Scalars And Vectors

① Physics ② Maths ③ Computer Science {Data Science}

Defn: Scalar:

A Scalar is a single numerical Value. It represents a magnitude or quantity and has no direction.

Ex: Car Speed = 45 Km/hr → Magnitude

Temperature in Celsius T = 25°C

Application in Data Science

Dataset: Count of the Total No.of Records = 5

Average of the feature f1 = —

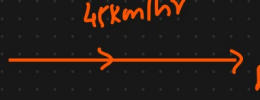
	Age		
	f1	f2	f3
	—	—	—
	—	—	—
	—	—	—
	—	—	—
	—	—	—

Simple Linear Regression ⇒ $y = mx + c$ (c → intercept → Scalar value; m → slope)

② **Vector**: Numerical Value which has both magnitude And Direction.

A vector is an ordered list of numbers. It can represent a point in space or quantity with both magnitude and direction.

Eg: Speed of the car is 45km/hr and is moving Toward East Direction



3hrs → magnitude, units

Example: Student marks

IQ	No.of study hrs	Pass/Fail
90	3hrs	Fails

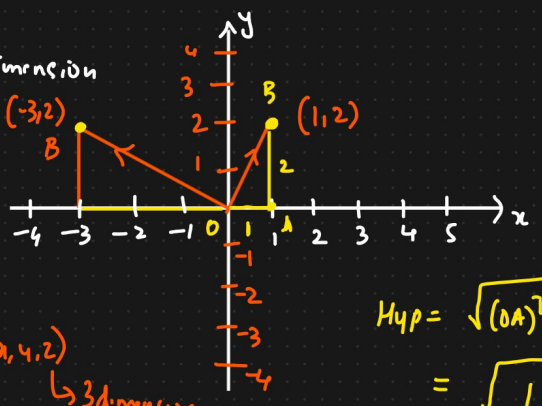
A vector representing person IQ and no.of study = [90, 3hrs]

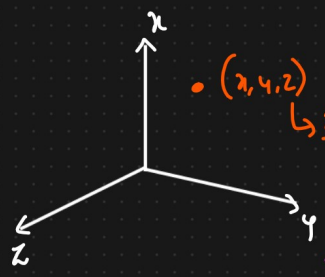
→ [100 3hrs] Pass

A vector representing person's weight over time [70, 72, 75, 73] ← 4 dimension

$A = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ ⇒ 2 dimension

$B = \begin{bmatrix} -3 \\ 2 \end{bmatrix}$





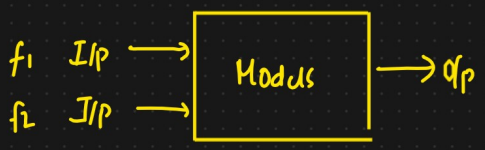
$Hyp = \sqrt{(OA)^2 + (AB)^2}$

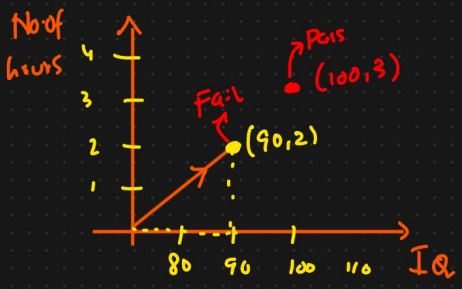
$= \sqrt{1+4} = \sqrt{5} = OB$

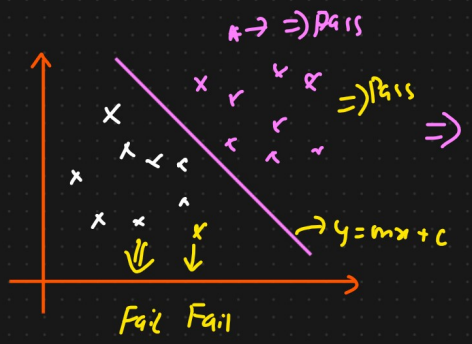
$\begin{bmatrix} x \\ y \\ z \end{bmatrix}$

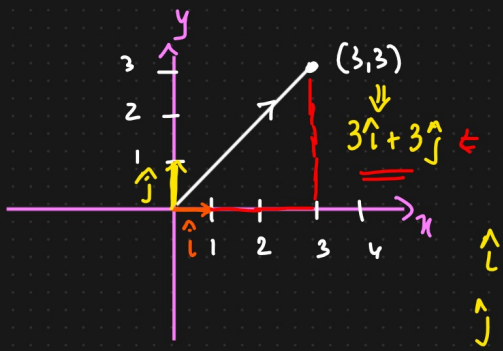
f_1 f_2 f_3 f_4 f_5

f_1	f_2	op ←
IQ	No. of hours	Pass/Fail
→ [90	2]	Fail ⇒ 0
→ [100	3]	Pass ⇒ 1







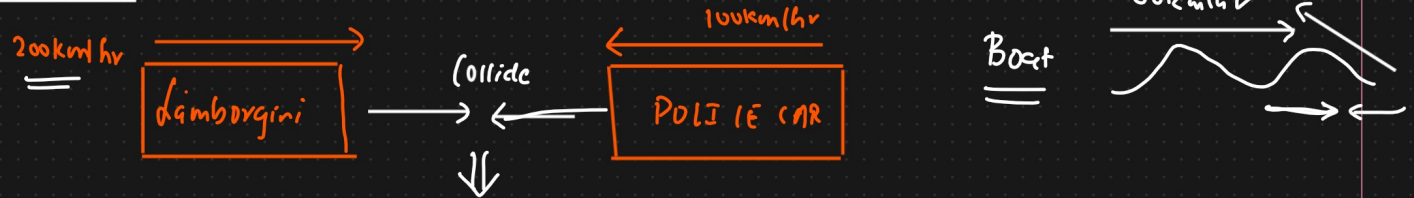


Unit Vector

$\hat{\mu} = 1$

$\hat{i}$ $\hat{j}$ ⇒ unit vector towards x And y axis ⇒ 1

Gaming Industry ⇒ GTA 6



Aliasing Effect => CAR => Blown Up