Scalar & Vector

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Scalar

A scalar is a numerical value. It represents a magnitude or quantity and has no direction.

Ex- Car speed = 45 km/hr → Magnitude

Temperature in celsium T = 45° C

Application in Data Science

① Dataset: > Count the total no. of records.

> Average of the feature f1

Records ⇒ Age height

f1 f2 f3

② Simple Linear Regression ⇒ $y = mx + c$ → Intercept

↳ slope ↳ Scalar Value

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.

Ex- Speed of the car is 45 km/hr and is moving towards East Direction.

45 km/hr →E

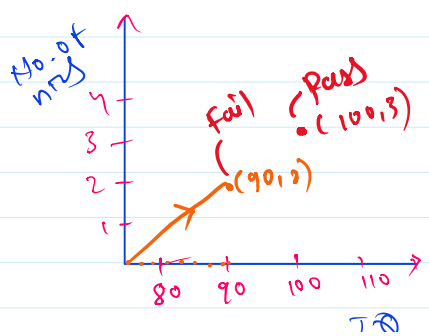
Example:

Student Marks		
IQ	no. of study hrs	Pass/Fail
90	3 hrs	Fails
100	3 hrs	Pass

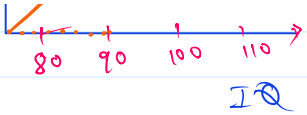
A vector representing Person IQ and no. of study hours [90, 3hrs]

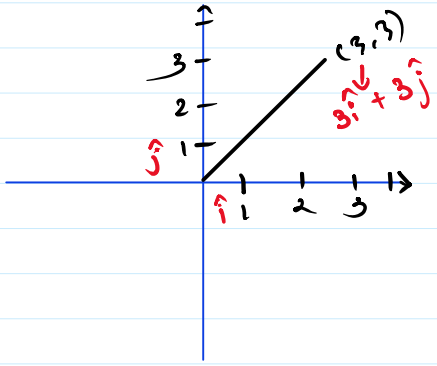
↑ magnitude ↑ unit

A vector representing person weight over time. [70, 72, 75, 73]



f1	f2	O/P
IQ	No. of hrs	Pass / Fail
[90	2]	Fail ⇒ 0
[100	3]	Pass ⇒ 1





Unit vector

$\hat{a} = 1$

$\hat{i}$, $\hat{j}$ => unit vector towards x and y axis => y