



Caltrans Division of Research,
Innovation and System Information

Research



Results



Planning, Policy,
and Programming

An Activity-based Toolbox for Planning Applications

An activity-based modeling toolbox was produced for planning agencies to investigate the effects certain policies have on travel demand.

WHAT IS THE NEED?

Activity-based travel demand models have been continuously developed for over 40 years. Several such models have been developed and applied to different cities and regions around the world demonstrating how activity-based modeling has evolved from a theoretical framework to a variety of practical demand modeling packages. However, despite the advancements and diversification that have taken place, these models continue to have very limited application to real world cases, due primarily to their complexity, which makes them less competitive to more traditional alternatives like the Four-Step models.

WHAT WAS OUR GOAL?

The goal of this study was to develop a comprehensive mathematical/statistical framework to infer activity scheduling behavior from individuals based on their socio-demographic profiles.

WHAT DID WE DO?

We developed a model-building process that clusters individuals based on their reported (one-day) activity patterns and demonstrates that clustering activity/travel patterns in terms of such activity characteristics as type, duration, scheduling, and location can be an effective tool to capture preferential distributions of activity arrival and departure times, and durations of activities of various types. Such characteristics then serve as inputs to theoretically-consistent activity-based travel models that can be used together with econometric, machine learning, and optimization models to predict the formation of activity agenda of individuals based solely on their socio-economic profiles.

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An Activity-based Toolbox for Planning Applications

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WHAT WAS THE OUTCOME?

Testing the entire modeling system on an out-of-sample population shows that the model is able to predict activity/travel patterns with substantial accuracy. Additionally, composition of these models in the form of a simplified planning toolbox enables planners to apply the proposed techniques without the hassle of getting involved in the complexity of the underlying models.

WHAT IS THE BENEFIT?

The toolbox developed from this research can assist Metropolitan Planning Organizations with investigating the policy effects of proposed transportation and land use changes on the improved efficiency of regional socio-economic interactions within the context and confines of daily routines.