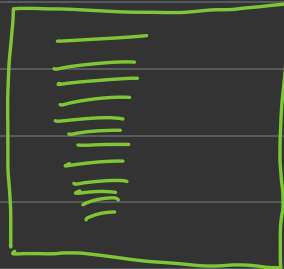03 Sept 2022

Term 4 – ML   April 2022

– Data is the new oil.
– ML is a powerful concept & framework for making
   the best out of it.

– Age of Information or
   Age   of   data.
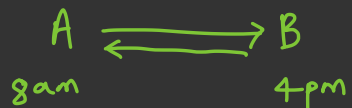
eg: Google knows everything about my location.

MMT
(mumbai & N. Mumbai)

Data

Information

[Darshan + 49 more ppl]

A ⇄ B
8am   4pm

| Bus Service	Car
X	✓ convenient & easy
AC	AC
✓	Guaranteed Seat
P2P	Home – Destn
15 min	Time Conv.
☆ 2950/- pm	10 000 – 120000 rs /month
☆ No Driving	Driving – Tired & fatigue
Sleep, Meetings,	Home – fresh
Netflix	

Who is most intelligent lifeform on the planet at the moment?
Human.

– m/c : To mk data driven
decisions at a scale.

your friend (10yrs)

Will you lend a 10000 rs?

10yrs (100 interaction)

past
experience!

───── excel
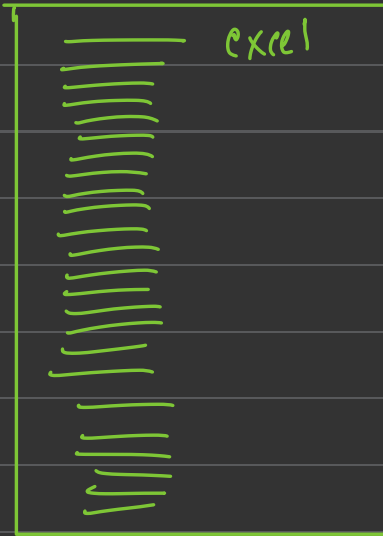
M/c

80 yes ✓ :) Money Lended

20 NO

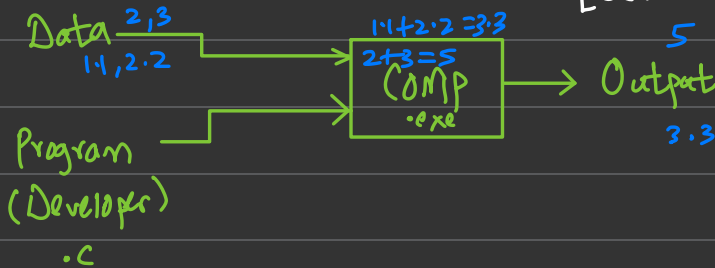10 interaction Human

7   3
yes   No

:) money lended.
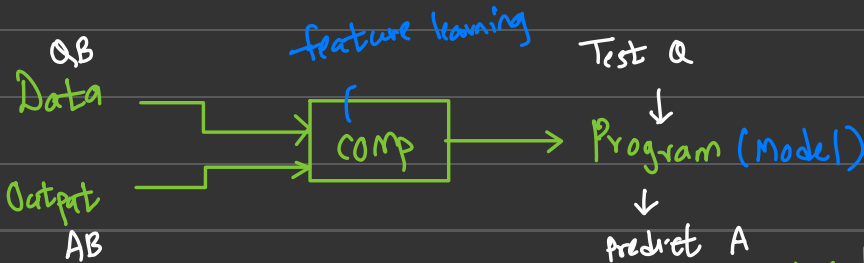
Traditional Programming Paradigm

HDFC $\xrightarrow{\text{website}}$ Infosys

Task: Add two nos   [Deterministic]

Data $\frac{2,3}{1.1, 2.2}$ ────→ ┌─────────────┐
                                   │ 1.1+2.2=3.3 │   5
                                   │ 2+3=5   │ ──→ Output
                                   │ COMP   │
Program ──────────────────────────┤ .exe   │   3.3
(Developer)   └─────────────┘
   .C

ML   Programming Paradigm

QB   feature learning   Test Q
Data ──────→ ┌──────┐   ↓
             │ comp │ ──────→ Program (Model)
Output ─────→└──────┘   ↓
 AB   Predict A
                                     ↳ Cmp Pred vs Actual → Rate Perf.
                                       understand relationship b/w

QB	AB
1	1
2	2
3	3
⋮	⋮
⋮	⋮
⋮	⋮
100	100

} Study   QB & AB
   80   20 Q
                                         ↓
         80 QB → ┌───────┐   Program
         80 AB → │ Brain │ ──→   ↓
                  └───────┘   20 A
} 20
   Test ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─→ ┌──────┐ Predicted
                                    │ ≡≡≡ │
Actual (True)   └──────┘
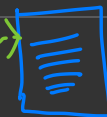
Compare Actual & Predicted
answers & rate the performance
of a student.

——— X ———

04 Sept 2022

y
Dependent
Variable (1)

X
Independent Variables (1 or more)

① Price
of car
~ Brand + Engine Power + Mileage + Transmission Type
+ Color + Variant + Fuel Type + Body Type + ABS +
EBD + ADAS + HP + Torque

↳ Regression

② Price of
Mobile
~ Brand + RAM + Storage + Battery + Screen Size +
Camera + OS + 5G/4G + OLED/AMOLED + Processor

③ Apple vs
Orange
~ Color + Taste + Shape + Texture + Nutrition Value
+ Calorie Value + Price

Classification

④ Iris (Setosa
vs Versicolor
vs Virginica)
~ Sepal Length + Sepal Width + Petal Length
+ Petal Width

https://miro.medium.com/max/
1000/1*IFC_U5j_Y8IXF4Ga87KNVg.png

https://miro.medium.com/max/638/0*2c7voFri9cIXGrc4

ML Problems

Regression

y is Continuous

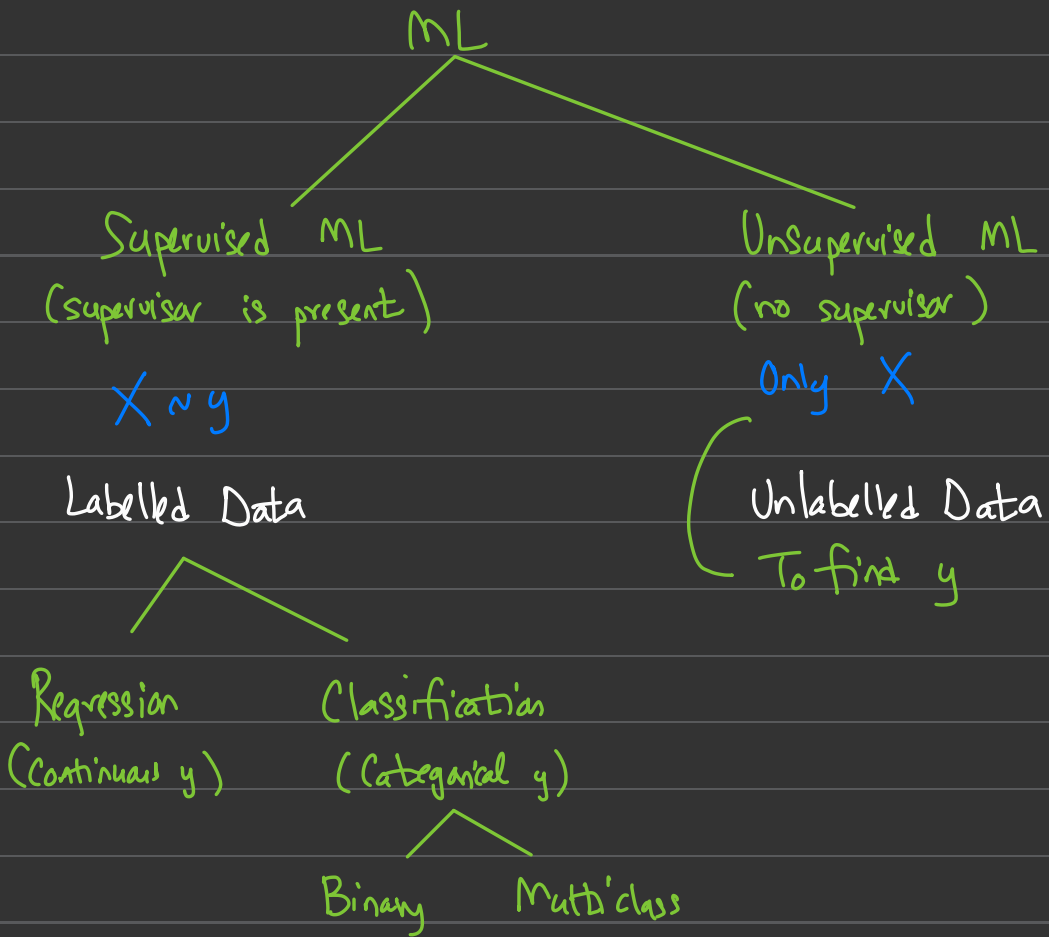**Classification**

y is Categorical

Binary (2)

eg: Apple vs
Orange

eg: Male vs
Female

eg: Spam vs
Ham

Multi-class (more than 2)

eg: Iris Dataset

eg: Apple vs Orange
vs Mango vs Grapes

ML

Supervised ML
(supervisor is present)

$X \sim y$

Labelled Data

Regression
(Continuous y)

Classification
(Categorical y)

Binary   Multi'class

Unsupervised ML
(no supervisor)

Only X

Unlabelled Data
To find y

https://www.aplustopper.com/wp-content/uploads/2017/05/Correlation-1.jpg

Take Home Task: Difference b/w Pearsons,
Spearman Rank & Kendal's
Correlation   Coefficient + Applications

https://www.mathsisfun.com/data/correlation.html

Graph Index

To calculate the Slope:

Divide the **change in height** by the **change in horizontal distance**

Equation of a
Straight Line

Slope

$m = 0.5$

If we move 1 unit on X-axis,
we climb 0.5 units on Y-axis

$$\text{Slope} = \frac{\text{Change in Y}}{\text{Change in X}}$$

$$= \frac{y_2 - y_1}{x_2 - x_1}$$

y-intercept

$C = 2$

Eqn. of Line

$y = mx + C$

$y = 0.5x + 2$
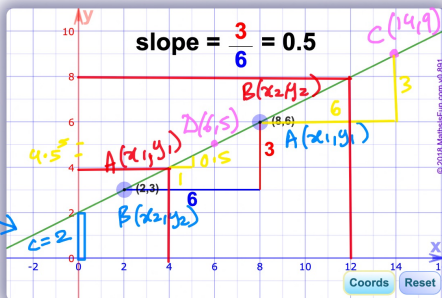
Given x, we can find y. ⭐
If $x = 4$, $y = 0.5(4) + 2 = 4$, If $x = 12$, $y = 0.5(12) + 2 = 8$

Examples:

Have a play (drag the points):

Change in Y

Change in X

$$m = \frac{6-3}{8-2} = \frac{3}{6} = 0.5$$

$$m = \frac{3-6}{2-8} = \frac{-3}{-6} = 0.5$$

slope $= \dfrac{3}{6} = 0.5$

$C(14,9)$

$B(x_2,y_2)$

3

6

$A(x_1,y_1)$

$(8,6)$

$D(6,5)$

4.5

$A(x_1,y_1)$

10.5

3

1

$(2,3)$

6

$B(x_2,y_2)$

$C = 2$

Coords | Reset

$$m = \frac{9-5}{14-6} = \frac{4}{8} = 0.5$$

$$m = \frac{5-9}{6-14} = \frac{-4}{-8} = 0.5$$

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