Destination Decision Model for Cruising Taxis Based on Embedding Model

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Abstract : In Japan, taxi is one of the popular transportations and taxi industry is one of the big businesses. However, in recent years, there has been a difficult problem of reducing the number of taxi drivers. In the taxi business, mainly three passenger catching methods are applied. One style is "cruising" that drivers catches passengers while driving on a road. Second is "waiting" that waits passengers near by the places with many requirements for taxies such as entrances of hospitals, train stations. The third one is "dispatching" that is allocated based on the contact from the taxi company. Above all, the cruising taxi drivers need the experience and intuition for finding passengers, and it is difficult to decide "the destination for cruising". The strong recommendation system for the cruising taxies supports the new drivers to find passengers, and it can be the solution for the decreasing the number of drivers in the taxi industry. In this research, we propose a method of recommending a destination for cruising taxi drivers. On the other hand, as a machine learning technique, the embedding models that embed the high dimensional data to a low dimensional space is widely used for the data analysis, in order to represent the relationship of the meaning between the data clearly. Taxi drivers have their favorite courses based on their experiences, and the courses are different for each driver. We assume that the course of cruising taxies has meaning such as the course for finding business man passengers (go around the business area of the city of go to main stations) and course for finding traveler passengers (go around the sightseeing places or big hotels), and extract the meaning of their destinations. We analyze the cruising history data of taxis based on the embedding model and propose the recommendation system for passengers. Finally, we demonstrate the recommendation of destinations for cruising taxi drivers based on the real-world data analysis using proposing method.

Keywords : taxi industry, decision making, recommendation system, embedding model

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