DRISI

CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

Research Notes

A general traffic equilibrium framework with ride sourcing services that considers flow-dependent waiting time and public transit

Capturing the change of travelers' behavior based on waiting times and deadhead miles

Planning, Policy and Programming

NOVEMBER 2023

Project Title:
A general traffic equilibrium framework with ride sourcing services that considers flow-dependent waiting time and public transit

Task Number: 3466

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WHAT IS THE NEED?

As an alternative mode choice, ride-sourcing makes the behavior of travelers much more complicated due to its interactions with the traditional modes. There is a clear need to quantify and understand the impact of flow-dependent waiting times on the passengers, the influence of deadhead miles on the transportation system, the highly complex interactions between ride-sourcing and traditional transportation modes, and furthermore, to help transportation planners and policy makers to facilitate or regulate the ride-sourcing services.

WHAT ARE WE DOING?

In this project, researchers extend the previous model to include the public transit services, and capture the interactions between solo driving, ridesourcing and public transit. Moreover, the project will extend the previous study to model the flow-dependent waiting times of passengers, including ridesourcing passengers and public transit passengers, together with the impact of waiting times due to deadhead miles. These enhancements can characterize the flow-dependent features of the problem, and more accurately quantify the impact of ridesourcing services on congestion. It will allow for more realistic estimations of the overall ridesourcing usage and delay in the transportation system.

WHAT IS OUR GOAL?

We plan to address the above-mentioned problems through both theoretical and experimental investigations. The theoretical work will be focused on the proper formulation and solution of the general traffic equilibrium framework, and the properties of the model, while the experimental work will be primarily concerned

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with examination of factors that influence waiting times, mode share and delay in the network.

WHAT IS THE BENEFIT?

This research will allow for better estimation of the effect of overall system delay on the travel behavior of someone who is waiting for a ride. This will be used to improve travel equilibrium models and statewide modeling assumptions.

WHAT IS THE PROGRESS TO DATE?

Researchers have begun the development of the traffic equilibrium model of ride sourcing services. Further coordination expected Fall 2023.

IMAGES

Image 1: Young Man and Woman Waiting for a Bus at the Bus Stop in City (credit pexels.com user: Satumbo 9)