Date .....

# Introduction to Machine Learning

Past data →  → Prediction

AI v/s ML —— Enables machine learn from past data

Intelligent systems that can simulate humans

(No need to pre-program)

Machine Learning application

1) Self driving car
2) Earthquake
3) Stock / Crypto currency.

etc.

→ Supervised ML
→ Un-supervised ML
→ Re-inforcement ML

Supervised ML

↙ Regression

↘ Classification

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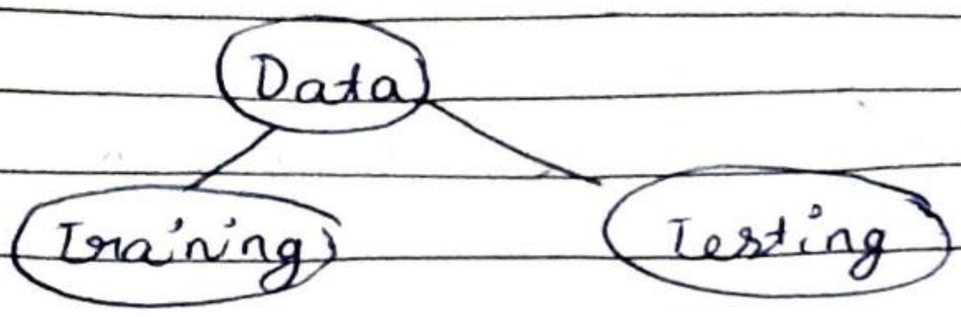
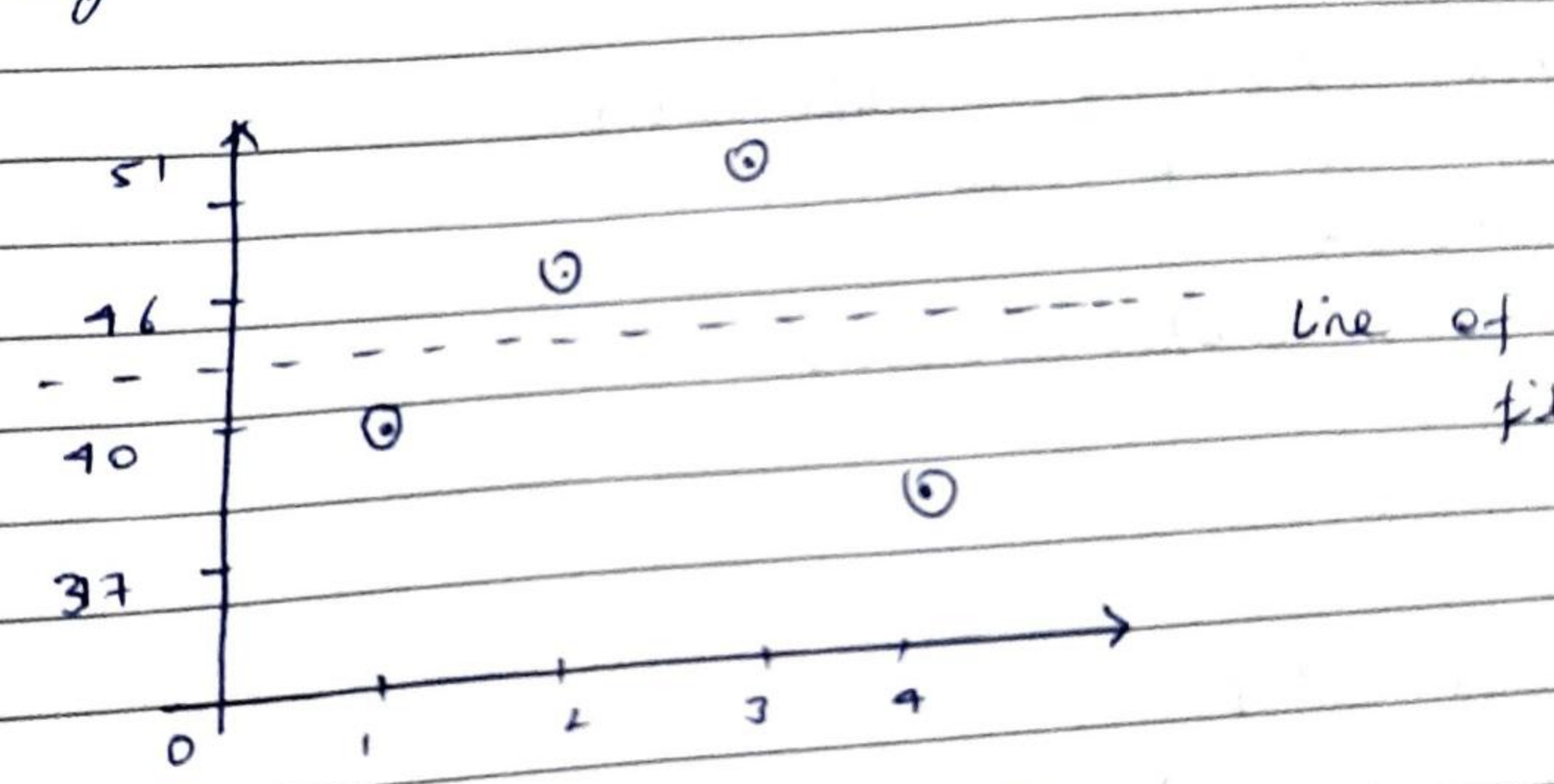



Linear Regression

Bitcoin price

| | | | | |
|---|---|---|---|---|
| | 40 | 46 | 51 | 37 |
| day | 1 | 2 | 3 | 4 |




errors = $e_1 + e_2 + e_3 + e_4$

loss (SSE) = $(e_1)^2 + e_2^2 + e_3^2 + e_4^2$

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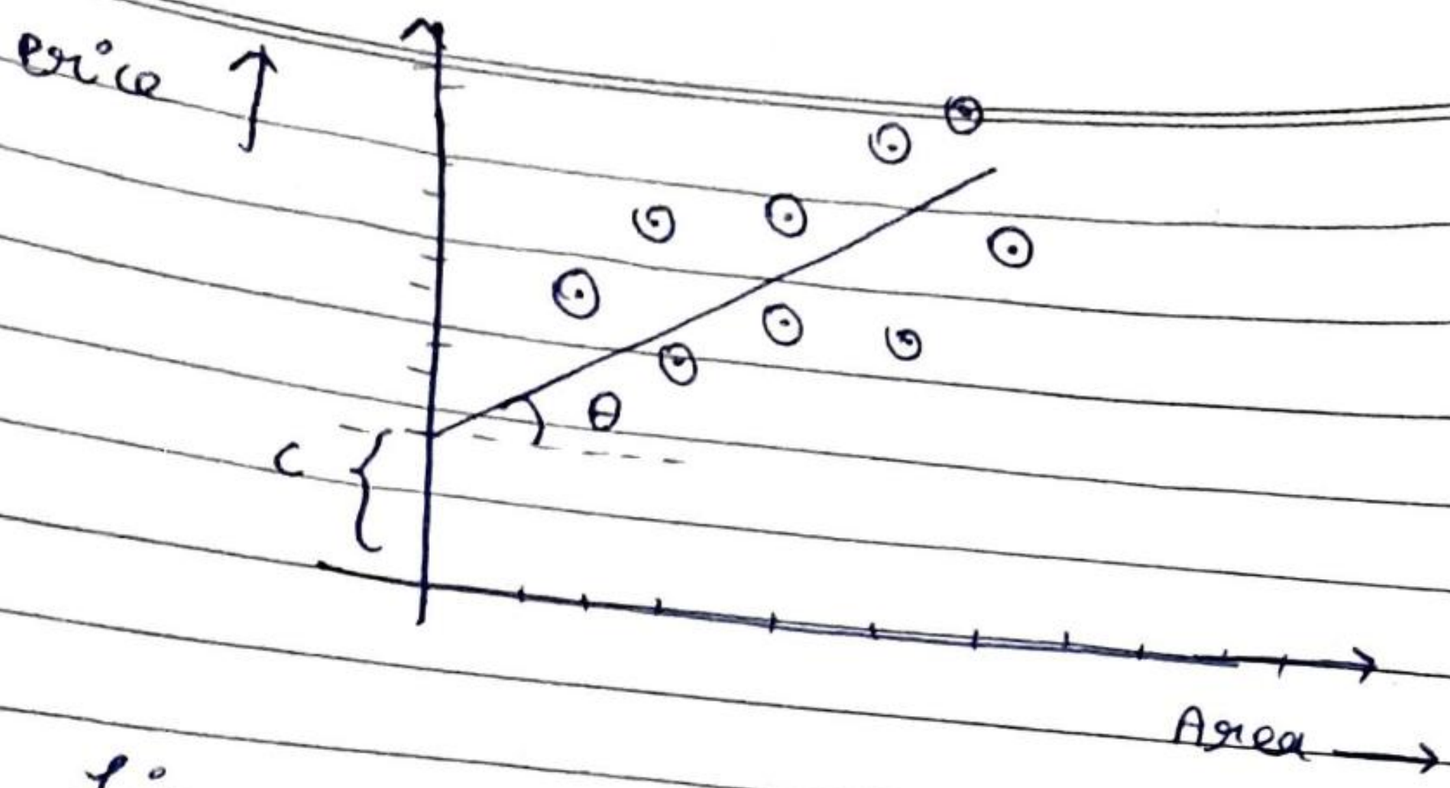


Line of best fit.

$$y = mx + c$$

$$f(x) = w_1 x_1 + w_0$$

$f(x)$ & $x$ from data

$w_1$ & $w_0$ → unknown

$$f(x_1, x_2) = w_0 + w_1 x_1 + w_2 x_2$$

Label — Features (from data)

This will be a plane (not a line)

$$f(x_1, x_2 \; x \; \ldots \; x_n) = w_0 + w_1 x_1 + w_2 x_2 + \ldots w_n x_n$$

For n features (from data)

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| x | y |
|---|---|
| 1 | 3 |
| 2 | 2 |
| 3 | 4 |

$y = mx + c$
(Line of best fit)

$SSE = \sum (mx + c - y')^2$

↓

This should be minimum

$= (m \times 1 + c - 3)^2 + (m \times 2 + c - 2)^2 + (m \times 3 + c - 4)^2$

Loss function

This should give me minimum loss

For minima,

$\frac{d(SSE)}{dm} = 2(m + c - 3) + 2(2m + (-2) \times 2 + 2(3m + c - 4) \times 3 = 0$

$\frac{d(SSE)}{dc} = 2(m + c - 3) + 2(2m + c - 2) + 2(3m + c - 4) = 0$

For maxima & minima

$\frac{d(SSE)}{dm} = 0$ & $\frac{d(SSE)}{dc} = 0$