

Joint Optimization of Carsharing Stations with Vehicle Relocation and Demand Selection

Authors : Jiayuan Wu, Lu Hu

Abstract : With the development of the sharing economy and mobile technology, carsharing becomes more popular. In this paper, we focus on the joint optimization of one-way station-based carsharing systems. We model the problem as an integer linear program with six elements: station locations, station capacity, fleet size, initial vehicle allocation, vehicle relocation, and demand selection. A greedy-based heuristic is proposed to address the model. Firstly, initialization based on the location variables relaxation using Gurobi solver is conducted. Then, according to the profit margin and demand satisfaction of each station, the number of stations is downsized iteratively. This method is applied to real data from Chengdu, Sichuan taxi data, and it's efficient when dealing with a large scale of candidate stations. The result shows that with vehicle relocation and demand selection, the profit and demand satisfaction of carsharing systems are increased.

Keywords : one-way carsharing, location, vehicle relocation, demand selection, greedy algorithm

Conference Title : ICTIS 2021 : International Conference on Technological Innovation System

Conference Location : Athens, Greece

Conference Dates : April 08-09, 2021