

A Mixed Path Size Logit-Based Taxi Customer-Search Model Considering Spatio-Temporal Factors in Route Choice

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Abstract— This paper introduces a model to analyze route choice behavior of taxi drivers for finding next passenger in urban road network. Considering the situation of path overlapping between selected routes in the process of customer-searching, a mixed path size logit (MPSL) model is proposed to analyze route choice behaviors through considering spatio-temporal features of route including customer generation rate, path travel time, cumulative intersection delay, path distance, and path size. Specially, customer generation rate is defined as attraction strength based on historical pick-up records in the route, the intersection travel delay and path travel time are estimated based on large scaled taxi global positioning system (GPS) trajectories. In the experiment, the GPS data were collected from about 36000 taxi vehicles in Beijing at 30-s interval during six months. In the model application, an area of approximately 10 square kilometers in the center of Beijing is selected to demonstrate the effectiveness of the proposed model. The results indicated that the MPSL model could effectively analyze the route choice behavior in customer-searching process and express higher accuracy than traditional multinomial logit model and basic PSL model.

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