

Construction of Demand Forecast Model of Tokyo Taxi Based on Probe Data Analysis

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Abstract

We construct a machine learning based decision support model that can help taxi drivers dispatch their vehicles appropriately by utilizing probe data of taxis in Tokyo. Traditionally, taxi dispatch has relied on the driver's experience and intuition. The number of customers acquired depends on their knowledge gained through many years of experience. However, sometimes many taxis are waiting for a customer at train stations, sometimes many customers wait in a long queue for a taxi. In addition, there are differences in the travel distance depending on characteristics of town surrounding a station. In fact, not all drivers know stations with high demand and stations where there are customers with long expected travel distances. Therefore, it is desirable to build an analytical model that enables efficient acquisition of customers regardless of their experience. This study constructs a machine learning model to evaluate a station using two indicators, driver waiting time and customer travel distance based on taxi probe data and propose a method to visualize them for drivers to understand the model's output easily. Besides, stations are clustered based on these two indicators. By this process, we propose an analysis model with visualization and clustering that supports driver's decision.