

IVT - Seminar

“Using macroscopic models to describe traffic dynamics on urban networks”

by Dr. Vikash Gayah

Friday, March 8th, 2013, 14:00-15:00hr

HIL F 36.1

ETH Hönggerberg, Zürich

Abstract:

This research creates and uses macroscopic traffic models to describe the aggregate behavior of vehicles on urban street networks. Insights gained from these models can then be used to design network-wide policies that may increase the ability of these networks to serve vehicle-trips. In particular, this work focuses on the turning maneuvers that exist in networks with multiple routes. The presence of multiple routes and turning maneuvers are found to have two effects on aggregate vehicle behavior: 1) they cause unstable and inefficient behavior when a network is congested; and, 2) they may reduce maximum vehicle flows across the network. Fortunately, this work finds that limiting the rate at which vehicles are allowed to enter a network and providing drivers with real-time information on current traffic conditions can help mitigate the first effect and allow the network to operate more efficiently. It is also found that the second effect may not always be harmful—lower network flows do not necessarily result in decreased network efficiency if the lower flows are accompanied by more direct vehicle routing. In fact, two-way networks, which accommodate conflicting left-turns and result in lower maximum vehicle flows than one-way networks, are found to serve trips at a higher rate because drivers travel shorter distances on average. Thus, in many cities, maximum network efficiency can be improved by converting one-way streets to two-way operation. This presentation will describe the first of these two effects in detail, and will also discuss the implications of the second.

Presenter’s bio:

Vikash V. Gayah is an Assistant Professor in the Department of Civil and Environmental Engineering at the Pennsylvania State University. He received his Ph.D. in Civil and Environmental Engineering with an emphasis in transportation systems at the University of California, Berkeley. He also received a B.Sc. (2005) and a M.S. (2006) in Civil and Environmental Engineering at the University of Central Florida. His recent awards include: the University of California Transportation Center Student of the Year, Dwight D. Eisenhower Graduate Fellowship recipient, the Gordon F. Newell Award for Excellence in Transportation Science and the ASCE Florida Section Graduate Student of the Year. His research interests are in transportation network dynamics, traffic flow theory, public transportation systems, traffic safety and urban mobility.

Organizer: Dr. Monica Menendez (monica.menendez@ivt.baug.ethz.ch)

No reservation is required.


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