

REDUCING SURGE PRICES FOR CAB HAILING SERVICE

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Problem Statement

Problem Statement:

- How to bring down the surge pricing during rush hours to an acceptable level?

Hypothesis:.

- By communicating to the drivers about the Rush hours timing and geographical location, surge pricing can be brought down
- Here communication is passive, i.e. at the start of the day/week and not during the rush hours.

Scope

Available Data

28 Days/4 Weeks

58k trips

Boundary Conditions

Rush Hours
(6 pm -10 pm)

Days: M-F

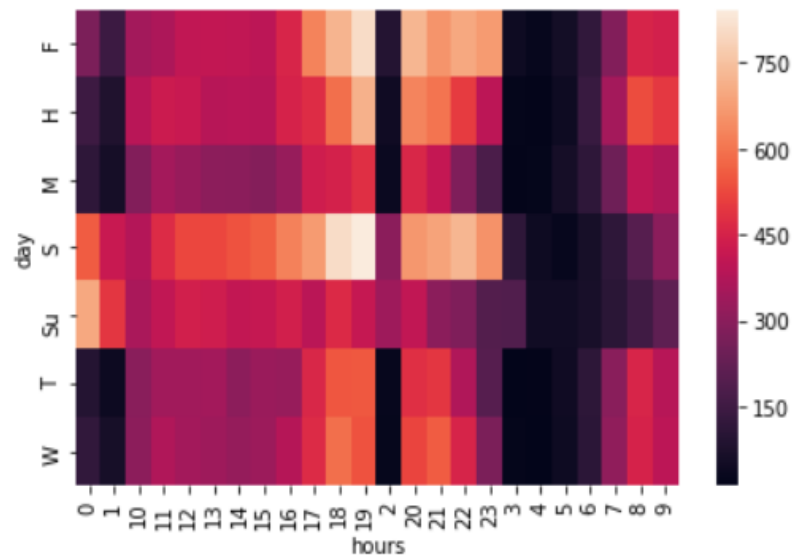
MC Techniques Used

Open Model

NHPP

Data Exploration, Cleaning & Aggregation

- Classification of 58k trips into 168 Categories (24 hours * 7days) - *introduction of day_hour_factor*
- Definition & Calculation of
 - Rush Hours
 - Arrival Rates of the Customers (Requests/ Demand)
 - Arrival Rate of the Drivers (Supply_hours)



- Weekday rush hour comprises
 - 8:00 am
 - Hours between 5:00 pm and 10:00 pm
- Weekend rush hour comprises
 - Hours between 4:00 pm and 10:00 pm and 12:00 am

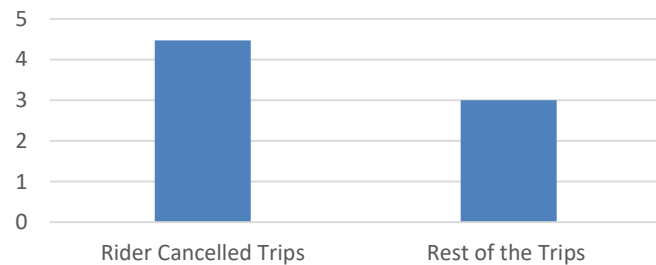
Key Patterns

- During Rush Hours (6 pm-10 pm, M-F)
 - 90% of drivers leaves after the first trip
 - 99.94% of the time Trips have been fulfilled (matched)
 - ~10% trips are cancelled

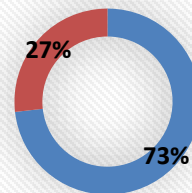
Rates/ per hour (pm)	6 to 7	7 to 8	8 to 9	9 to 10
Supply rate	2.75	2.57	2.12	2.29
Demand rate	3.2	3	2.75	2.32

	AA	BB	CC	DD
CC	15.14%	6.12%	73.01%	5.74%

Average ETA



Surge Multiplier

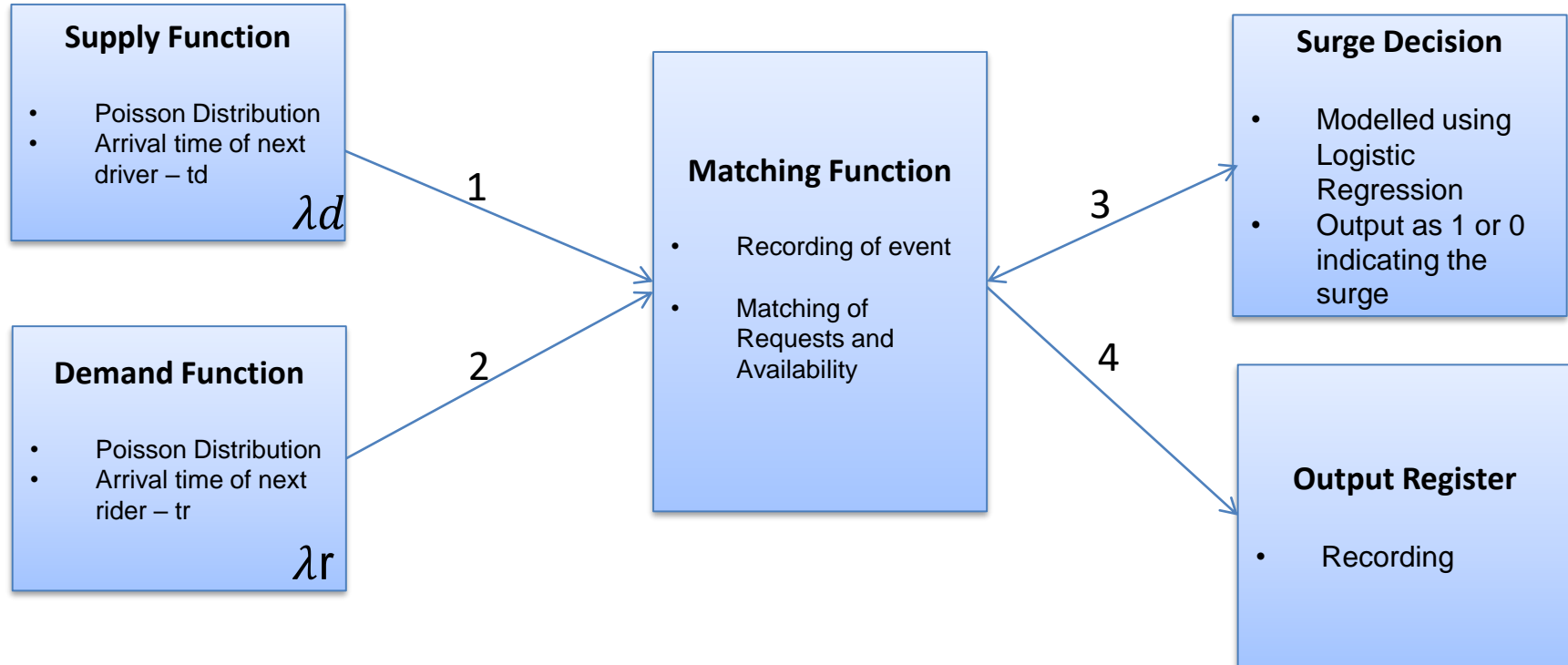


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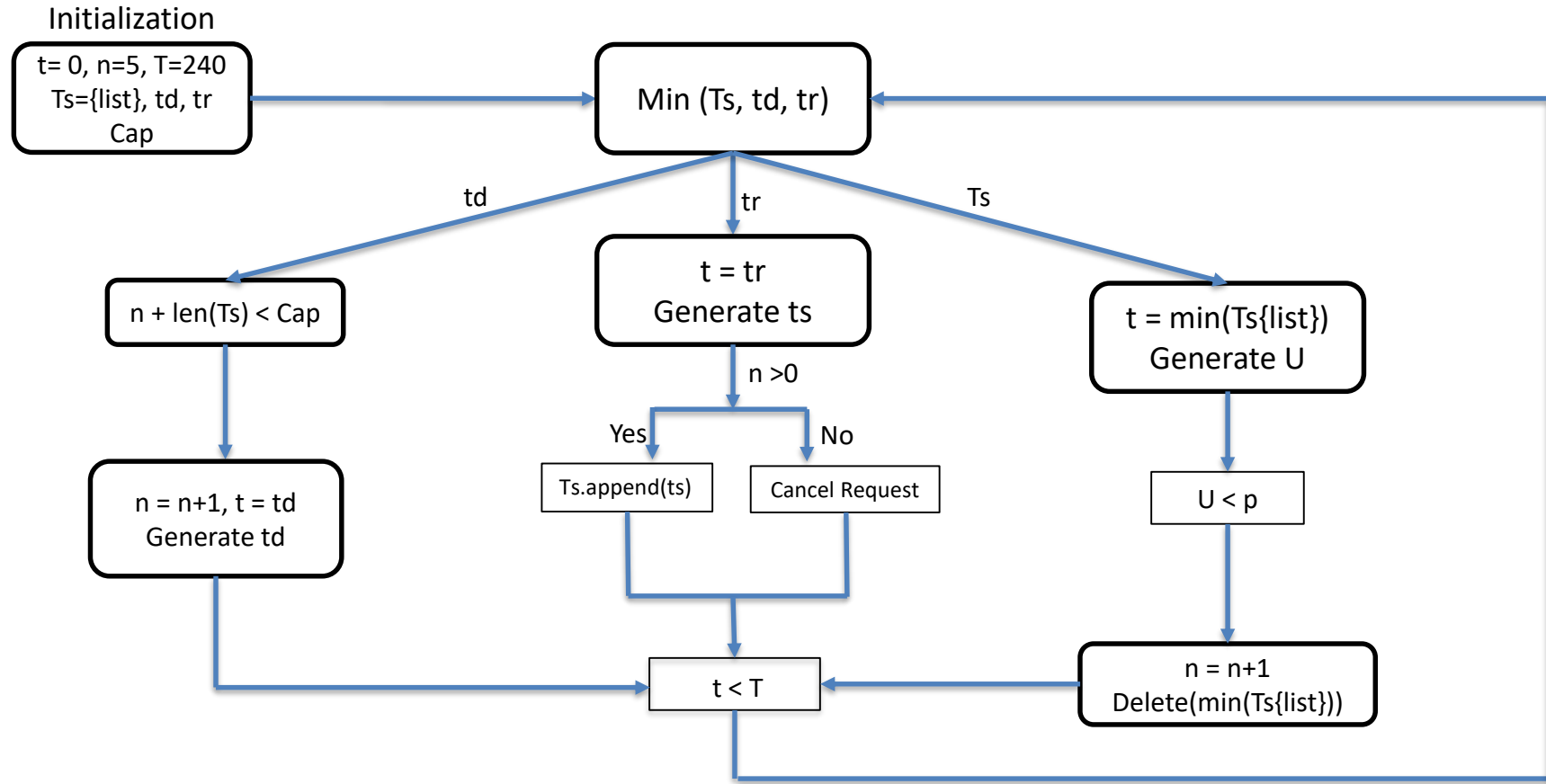
Definitions

- **Supply _hours:** Total hours all partners (drivers) were online, en route, or on trip in the given hour
- **Demand/ Requests:** Total requests in the given hour
- **Surge Pricing:** When Supply > Demand, leads to surge pricing
- **List of Service Times – T_s**
- **Total number of Drivers** active in the System – N
- **Model**
 - Open Network ($p=0.9$)
 - Probability of 90 % drivers leaving the system after completion of 1 trip in a day
 - With ($1-p=0.1$) probability of 10% returning back to system

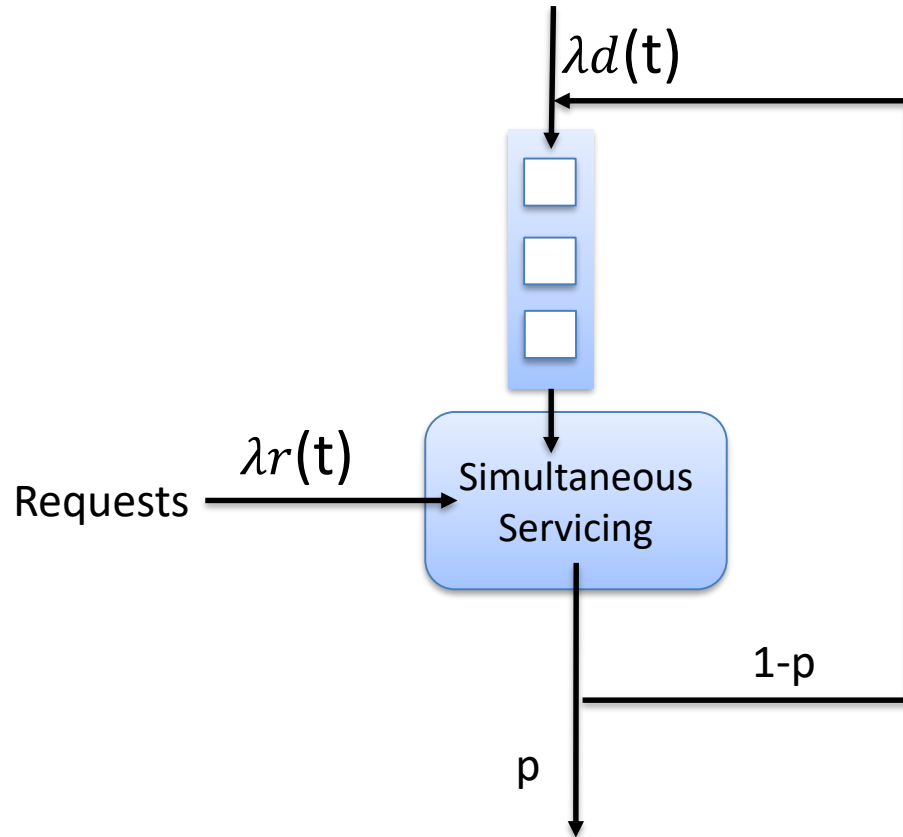
Project Flow Diagram



Open Network Model - Flow Chart



OPEN MODEL



Results

Drivers motivated to continue in the system

of Drivers

Fac=1				
Cap	p = 0.9	p = 0.8	p = 0.75	p = 0.7
15	0.63	0.6	0.587	0.566
16	0.61	0.573	0.552	0.523
17	0.588	0.535	0.449	0.46
18	0.566	0.5	0.46	0.423

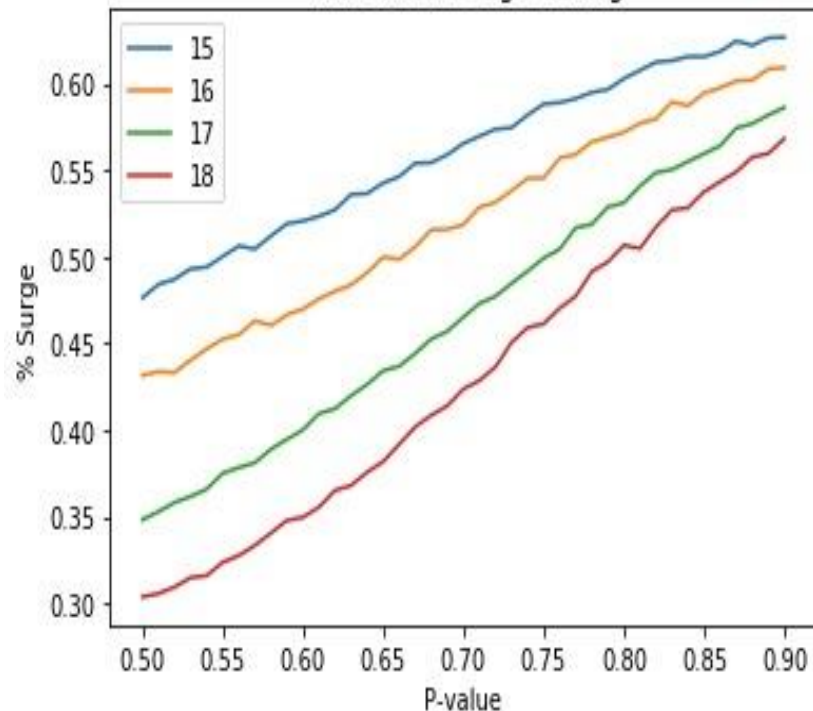
Drivers motivated to continue in the system

Fac=1.1				
Cap	p = 0.9	p = 0.8	p = 0.75	p = 0.7
15	0.61	0.578	0.545	0.52
16	0.57	0.54	0.48	0.44
17	0.56	0.51	0.45	0.41
18	0.53	0.49	0.46	0.374

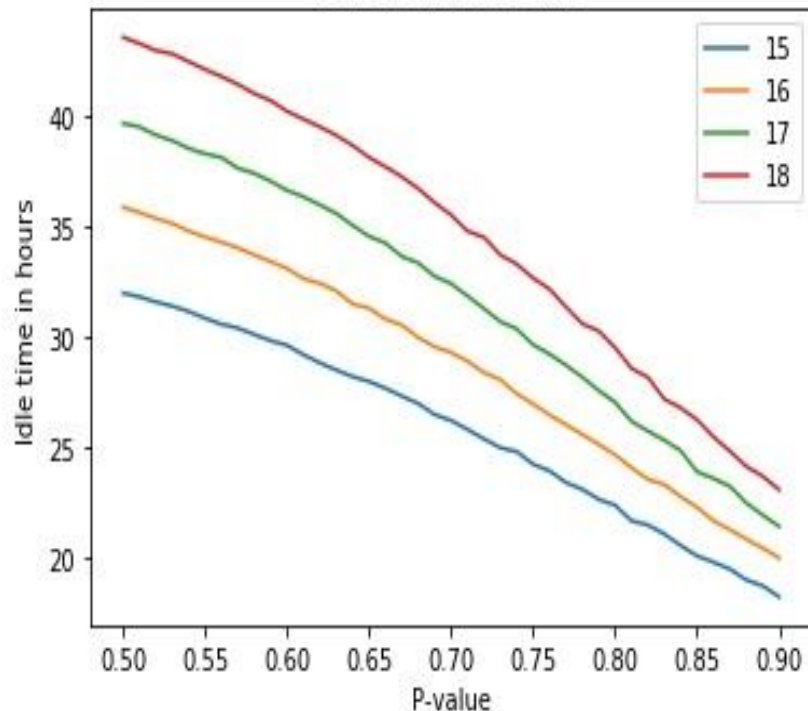
- Target: Bring down surge to 50%
- Simulation window 6:00 pm – 10:00 pm on Monday

Results (Contd.)

Variation in Surge Pricing



Variation in Idle time



Recommendations

- Passively communicating drivers about the rush hours and location brings down the count of surge pricing.

Future Enhancements

- Model uses lot of assumption, that needs to be validated.
- Psychological behavior of the partner/ drive does play a role and that requires attention.
- Possibility of breach of Demand & Supply Equilibrium to be studied.

THANK YOU

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Questions Please