Free report: Managing taxi markets with GPS data

Mineta National Transit Research Consortium study is applicable to most cities.

San Jose, Calif., July 21, 2014 – Transportation planners have received a substantial boost with the release of the Mineta National Transit Research Consortium's latest peer-reviewed study, *Modeling Taxi Demand with GPS Data from Taxis and Transit*. These planners are challenged to make regulatory, planning, and engineering decisions about how to manage taxi markets, accounting for their role in the transportation system. New York City was used as the model for the report, but the methods are general and can be applied to cities around the world where similar data is available. Principal investigator was Eric Gonzales, PhD, now with the University of Massachusetts, Amherst. The free report can be downloaded from http://transweb.sjsu.edu/project/1141.html

"Our primary objective was to identify factors that drive taxi demand and to understand how this varies by location and time of day," Dr. Gonzales explained. "The models generated by the study can help to estimate taxi demand and provide many other useful insights. Our secondary objective was to demonstrate how emerging 'big data' from taxis and transit systems can be integrated with demographic, socioeconomic, and employment information to develop useful demand models."

The models and insights in the study are useful for designing taxi regulations and transit schedule improvements. The models also show how characteristics of a neighborhood and competing transit service affect the number of trips made by taxi.

The dataset in the study includes records of every taxi trip in New York City (NYC) over a 10-month period, tracked by automatically operating Global Positioning System (GPS) receivers in each licensed taxi. Additional data sources included detailed transit schedule and routing information from transit agencies available online in the Google Transit Feed Specification (GTFS) format. Demographic, socioeconomic, and employment data were obtained from the US Census Bureau at the spatial resolution of census tracts.

By properly processing the data and integrating the various types of information in a Geographic Information System (GIS), it was possible to develop models that provide insights into the factors that determine the number of trips made by taxi.

Typically, NYC transit is more competitive during the day when service frequency is high, especially during morning and evening peaks when traffic congestion also slows taxis. Taxis are more competitive in evening hours when traffic moves quickly and less frequent transit service imposes longer waiting times. For trips to and from the regions' airports, there is typically a trade-off between slower, cheaper transit service, and a quicker, pricier taxi ride. In two cases, no trade-off was observed: Transit is faster and cheaper than taxis for trips to JFK Airport during afternoon peak and trips from JFK during morning peak, when traffic congestion eliminates the competitive advantage of taxi speed.

Dr. Gonzales concluded, "Ultimately, these trip generation and mode choice models provide planners, engineers, and decision makers the necessary information about how people use the transportation system. In this case, identifying factors that drive taxi demand can help planners make forecasts about how this demand can be expected to grow and change as neighborhoods evolve. And as decisions are made regarding taxi industry regulation, transit service provision, and urban development, these models are useful for forming a complete and holistic vision of how travel patterns and mode use can be expected to respond."

The report's 11 figures include sensitivity analyses, probability plots, comparisons of travel times and costs, transit access times, and more. The seven tables include taxi and transit trip comparisons, model fit statistics and coefficients, and more. For a free PDF of the 68-page research report, go to http://transweb.sjsu.edu/project/1141.html

Tweet this: Our #free #research report: Managing #taxi markets with #GPS data. Big help for #transpo planners. http://ow.ly/zhSLH

ABOUT THE PRINCIPAL INVESTIGATOR

Eric Gonzales, PhD, currently an assistant professor in the Department of Civil and Environmental Engineering at the University of Massachusetts Amherst, was previously an assistant professor at Rutgers University. He received a PhD in civil and environmental engineering at UC Berkeley in 2011. He was the University of California Transportation Center's Outstanding Student of the Year 2010-2011 and an Eno Transportation Foundation Fellow in 2010.

OTHER INVESTIGATORS

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ABOUT THE MINETA NATIONAL TRANSIT RESEARCH CONSORTIUM

The Mineta National Transit Research Consortium (MNTRC) is composed of nine university transportation centers led by the Mineta Transportation Institute at San Jose State University. The Consortium was organized in January 2012 after winning a competition sponsored by the US Department of Transportation (DOT) to create consortia tasked with "Delivering Solutions that Improve Public Transportation." Member universities include Bowling Green State University, Grand Valley State University, Howard University, Penn State University, Rutgers University, San Jose State University, University of Detroit Mercy, University of Nevada Las Vegas, and University of Toledo. Visit transweb.sjsu.edu/mntrc

ABOUT THE MINETA TRANSPORTATION INSTITUTE

The Mineta Transportation Institute (MTI) conducts research, education, and information transfer programs regarding surface transportation policy and management issues, especially related to transit. Congress established MTI in 1991 as part of the Intermodal Surface Transportation Efficiency Act. MTI won national re-designation competitions in 2002, 2006 and 2012. The Institute is funded through the US Secretary of Transportation's Research and Technology Office, US Department of Homeland Security's Transportation Security Administration, the California Department of Transportation's Division of Research, Innovation and Systems Development, and public and private grants. In 2006 the US Department of Homeland Security selected MTI as a National Transportation Security Center of Excellence. The internationally respected members of the MTI Board of Trustees represent all major surface transportation modes. MTI, the lead

institute for the nine-university Mineta National Transit Research Consortium, is affiliated with San Jose (CA) State University's College of Business. Visit transweb.sjsu.edu

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