



“Traffic Congestion, TransDec, ClearPath, and Time-Dependent A*: A BigData Problem, A System Solution, A Product, and an Algorithm”



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Tuesday, April 30, 2013
4:00pm, in 32-G575

Abstract: The vast amounts of transportation datasets (traffic flow, incidents, etc.) collected by various federal and state agencies are extremely valuable in real-time decision-making, planning, and management of the transportation systems. In this talk, I will argue that considering the large **volume** of the transportation data, **variety** of the data (different modalities and resolutions), and the **velocity** of the data arrival, developing a scalable system that allows for effective querying and analysis of both archived and real-time data is an intrinsically challenging BigData problem. Subsequently, I will present our end-to-end prototype system, dubbed TransDec (short for Transportation Decision-Making), which enables real-time integration, visualization, querying, and analysis of these dynamic and archived transportation datasets. I will then discuss a GPS navigation application enabled by such a system and demonstrate its commercialization as a product called ClearPath (see <http://myfastestpath.com>). Motivated by ClearPath, we will look under the hood and focus on a route-planning problem where the weights on the road-network edges vary as a function of time due to the variability of traffic congestion. I will show that naïve approaches to address this problem are either inaccurate or slow, leading to our new approach to this problem: A time-dependent A* algorithm.

Bio: *Cyrus Shahabi* is a Professor of Computer Science and Electrical Engineering and the Director of the Information Laboratory (InfoLAB) at the Computer Science Department and also the Director of the NSF's Integrated Media Systems Center (IMSC) at the University of Southern California. He was also the CTO and co-founder of a USC spin-off and an In-Q-Tel portfolio company, Geosemble Technologies, which was acquired in July 2012. He received his B.S. in Computer Engineering from Sharif University of Technology in 1989 and then his M.S. and Ph.D. Degrees in Computer Science from the University of Southern California in May 1993 and August 1996, respectively. He authored two books and more than two hundred research papers in the areas of databases, GIS and multimedia. Dr. Shahabi has received funding from several agencies such as NSF, NIH, NASA, NIH, DARPA, AFRL, and DHS as well as several industries such as Chevron, Google, HP, Intel, Microsoft, NCR and NGC. He was an Associate Editor of IEEE Transactions on Parallel and Distributed Systems (TPDS) from 2004 to 2009. He is currently on the editorial board of the VLDB Journal, IEEE Transactions on Knowledge and Data Engineering (TKDE), ACM Computers in Entertainment and Journal of Spatial Information Science. He is the founding chair of IEEE NetDB workshop and also the general co-chair of ACM GIS 2007, 2008 and 2009. He chaired the nomination committee of ACM SIGSPATIAL for the 2011-2014 terms. He is a PC co-Chair of IEEE MDM 2013, IEEE BigData 2013 and regularly serves on the program committee of major conferences such as VLDB, ACM SIGMOD, IEEE ICDE, ACM SIGKDD, and ACM Multimedia. Dr. Shahabi is a recipient of the ACM Distinguished Scientist award in 2009, the 2003 U.S. Presidential Early Career Awards for Scientists and Engineers (PECASE), the NSF CAREER award in 2002, and the 2001 Okawa Foundation Research Grant for Information and Telecommunications. He was the recipient of US Vietnam Education Foundation (VEF) faculty fellowship award in 2011 and 2012, an organizer of the 2011 National Academy of Engineering “Japan-America Frontiers of Engineering” program, an invited speaker in the 2010 National Research Council (of the National Academies) Committee on New Research Directions for the National Geospatial-Intelligence Agency, and a participant in the 2005 National Academy of Engineering “Frontiers of Engineering” program.

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Host: Samuel Madden, CSAIL