



Transportation Seminar Series

Friday, January 30, 2009
4 - 5 p.m. in 240 Bechtel Engineering Center

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Assessment of mobile probe data and its use in traffic state estimation for highways

Abstract: The arrival of the mobile internet and the emergence of GPS enabled smartphones provides academia, government and industry with new opportunities to construct a traffic monitoring system which leverages the cellular network infrastructure. Today, GPS equipped smartphones have the potential to provide traffic information in real time for most of the transportation network. A traffic monitoring system based on this technology exploits the extensive coverage provided by the cellular network, the high accuracy in position and velocity measurements provided by GPS devices, as well as the existing infrastructure of the communication network.

While mobile device technology is very promising, fundamental challenges remain to be solved, particularly within the fields of modeling and data assimilation. The first part of the presentation will describe and present the main results of *Mobile Century*, an experiment conducted in February 2008 and conceived as a proof of concept of a smartphone based traffic monitoring system. The accuracy of the velocity measurements is such that a 2-3% penetration of cell phones in the driver population is enough to provide accurate velocity of the traffic flow. The data collected is analyzed to reveal fundamental features that are key to building a traffic monitoring system based on smartphones.

The second part of the presentation describes and assesses two methods proposed to perform traffic state estimation using data provided by mobile sensors. The methods assume the knowledge of the fundamental diagram and the conditions at both boundaries of the section of interest. Data from intermediate ramps is not required, since mobile sensors are expected to provide data to infer the state at those intermediate locations. The methods are assessed using two different datasets. The results are promising, showing that the proposed methods successfully incorporate the GPS data in the estimation of traffic. The accuracy in the estimation increases with both methods. For the cases investigated, one observation per mile-lane per minute provided sufficient data to identify most of the congestion.

Bio: Juan Carlos is a PhD Candidate in the Transportation Engineering program at UC Berkeley. He graduated from the Pontificia Universidad Católica de Chile (PUC) in 2002, majoring in Civil Engineering. He came to UC Berkeley in 2004 and received his MS degree in Transportation Engineering in 2005. Juan Carlos will join the Department of Transportation Engineering and Logistics at PUC upon graduation.

Please join us for a TRANSOC-sponsored cookie hour in the ITS library at 3:30 p.m.