Transportation Analytics

Final Project - Uber Load Management April 24, 2018

Optimization Variables

• $m_{ij} :=$ The number of cars relocated from location i to location j.

Model Parameters

- $D_i := \text{true demand for Ubers from location i}$
- ullet $y_{ij}:=$ number of people who open app in location i matched with car from location j.
- ullet $x_{ij}:=$ probability customers in location i will select Uber given it is in location j
- $N_{0j} := \text{number of cars in location j prior to relocation}$
- $N_{1j} = N_{0j} + \sum_{i} m_{ij} \sum_{i} m_{ji} := \text{number of cars in location } j$ after relocation
- $c_{ij} := \cos t$ of relocating Uber from location i to location j
- r := revenue from picking up a customer

Model

$$\max \sum_{i} \sum_{j} y_{ij} x_{ij} r - m_{ij} c_{ij}$$
such that $N_{1j} = N_{0j} + \sum_{i} m_{ij} - \sum_{i} m_{ji} \quad \forall j$

$$N_{0j} \ge \sum_{i} m_{ij} \quad \forall j$$

$$y_{ij} \ge 0 \quad \forall i, j$$

$$\sum_{j} y_{ij} \le D_{i} \quad \forall i \text{ [consider equality]}$$

$$\sum_{i} y_{ij} x_{ij} \le N_{1j} \quad \forall j$$