ITS Seminar

SPECIAL TOPICS ON TRAFFIC ANALYSIS WITH AIMSUN MICROSCOPIC SIMULATOR

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September 4, 2:00 PM – 4:00 PM
• The combination of microscopic simulators with planning models and OD estimation
• The calibration and validation of microscopic simulation models

September 5, 10:30 AM – 11:30 AM
• The dynamic traffic assignment in microsimulation models

Place: Simulation Lab at Institute of Transportation Studies
(Social Science Tower 5th Fl.)

Institute of Transportation Studies
University of California, Irvine
ABSTRACT

The seminar will address three topics that are currently attracting an increasing attention from analysts and researchers are:

- The combination of microscopic simulators with planning models and OD estimation
- The calibration and validation of microscopic simulation models
- The dynamic traffic assignment in microsimulation models

The combination of microscopic simulators with planning models and OD estimation

Although Traffic Simulation models have evolved independently and in parallel with network equilibrium models, both levels of modeling complement each other and may help the decision-maker. Transport planning tools providing an overall view at macro level when combined with a microsimulation tool providing a refined dynamic view of the sub-networks allow a more detailed analysis for a better decision making. Microscopic simulation on the other hand requires as input time-sliced Origin to Destination matrices, so far, at network level, no sound analytical methods exist and therefore the estimation of such matrices has still to be based in procedures that are heuristic in essence. The current version of the microscopic traffic simulator AIMSUN offers the transport analyst the possibility of interfacing the EMME/2 transport planning software for a combined study, as well as the functions for conducting sophisticated simulations with time dependent origin destination matrices and paths.

The calibration and validation of microscopic simulation models

From a methodological point of view it is widely accepted that simulation is a useful technique to provide an experimental test bed to compare alternate system designs, replacing the experiments on the physical system by experiments on its formal representation in a computer in terms of a simulation model. Simulation may thus be seen as a sampling experiment on the real system through its model. The reliability of this decision making process depends on the ability to produce a simulation model representing the system behavior closely enough for the purpose of using the model as a substitute of the actual system for experimental purposes. This reliability is established in terms of the calibration and validation of the model. Model calibration and validation is inherently a statistical process in which the uncertainty due to data and model errors should be account for. The seminar will explore explicit methods to take into account the autocorrelation dependencies between traffic data, and the specific time dependencies characteristics of traffic data whose emulation is one of the main abilities of microscopic simulation; it will also proposes guidelines for the calibration of the route choice models in the route based simulation with AIMSUN.

The dynamic traffic assignment in microsimulation models

The deployment of ITS must be assisted by suitable tools to conduct the feasibility studies required for testing the designs and evaluating the expected impacts. Microscopic traffic simulation has proven to be the suitable methodological approach to achieve these goals. The seminar will discuss some of the most critical aspects of the dynamic simulation of road networks, namely the heuristic dynamic assignment, the implied route choice models. The implementation of these features in the microscopic simulator AIMSUN will be presented in detail.