



# Transformative Traffic Management Harnessessed by Proactive Route Guidance

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Engineering, University of Virginia

April 9 | Malone G33/35 | 1:30-2:30PM

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## Abstract

The route guidance system is one of the most effective ways of reducing traffic congestion. This talk presents transformative traffic management using a proactive user optimum-oriented route guidance system that incorporates individual users' preferences to achieve users' better satisfaction and transportation system performance improvement.

To ensure the route guidance system accurately captures each driver's route choice preference, the traditional discrete choice model, mixed logit model, support vector machine, and multi-task linear model adaptation (MT-LinAdapt) were implemented using the stated preference dataset collected from 102 participants. The evaluation results showed that MT-LinAdapt outperformed the other methods. In addition, a deep neural network approach, namely, hybrid-transformer-LSTM, was designed to model route choice behaviors using detailed network features and real-world route choices.

The proposed transformative traffic management using a proactive user optimum-oriented route guidance system was evaluated using a commonly used Sioux Falls network and user population whose preferences were synthesized from surveyed participants. The proposed approach demonstrated advantageous performance in terms of users' satisfaction (up to 22% more satisfied users), system mobility and sustainability (up to 10% travel time reduction and up to 42% delay reduction), and future traffic conditions estimation (up to 70% links having more accurate volume estimation), compared to a user equilibrium solution.

## About Our Speaker

Brian Park is a Professor of Civil Engineering & Systems Engineering and a member of Link Lab at the University of Virginia. He is a recipient of the 2014 George N. Saridis Best Transactions Paper Award for Outstanding Research, the Jack H. Dillard Outstanding Paper and Charley V. Wootan Award. He is an ASCE ExCEE'd teaching fellow. Park is an Associate Editor of the ASCE Journal of Transportation Engineering, the Journal of Intelligent Transportation Systems, and the KSCE Journal of Civil Engineering, and an editorial board member of the International Journal of Sustainable Transportation. Furthermore, he is a member of the TRB Traffic Simulations Committee.

## More Information:

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