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Sarlas, Georgios; Axhausen, Kay W. 

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# A direct demand modeling framework for traffic volume and speed prediction

Georgios Sarlas  
IVT, ETH Zürich  
ETH Hönggerberg,  
CH-8093 Zürich

Kay W. Axhausen  
IVT, ETH Zürich  
ETH Hönggerberg,  
CH-8093 Zürich

☎ +41-44-633 37 93  
✉ [georgios.sarlas@ivt.baug.ethz.ch](mailto:georgios.sarlas@ivt.baug.ethz.ch)

☎ +41-44-633 39 43  
✉ [axhausen@ivt.baug.ethz.ch](mailto:axhausen@ivt.baug.ethz.ch)

Econometrics have found application in a plethora of transport and geographical problems, constituting a medium both for obtaining parameters values, and for prediction. However, only a limited number of applications acknowledge and treat for the issues of using spatial data. This is the direction of this paper. We employ the family of spatial autoregressive models to formulate a direct demand modeling framework capable of making statements about traffic volume and speed at any location in a nationwide network. As a point of departure, two separate spatial models are estimated. Subsequently, the simultaneous estimation of both variables is conducted by a generalized method of moments estimator, accounting properly for the endogeneity aspects in the model. In summary, a framework allowing for the treatment of both the interdependence between the two variables and the spatial dependencies, is presented. Last, the developed modeling approach is evaluated through a case study. The predictive accuracy of the estimated models is compared to the output of a traditional four-step model to assess their ability to constitute a trustworthy alternative, and also highlight inherent strengths and weaknesses.

*Keywords: travel demand modelling, spatial regression, simultaneous equations, endogeneity*