What is the project about?

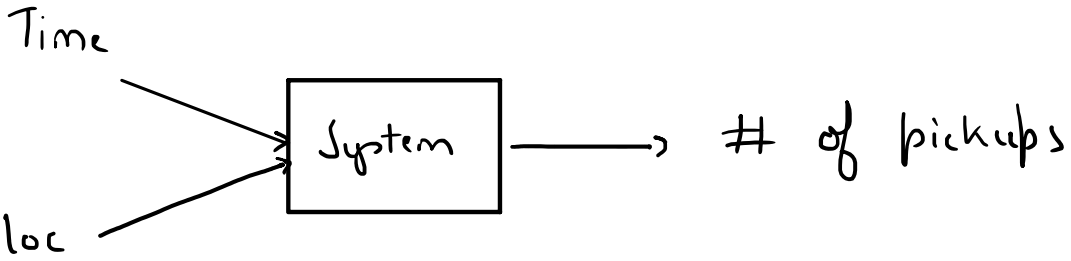
Uber demand Prediction

Taxis → NYC

Demand → location + time t

lat long

JFK Airport → 8:00 pm



Uber → Cab services

↓

Driver partners

↓

Flexible working hours

Share 20% 30%

↙ ↘

Driver Uber

Platforms → Ola, Rapido

System → Driver earnings ↑ → Uber Earnings ↑

Cut

Drivers → Smartphone App

↓

location info

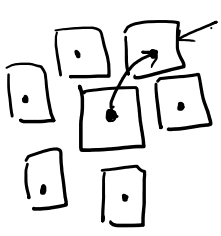
time

← Demand

next time interval

Driver can navigate to regions of higher demand.

Driver → # of pickups



Current location → 150

8:00 pm 8:10 pm

t + 1

Current interval ∝ Next time interval

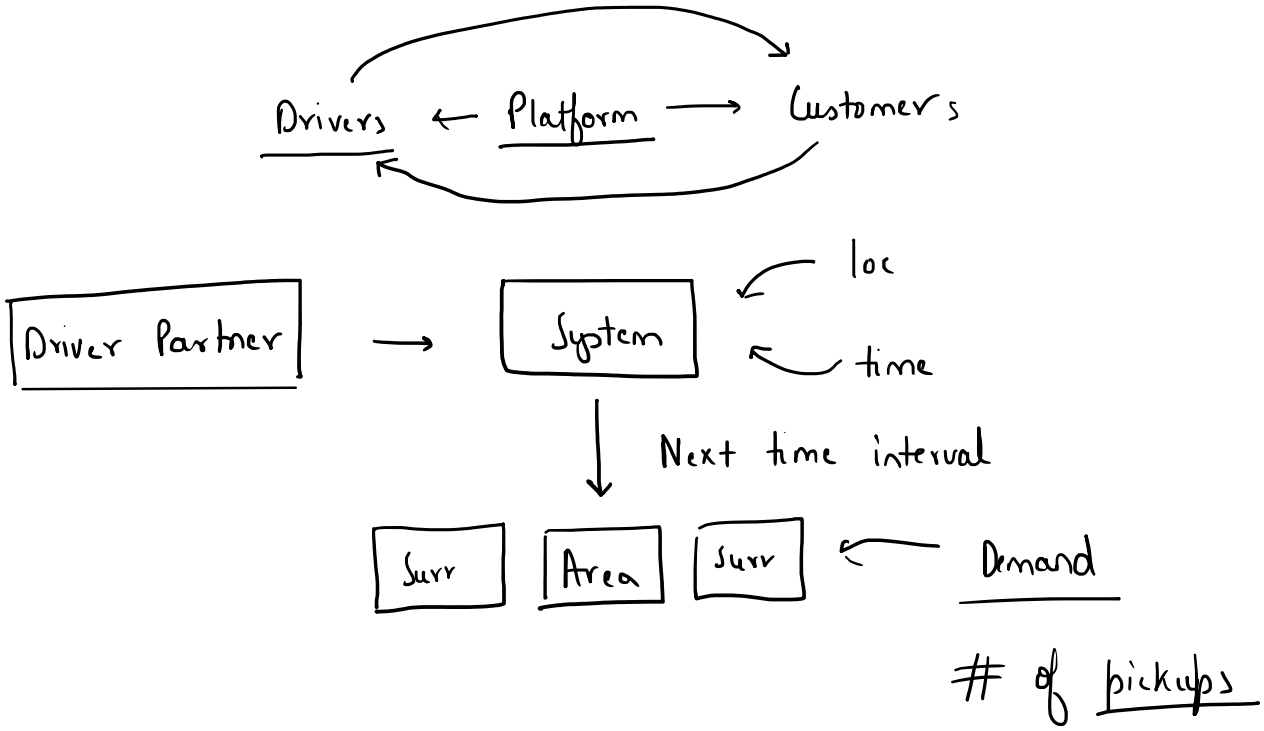
(t + 1)

Current interval ∝ Next time interval

Chances of getting ride ↑

Wait time ↓

Uber Revenue ↑



Platform

1) Increased Revenue

2) Trust ← Driver →
↑ Customer → Demand ↑ Drivers.
Surge Pricing

3) Additional feature → Edge

Driver

1) Earnings ↑.

2) Plan his routes.

3) More inclined towards the platform.

4) Lesser wait times.

5) Lesser customer cancellations.

Customer

1) lower prices.

2) Lesser wait times and lesser driver cancellations.

3) Trust in the platform.

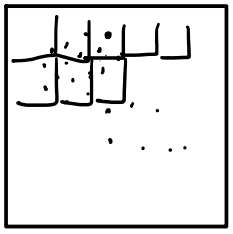
About the Data

System → ML Problem

# of pickups → Regression Task

location
Time → ML → No of pickups

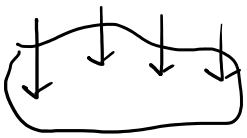
Row → Booking



Multiple locations

Multiple lat / long

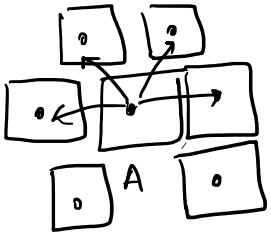
Airport



Regions

Task

1) Break down the city of NY into regions.



# of pickups

8:00 pm

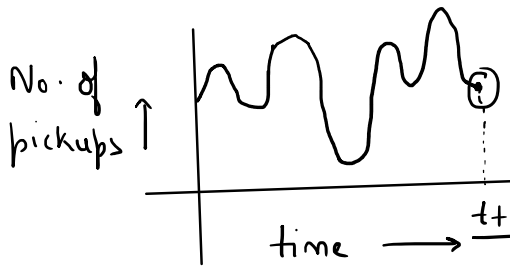
8:15 pm

2) location coordinate / region.

Region → time t → Demand

8:00 pm

Region A



Regression

A, t+1

↓

# of pickups

time of day, what day it is

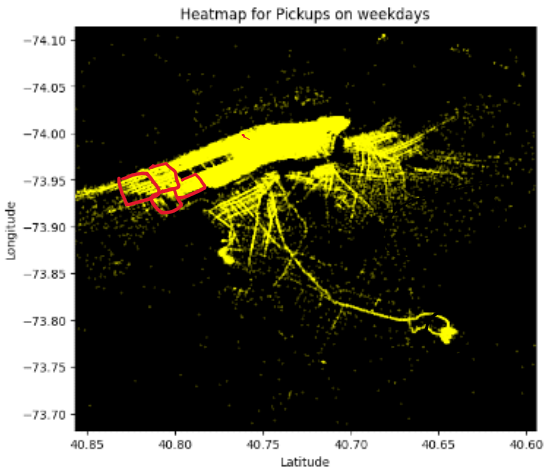
weekdays → office ↑

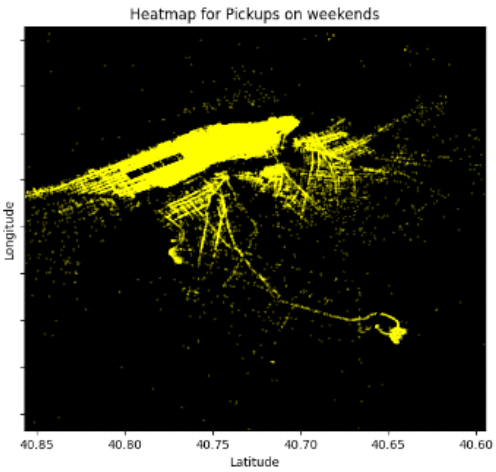
weekends → clubs, restaurants, theatres

residential → offices

office → homes

How to achieve





1) Regions → Unsupervised ML techniques

↓

Clustering

2) Historical data → time interval

↓ time series analysis → time series models

&

AR, ARIMA

3) Training the regressor → 8:15, Region A

4) Evaluation → MAPE (mean absolute Percentage Error)

$$MAPE = \frac{1}{n} \sum_{i=1}^{n} \left| \frac{Y - \hat{Y}}{Y} \right| \times 100$$

MAE , MSE

	Actual value	Predictions	AE	%E
Region X	100	105	5	5%
	10	15	5	50%

$\left|\frac{10-15}{10}\right| \times 100 = 50\%$

$\left|\frac{100-105}{100}\right| \times 100 = 5\%$

Demand Prediction

10%

100

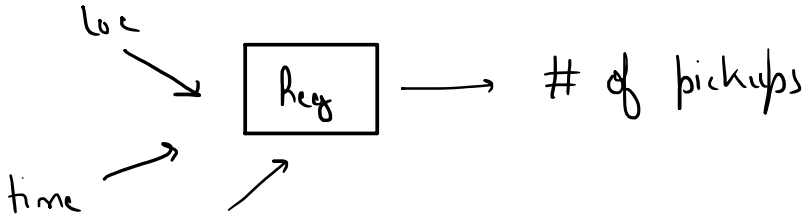
1100 1000

MAPE

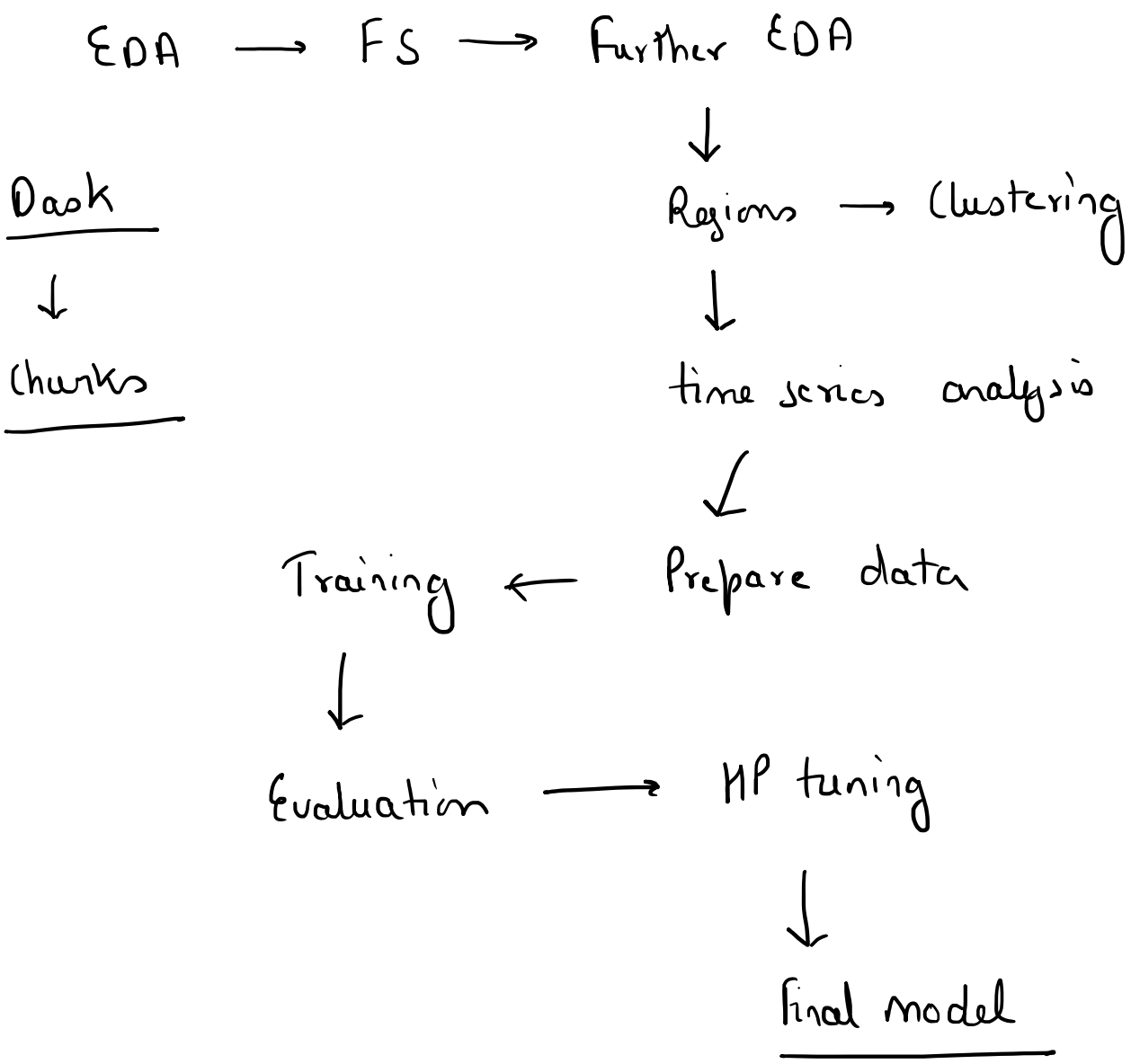
100 200

100%

Penalize



Expected Flow



final model → Plot a graph.

t = 8:00 pm

loc =

Demand pred → Plot