SCRAM Applied to Car Sharing

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Abstract

Introduction

We seek to improve the performance of a fleet of shared autonomous vehicles through improved matching of vehicles to passengers requesting rides.

Car Sharing Model

Our model for car sharing is a discrete-time agent based model proposed by Fagnant and Kockelman (Fagnant and Kockelman 2014). This model represents a 10 mile by 10 mile city as a grid of 0.25 mile by 0.25 mile grid cells. Trips are generated in each grid cell according to a rate that decreases the farther a cell is from the city center. This rate is the mean for a Poissoin process from which a number of trips is drawn for the corresponding cell. The distance of each trip is drawn from a distribution based on NHTS trip distance data. Time is discretized into five minute intervals for a total of 288 time steps per day. At each time step available vehicles are matched to passengers requesting trips. If a trip cannot be served it is added to a wait list and can request a ride again at the next time step.

Matching Algorithms

References

Fagnant, D., and Kockelman, K. 2014. The travel and environmental implications of shared autonomous vehicles, using agent-based model scenarios. *Transportation Research Board Part C*.