Towards the Interaction between Drivers and Traffic Control: A New Form of Control in the Big Data Era

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Abstract

The integration of internet and mobile phones has opened the door for utilizing private vehicles as probes for conducting performance evaluation or generating traffic information. We want to take one step further to incorporate individual vehicle data into traffic control as well, gradually replacing the role of the existing traffic surveillance systems as the dominant source of traffic data. To prepare for such a paradigm shift, one needs to overcome some key institutional barriers, in particular, the privacy issue. A Highway Voting System (HVS) is proposed to address this issue in which drivers provide link- and/or path-based vehicle data to the traffic management system in the form of "votes" in order to receive favorable service from traffic control. The proposed HVS offers a platform that links data from individual vehicles directly with traffic control. In the system, traffic control responds to voting vehicles in a way similar to the current system responding to priority vehicles and providing the requested services accordingly. We show that the proposed "voting" system can effectively resolve the privacy issue which often hampers traffic engineers from getting detailed data directly from individual drivers.

Strategies to entice drivers into "voting" so as to increase the market penetration level under all traffic conditions are discussed. Examples are given
to demonstrate the impact of the proposed system on algorithm development and traffic control.

**About the Speaker**

**Dr. Lin** received a Ph.D. degree in civil engineering from the University of California at Berkeley. He is currently an associate professor at the Department of Systems and Industrial Engineering of the University of Arizona. Prior to joining U of A, he has worked as a postdoctoral researcher at the PATH program of the University of California at Berkeley. His research interests are optimization in logistics, transportation network analysis and intelligent transportation systems. He is currently a member of the Intelligent Transportation Systems Committee of Transportation Research Board, National Research Council of the United States. He is serving on the advisory committee of University of California Transportation Center. He is an associate editor of IEEE ITSC Transactions and two other journals.

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