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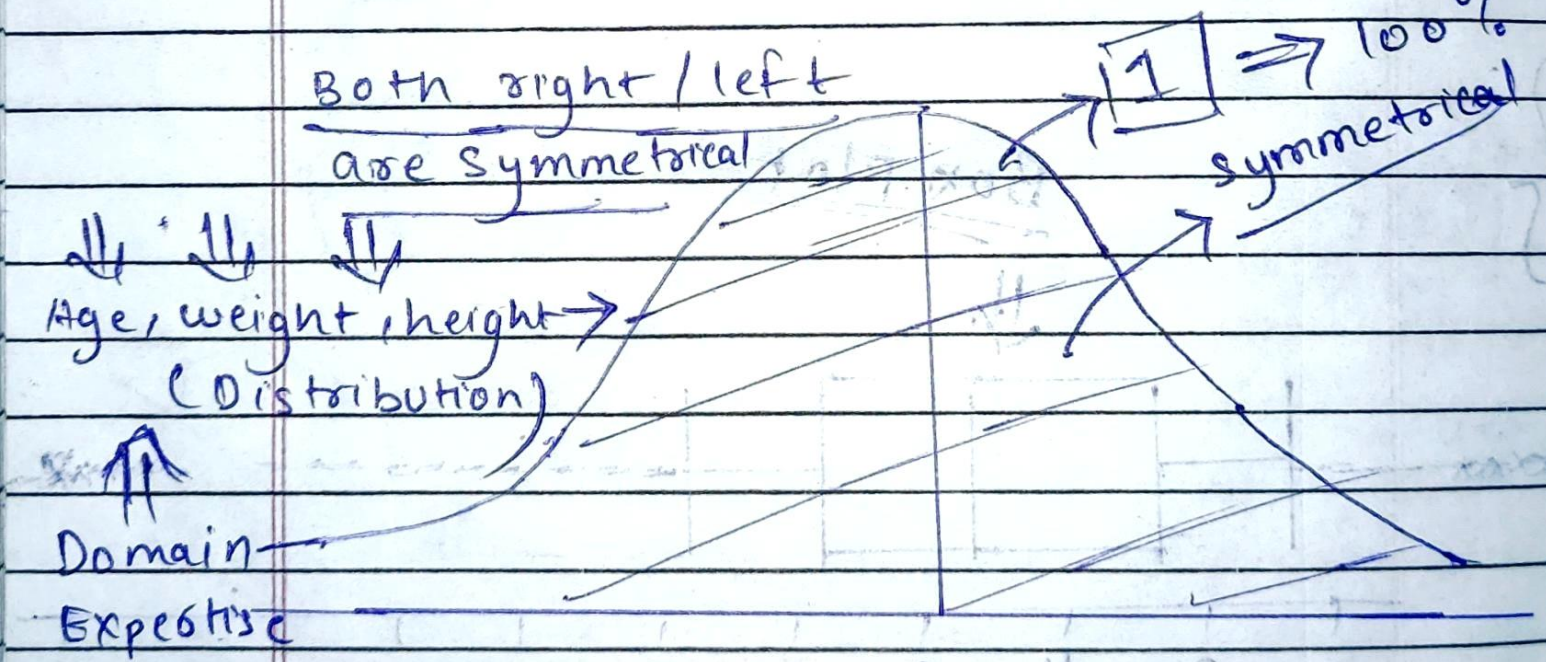
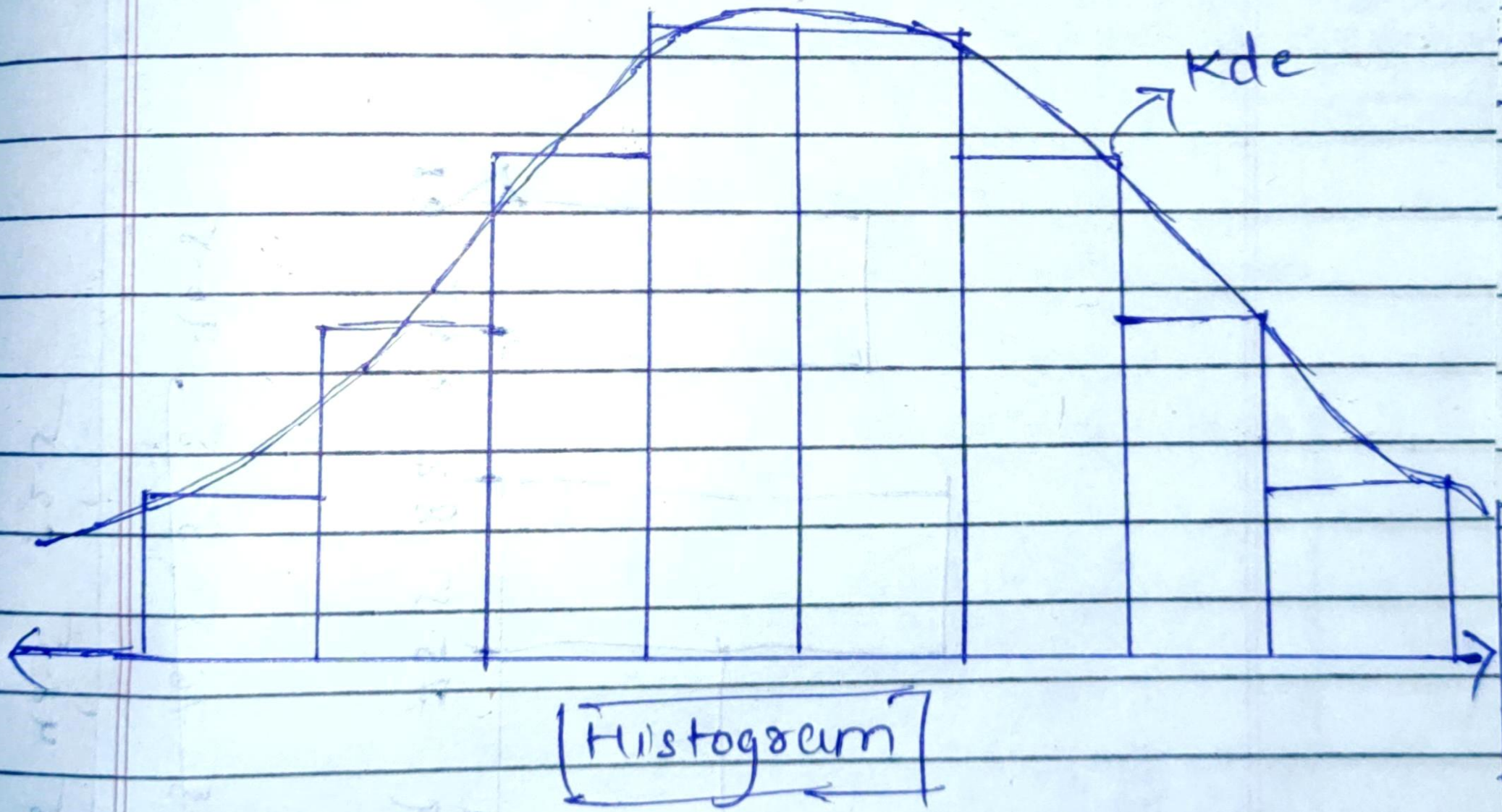
Day 3 (Statistics)

1. Normal Distribution
2. standard Normal Distribution
3. Z - score

* Gaussian / Normal Distribution.



(Kde) Kernal density estimation



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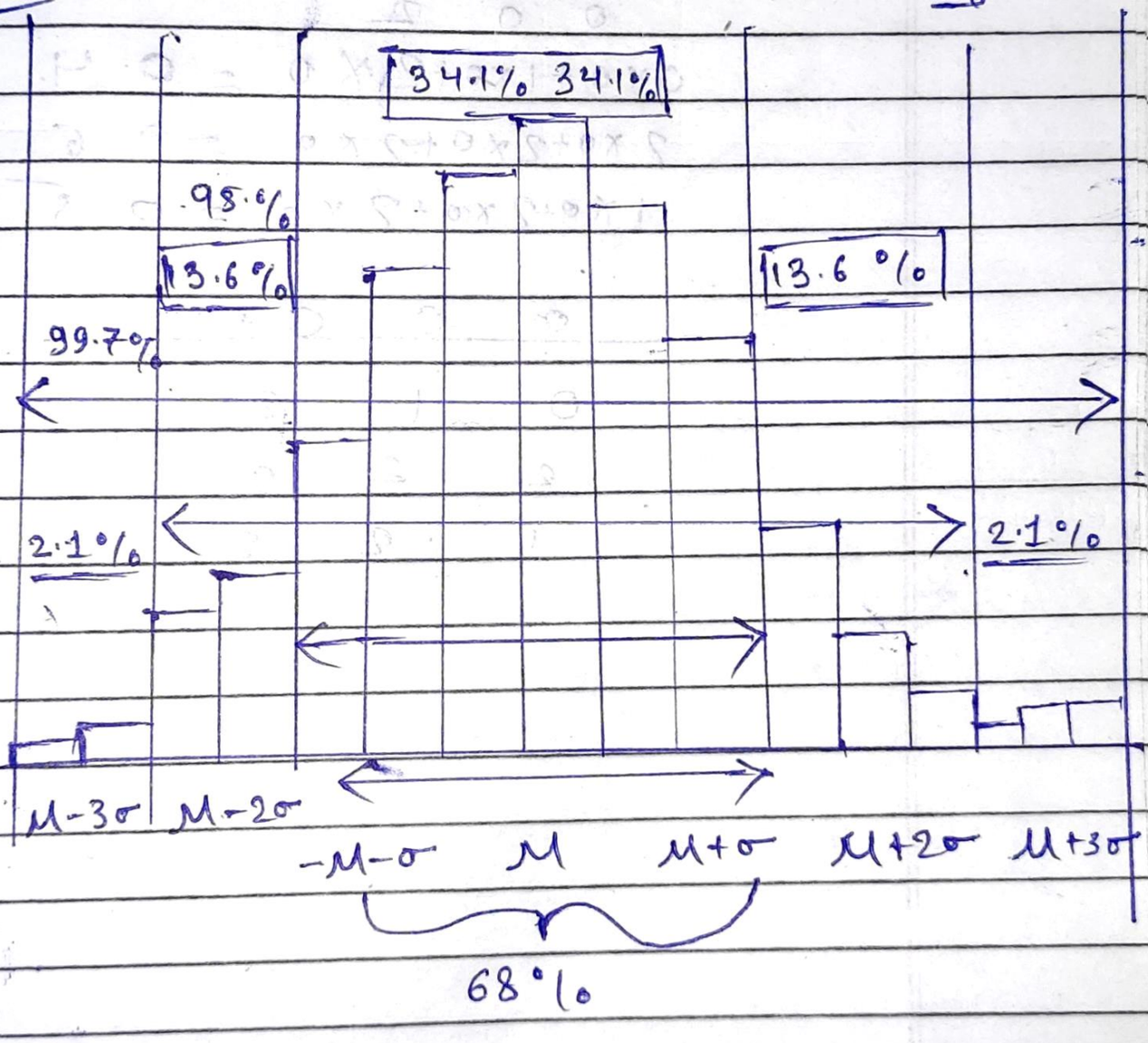
IRIS Dataset

Petal length, Sepal length, Petal width, Sepal width

⇓

Gaussian Distribution.

* Emperial Rule of Normal Distribution



Gaussian / Normal Distribution

⇓

Assumption of Data.

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(SND) standard Normal Distribution :

$X \approx$ Gaussian Distribution (μ, σ)

$$\text{Z-score} = \frac{x_i - \mu}{\sigma}$$

$Y \approx$ SND $(\mu = 0, \sigma = 1)$

$x = \{1, 2, 3, 4, 5\}$

$\mu = 3$

$\sigma = 1.41$

$$\text{Z-score} = \frac{x_i - \mu}{\sigma} = \frac{x_i - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$\frac{\sigma}{\sqrt{n}} \Rightarrow$ standard Error $\Rightarrow$ Inferential stats.

$$\text{Z-score} = \frac{x_i - \mu}{\sigma} \Leftarrow$$

$x = \{1, 2, 3, 4, 5\}$

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$$= \frac{1-3}{1.414} = -1.414$$

$$= \frac{2-3}{1.414}$$

$$= \frac{4-3}{1.414} = \frac{1}{1.414}$$

$$z\text{-score} = \boxed{\frac{x_i - \mu}{\sigma}} \Leftarrow$$

$$X = \{1, 2, 3, 4, 5\}$$

$$\mu = 3 \qquad \sigma = 1.414$$

$$Y = \{-1.414, -0.707, 0, 0.707, 1.1414\}$$

process: standardization ⟹ $\mu = 0$ & $\sigma = 1$

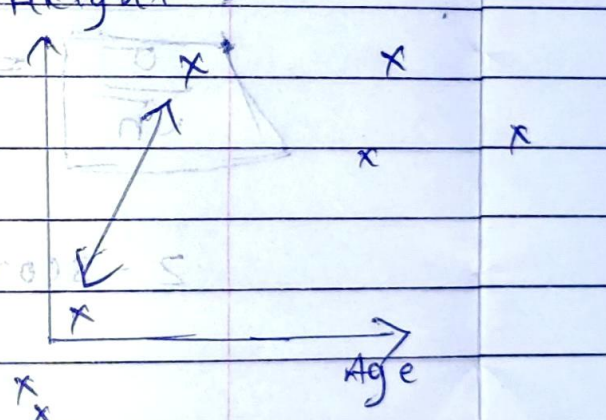
~~[standard Deviation] ⟹ $\mu = 0$ & $\sigma = 1$~~

	(year) Age	(kg) weight	(cm) Height
$\mu = 0$ // $\sigma = 1$ // ⟹	24	72	150
	26	78	160
	32	84	165
	33	92	170
	34	87	150
	28	83	180
	29	80	175

Machine learning Alg

Algorithm ⟹ Math equation ⇓ Mathematical model

Mathematical calculation Time ↑↑



0-1 | Same Scale

Feature Scaling

Normalization ⇓

$$\frac{X_i - \mu}{\sigma}$$

standardization {z-score}

$\mu = 0, \sigma = 1$

$[-3 \leftrightarrow 3]$

$[0-1]$ $[-1-1]$

$[0-5]$

$[0-4]$

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Feature Scaling :

Normalization [lower scale ↔ Higher scale]

① Min Max Scaler [0 - 1]

$$x_{scaled} = \frac{x - x_{min}}{x_{max} - x_{min}}$$

Apply ⇒ Deep learning

$$= \frac{1-1}{5-1} = 0 \qquad \frac{2-1}{5-1} = \frac{1}{4}$$

x	y
1	0
2	0.25
3	0.5
4	0.75
5	1

$$\frac{3-1}{5-1} = \frac{2}{4} \qquad \frac{4-1}{5-1} = \frac{3}{4}$$

0 to 1

$$\frac{5-1}{5-1} = \frac{4}{4} = 1$$

Apply

Deep learning :