DYNAMIC ORIGIN-DESTINATION DEMAND ESTIMATION USING PARTIAL DYNAMIC AND PARTIAL STATIC LINK TRAFFIC COUNTS

By

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ABSTRACT

We present a micro-simulation DTA based approach to estimate the time-dependent (or dynamic) origin-destination (OD) demand matrix for a general network, given dynamic traffic counts for a set of the links, static traffic counts for another set of links, as well as a priori OD matrix. This model is formulated as an iterative bi-level optimization framework. The upper level is a constrained generalized least-squares problem, involving the deviations between link counts, a priori OD matrix and their estimated counterparts. The lower level is a microscopic traffic simulation process, where the proportion matrix is obtained. The traffic simulation is implemented by the microscopic simulator Quadstone Paramics 6.5. We present the first work to measure the impact of the observed static link counts data in the dynamic OD estimation problem. The case study on an example network and a corridor network at the city of Fresno, CA demonstrates that static link counts improve the estimated results. Several critical issues, including congestion, flow interaction, under-specification, multiple vehicle class, optimal sensor deployment etc. in the dynamic traffic demand estimation problem are discussed and solutions are suggested.