirements
- Good programming knowledge, especially in C++. Knowledge of OpenSceneGraph beneficial.
- Good understanding of geometry.
- Basic understanding of roadway geometric design and/or traffic simulation is beneficial but not required.

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