Transportation Center Seminar Series presents.....

Alexandre Bayen
Asst. Prof. of Civil & Environmental Engineering
University of California, Berkeley

Mobile Millennium: using smartphones to monitor traffic in privacy preserving environments

Thursday, Dec. 4, 2008
4:00 – 5:00 pm
Refreshments available at 3:30 pm

Location:
Transportation Center –Lower level
Northwestern University
Chambers Hall - 600 Foster
Evanston, IL

ABSTRACT: This talk describes how the mobile internet is changing the face of traffic monitoring at a rapid pace. In the last five years, cellular phone technology has leapfrogged several attempts to construct dedicated infrastructure systems to monitor traffic. Today, GPS equipped smartphones are progressively morphing into an ubiquitous traffic monitoring system, with the potential to provide traffic information in real time for the entire transportation network. Traffic information systems are one of the first instantiations of the potential of participatory sensing for large scale cyberphysical infrastructure systems. While mobile device technology is very promising, fundamental challenges remain to be solved, in particular in the fields of modeling and data assimilation. The talk will present a new system, called Mobile Millennium, launched recently by UC Berkeley, Nokia and Navteq, in which the driving public in Northern California can freely download software into their GPS equipped smartphones, enabling them to view traffic in real time and become probe vehicles themselves. The smartphone data is collected in a privacy preserving environment, using spatially aware sampling. Using data assimilation, the probe data is fused with existing sensor data, to provide real time estimates of traffic. The data assimilation scheme relies on the appropriate use of Ensemble Kalman Filtering on networked hyperbolic first order partial differential equations. Results from experimental deployments in California and New York are presented, as well as preliminary results from a pilot field operational test in California, which is planned to reach 10,000 probe vehicles in a few months.

BIO: Alexandre Bayen received the Engineering Degree in applied mathematics from the Ecole Polytechnique, France, in July 1998, the M.S. degree in aeronautics and astronautics from Stanford University in June 1999, and the Ph.D. in aeronautics and astronautics from Stanford University in December 2003. He was a Visiting Researcher at NASA Ames Research Center from 2000 to 2003. Between January 2004 and December 2004, he worked as the Research Director of the Autonomous Navigation Laboratory at the Laboratoire de Recherches Balistiques et Aerodynamiques, (Ministere de la Defense, Vernon, France), where he holds the rank of Major. He has been an Assistant Professor in the Department of Civil and Environmental Engineering at UC Berkeley since January 2005. Alexandre Bayen is the recipient of the Ballhaus Award from Stanford University, 2004. His project Mobile Century received the 2008 Best of ITS Award for ‘Best Innovative Practice’.