

sit at a seat with paper
and write your name!



EECS 245 Fall 2025

Math for ML

Lecture 1: Introduction

→ Read chapters 1.1-1.2

→ Course website: eecs245.org

Agenda

- ① Who am I?
- ② What is machine learning,
and what will we learn in this class?
- ③ Logistics
- ④ Models and loss functions

Who am I?

→ call me Suraj "soo-rudge"

→ 2nd year as Teaching Faculty
@ Michigan

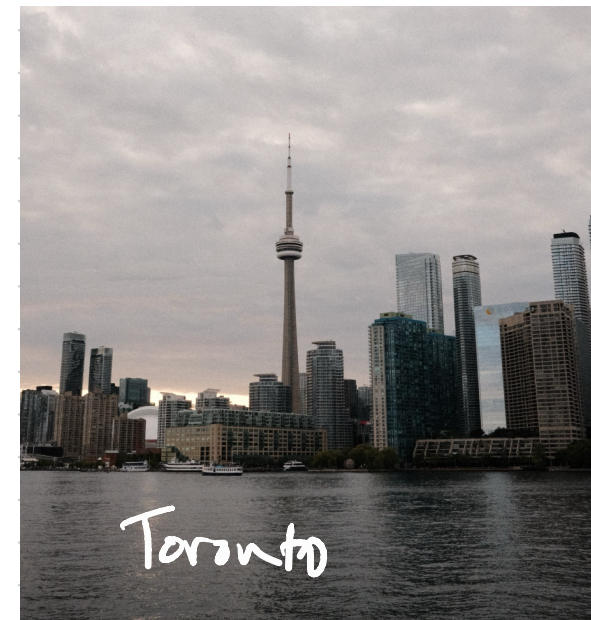
→ Taught data science @ UCSD
from 2021-2024

→ BS and MS @ UC Berkeley

→ TA info : eecs245.org/staff



rampure@umich.edu
rampure.org



If you could do anything,

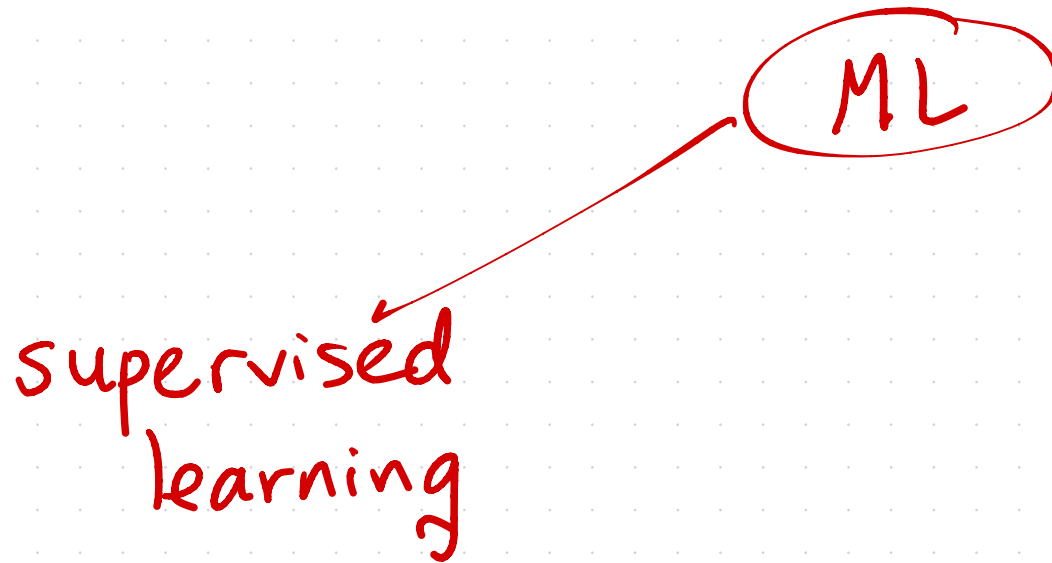
what would you do?



My answer: 50% travel agent/advisor/blogger

50% university instructor

ML: automatically learning
patterns from data



ML

dataset needs
"right answers"

"given X ,
predict y "

supervised
learning

classification

→ predicting
a category

→ e.g. predicting
digits,
predicting
animal species

regression

→ predicting
a real
number

→ e.g. predicting
house prices,
predicting
commute times,

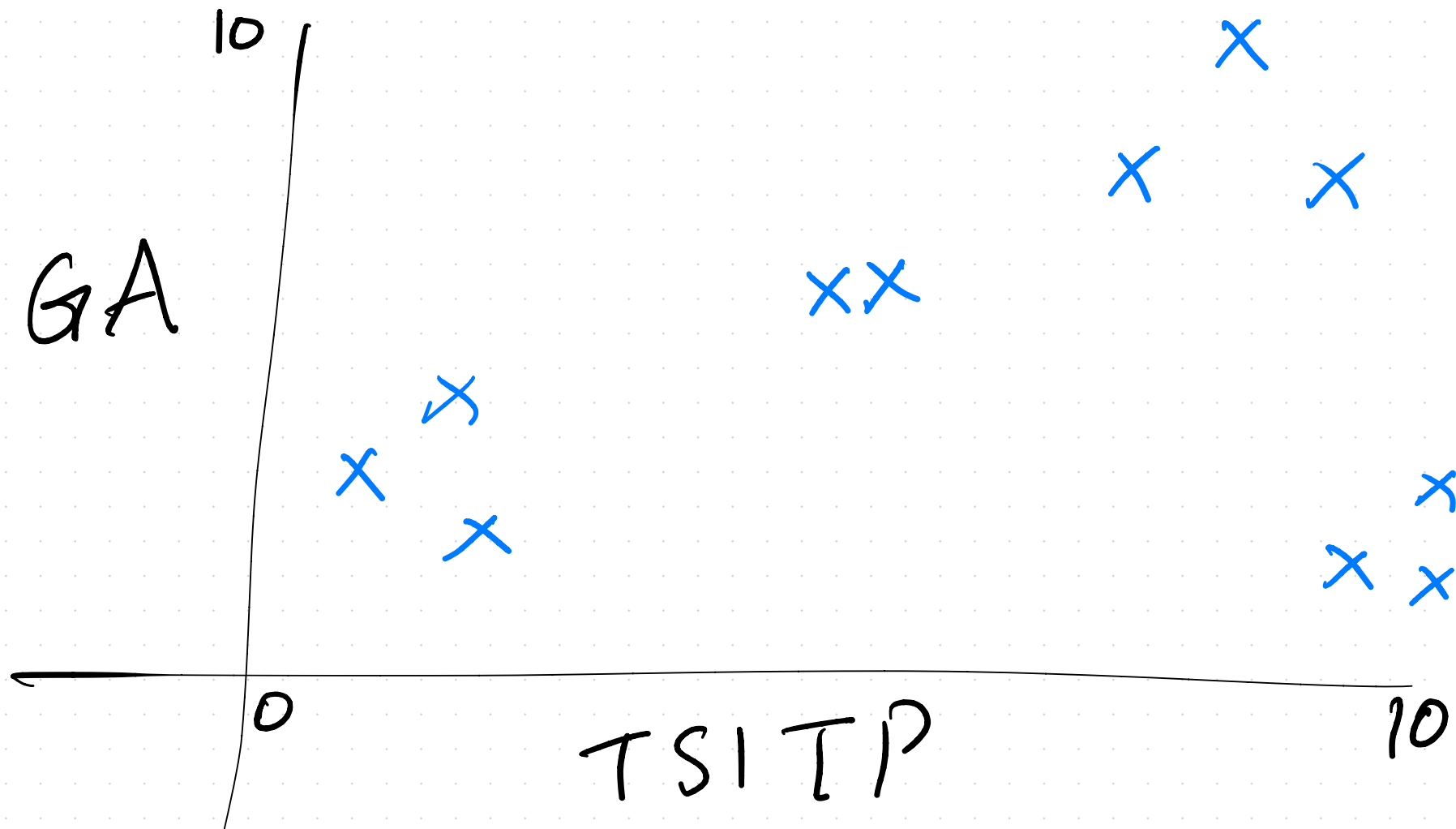
unsupervised
learning

"given X ,
find patterns"

dim.
red.

clustering

e.g. clustering



e.g. dimensionality reduction

one per TV show

one
per
user

millions



TS/TP	GA	HMM	(thousands)
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50
51	51	51	51
52	52	52	52
53	53	53	53
54	54	54	54
55	55	55	55
56	56	56	56
57	57	57	57
58	58	58	58
59	59	59	59
60	60	60	60
61	61	61	61
62	62	62	62
63	63	63	63
64	64	64	64
65	65	65	65
66	66	66	66
67	67	67	67
68	68	68	68
69	69	69	69
70	70	70	70
71	71	71	71
72	72	72	72
73	73	73	73
74	74	74	74
75	75	75	75
76	76	76	76
77	77	77	77
78	78	78	78
79	79	79	79
80	80	80	80
81	81	81	81
82	82	82	82
83	83	83	83
84	84	84	84
85	85	85	85
86	86	86	86
87	87	87	87
88	88	88	88
89	89	89	89
90	90	90	90
91	91	91	91
92	92	92	92
93	93	93	93
94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99
100	100	100	100



2 cols

A blank sheet of white graph paper with a light gray grid pattern. A thick red line forms a rectangular border around the edges of the page. The border is slightly irregular, following the shape of the paper. There are no markings or text on the page.

EECS 245

"Mathematics for Machine Learning"

6 "chapters"

- 1) Introduction to Supervised Learning
some calculus, multivariable calculus,
summation notation
- 2) "Core" linear algebra
- 3) Linear algebra + ML
- 4) Multivariable calculus + linear algebra
- 5) "Hard" linear algebra
- 6) Probability (+linear algebra)

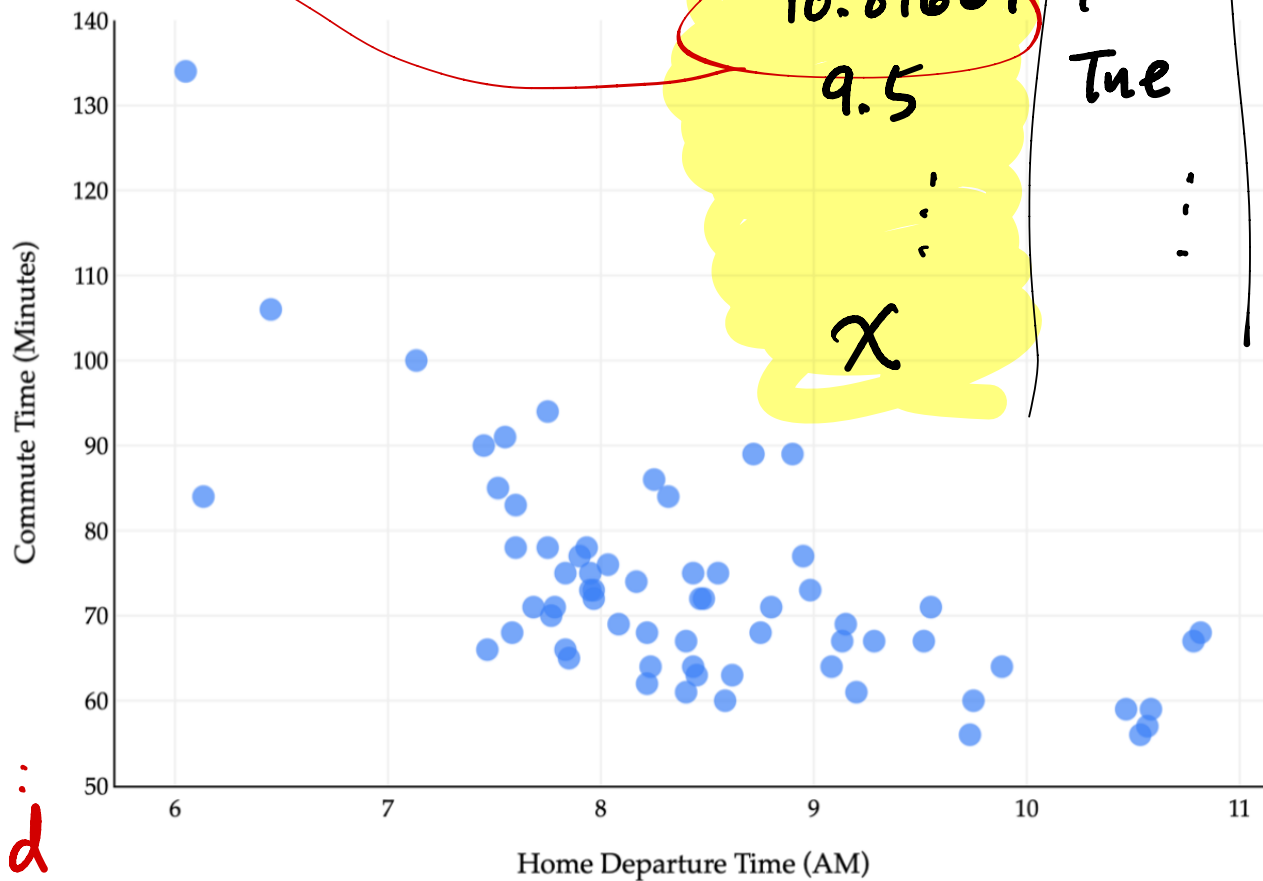
Logistics

eeecs245.org

no Canvas!

- ✓ Lectures and notes
- ✓ Labs
- ✓ Homeworks
- ✓ Exams

10 hours + 0.816667×60 minutes
 = 10:49 AM



departure
hour

10.81667

9.5

x

day

Mon

Tue

fuel

56

26

commute
time

68

75

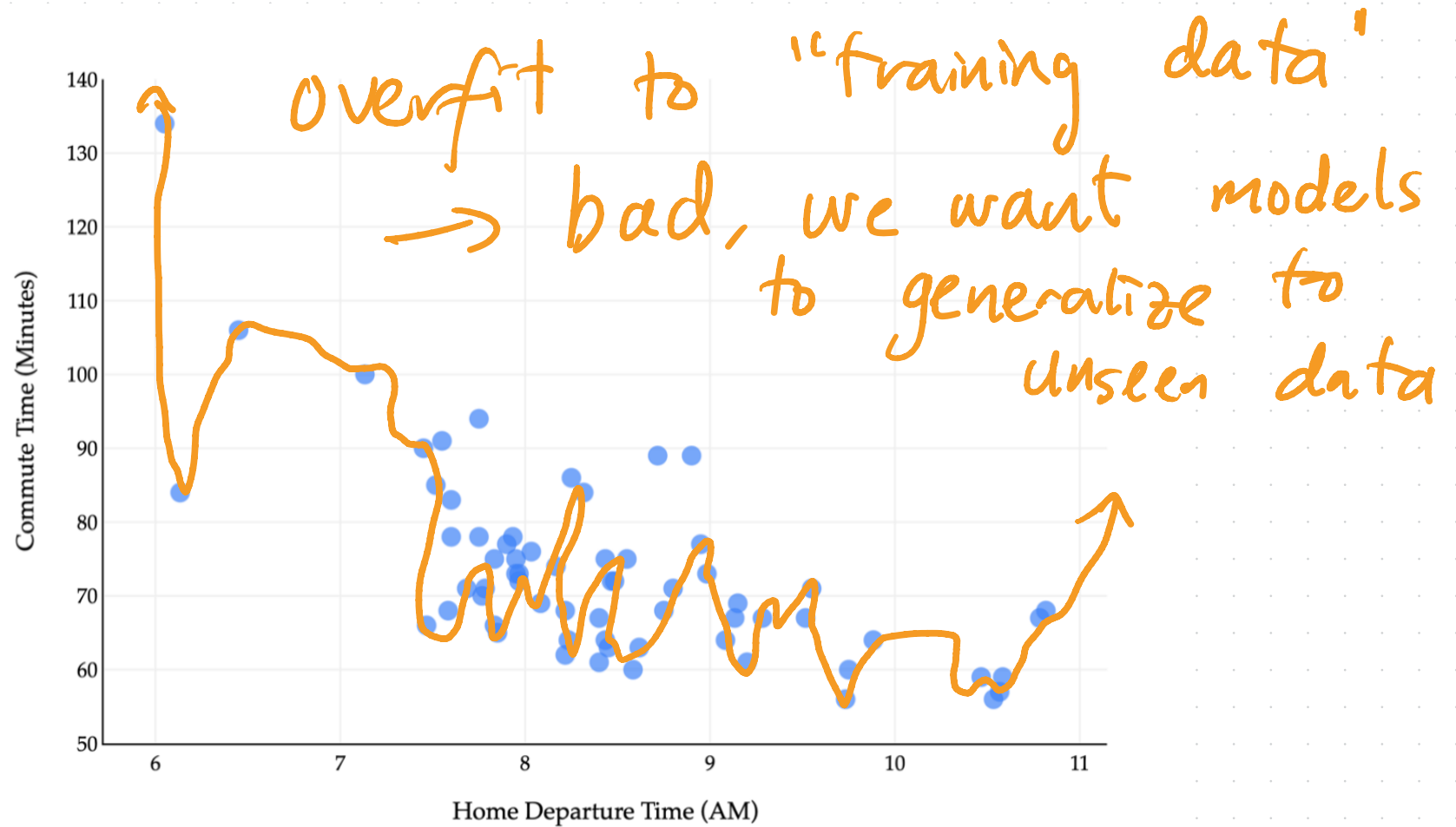
y

labels

Given x ,
 predict y :
 supervised
 regression

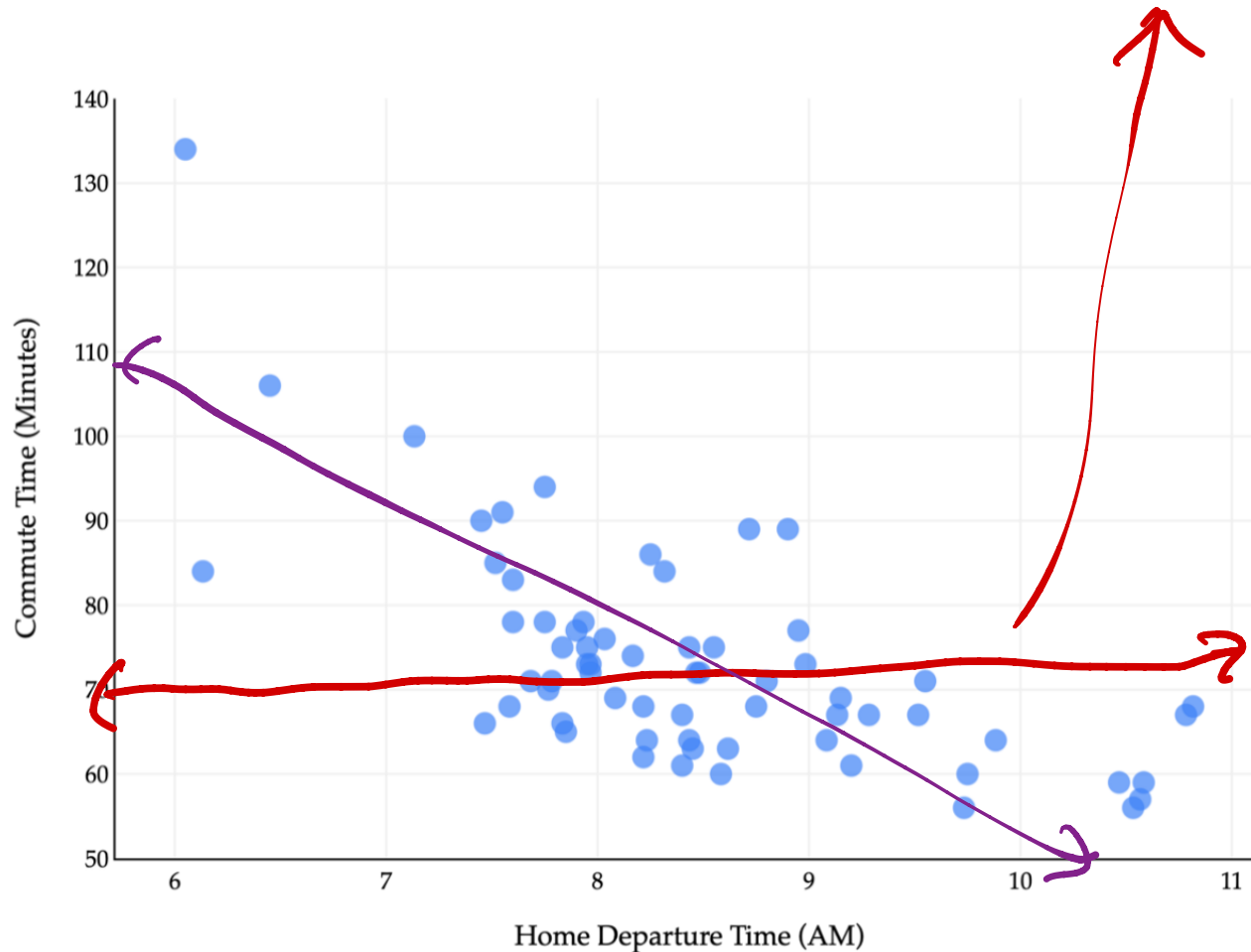
Need to assume
 future \approx past

Model : A set of assumptions about how data were generated



- ① Constant model
- ② Simple linear regression model

Question: Among all possible constant models, which is the best?



office hours: 4721 BBB
right now