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**New Research Suggests Transit Agencies Can Improve Customer Satisfaction
with Currently Available Data**

New techniques may provide more accuracy, and perhaps even tell riders how crowded the buses will be.

San Jose, Calif., March 28, 2016 – Bus transit agencies often provide their riders with estimated bus arrival times, based on real-time transit information, in order to help them make decisions, and improve their perceptions about the bus system's reliability. A drawback has emerged, however: travelers believe that these estimates are accurate to the minute, and when they aren't that precise, the result can be the kind of negative experience that reduces ridership.

Additionally, passenger occupancy can be a useful type of information for bus riders to have as they plan their trips, so they will be likely to know if a seat will be available on the bus when it arrives, or even if there will be space to board it at all; this type of information is sometimes provided to train passengers, where it has proven helpful, and it is already employed in a handful of bus transit systems.

A new study by the Mineta National Transit Research Consortium, Estimating Uncertainty of Bus Arrival Times and Passenger Occupancies, determines that accuracy for arrival time may be improved using different modalities than those commonly applied by transit agencies. It also explores techniques for estimating occupancies of the buses when they are still a number of stops away from any given point. In both cases an emphasis was on quantifying the level of uncertainty in the estimates. It is also suggested that bus passengers be given a way to gauge the confidence interval of these estimates, even as they are made as accurate as possible. The study was conducted by Vikash V. Gayah, PhD, who conducted the research with Zhengyao Yu and Jonathan S. Wood.

Says Dr. Gayah: "In an environment that is information-rich and in which transit users seek the most high-quality information about the current state of the transit network, providing these results to passengers might help to improve their decision-making and increase their confidence in the reliability of real-time transit information systems."

The estimation of travel times was approached by comparing linear regression models to the newer technique of accelerated failure time (AFT) survival models. AFT survival models are used to predict the time remaining until an event occurs. Commonly used to model time-to-failure of infrastructure elements, they are here applied to a different event: the arrival of a bus at a downstream stop. The two techniques were used to create estimates that were then compared to actual times on a bus transit system. For estimation of passenger occupancies, linear regression and count regression models were considered. Each approach was then compared to actual bus occupancies. Quantile regression models are also proposed as a way of estimating confidence intervals, in order to correctly evaluate the uncertainty level for each model.

Dr. Gayah points out that "These models can also benefit transit service providers. For example, models of passenger occupancy can predict when buses are expected to be full so that additional capacity can be provided in real time. Travel time uncertainty can also be used to optimize staffing decisions and plan driver shift changes."

For a free, no-registration download, go to http://transweb.sjsu.edu/project/1246.html.

Tweet this: Bus riders need accurate real-time information about bus arrival times and crowdedness. But how to provide it? http://tinyurl.com/hpcbwrh

ABOUT THE PRINCIPAL INVESTIGATOR

Vikash V. Gayah, PhD, is an Assistant Professor in the Department of Civil and Environmental Engineering at Pennsylvania State University. He received his BS and MS degrees from the University of Central Florida, and his PhD degree from the University of California, Berkeley. His research interests include urban transportation operations and network modeling, transit system operations, traffic safety, and statistical and econometric modeling of transportation data. Dr. Gayah currently serves as a member of the Traffic Flow Theory and Characteristics committee (AHB 45) of the Transportation Research Board, and is an editorial advisory board member of Transportation Research Part B.

Bios of both the other research team members are included in the report.

ABOUT THE MINETA TRANSPORTATION INSTITUTE

The Mineta Transportation Institute (MTI) conducts research, education, and information and technology transfer, focusing on multimodal surface transportation policy and management issues, especially as they relate to transit. The Institute has been funded by Congress through the US Department of Transportation's (DOT) Office of the Assistant Secretary for Research and Technology University Transportation Centers Program, the California Department of Transportation (Caltrans), and by other public and private grants and donations, including grants from the US Department of Homeland Security. The Institute operates from the College of Business at San José State University. Visit MTI at transweb.sjsu.edu

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 José State University. The Consortium was organized in January 2012 after winning a competition sponsored by the U.S. 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, Rutgers University, San Jose State University, University of Detroit Mercy, University of Nevada Las Vegas, and University of Toledo. Visit transweb.sjsu.edu/mntrc

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