Departmental Seminar

Department of Civil Engineering and Engineering Mechanics

Columbia University

Modeling of Commuters' Day-to-Day Learning Behavior

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644 MUDD

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This presentation will describe the use Stochastic Learning Automata (SLA) theory to model commuters. day-to-day learning behavior in the context of departure-time choices. Unlike other learning methods proposed in the literature, SLA is a powerful modeling tool that does not require extensive data because it can find a solution without a priori information on the optimal action. The proposed model aims to capture the commuters. departure-time choice learning behavior both in undisturbed and disturbed network conditions. Moreover, it is used to investigate commuters. Responses to toll, travel-time, departure / arrival time restrictions while selecting their departure-times.

First, theoretical aspects of the proposed day-to-day learning model will be described. Then, calibration results based on individual user data obtained from New Jersey Turnpike (NJTPK), a 148 mile-toll road with 27 entry-exit points will be discussed. To the best of our knowledge, this is the first attempt to dynamically model the variations in perception in a day-to-day travel choice model. Thus, we will describe in detail the estimation process conducted via Bayesian Inference approach and present important theoretical results that show that learning parameters are not constant among different users of the transportation system; rather they exhibit variations in perception among the population. The talk will be concluded with the discussion of future research needs, especially for the on-line implementation of this and similar models for real-time traffic control to minimize the impact of the non-recurrent traffic congestion.