



Path-planning Algorithm for Ride-sharing Systems

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Abstract

The rapid evolution of urban mobility necessitates efficient path-planning algorithms for ride-sharing systems. This work presents a novel path-planning algorithm, specifically designed for not-fully occupied vehicles in ride-sharing scenarios. Our approach not only optimizes travel time for the planned routes but also integrates passenger demand and coordination with other empty and not-fully occupied vehicles, in order to maximize the likelihood to get a second passenger en route. Formulated as an integer linear programming (ILP) problem, this method is computationally efficient and suitable for real-time applications. We validate its efficacy using a simulator based on the real road network of Shenzhen, China. Simulation results demonstrate that our proposed method significantly enhances service quality by answering more ride requests and reducing passenger waiting time.

Keywords

Ride-sharing systems; Path Planning Algorithms; Taxi Navigation; Orienteering Problem; Linear Programming

Suggested Citation