

TRANSPORTATION ENGINEERING SEMINAR

Solving Simultaneous Route Guidance and Traffic Signal Optimization (RGTSO) Problem Using Space-Phase-Time (SPT) Hypernetwork

Friday, September 4th, 2015

3:00pm to 4:30pm

Please join us in TEMPE - CAVC425

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Emerging connected vehicle and autonomous vehicle technologies refer to reliable wireless connections between vehicles and infrastructure and they provide the possibility of creating more sustainable transportation systems. Within the connected/autonomous vehicle environment, vehicles routes can be well guided to improve traffic mobility and safety. To achieve that goal, a strong coordination between vehicles scheduled routes and traffic signal timings at intersections is critical, especially in urban areas. This problem is referred to as “simultaneous route guidance and traffic signal optimization problem”, or RGTSO problem. A major challenge in solving the RGTSO problems is lacking efficient optimization framework which is capable of simultaneously optimizing routes for many vehicles and traffic signal timings at large-scale. To address this issue, a new type of network model is developed, referred to as “coupled space-time and phase-time networks” to explicitly represent the traffic signal control mechanism and time-dependent vehicle routes. Then a Lagrangian-relaxation-based optimization framework is proposed to decompose the RGTSO model into two subproblems: the vehicle Route Guidance (RG) problem the Traffic Signal Optimization (TSO) problem. The proposed optimization framework is not only applicable to future connected vehicles but also be suitable for many traffic applications today

Pengfei Li (Taylor) received his Ph.D. in Civil Engineering from Virginia Tech in Blacksburg in 2009. Currently, he is an associate research scientist affiliated with School of Computing, Informatics and Decision Systems Engineering (Industrial and Systems Engineering) at Arizona State University. Dr. Li has mixed expertise both in fundamental research and in applied research. He has published over 30 journal papers and referred conference proceedings.



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