Your Ultimate Guide To Landing Top AI roles

Key Mathematical Concepts

DECODE AiML

① Linear Space

→ values evenly spaced in linear Space.

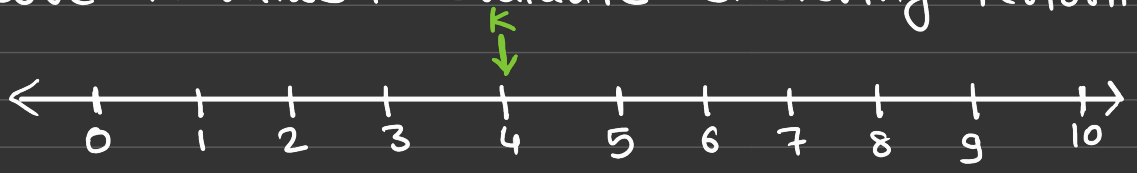
→ Regular Interval

→ The difference between Consecutive number is constant.

→ Example: no of clusters in K-means clustering

$$K = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]$$

use above K value to evaluate clustering Performance.



↳ Look for optimal K using metrics (within-Cluster Sum of squares)

② Logarithmic Space

→ Generates number that are evenly spaced on a logarithmic space

→ The ratio between consecutive number is constant.

→ Example : Finding optimal learning rate (α)

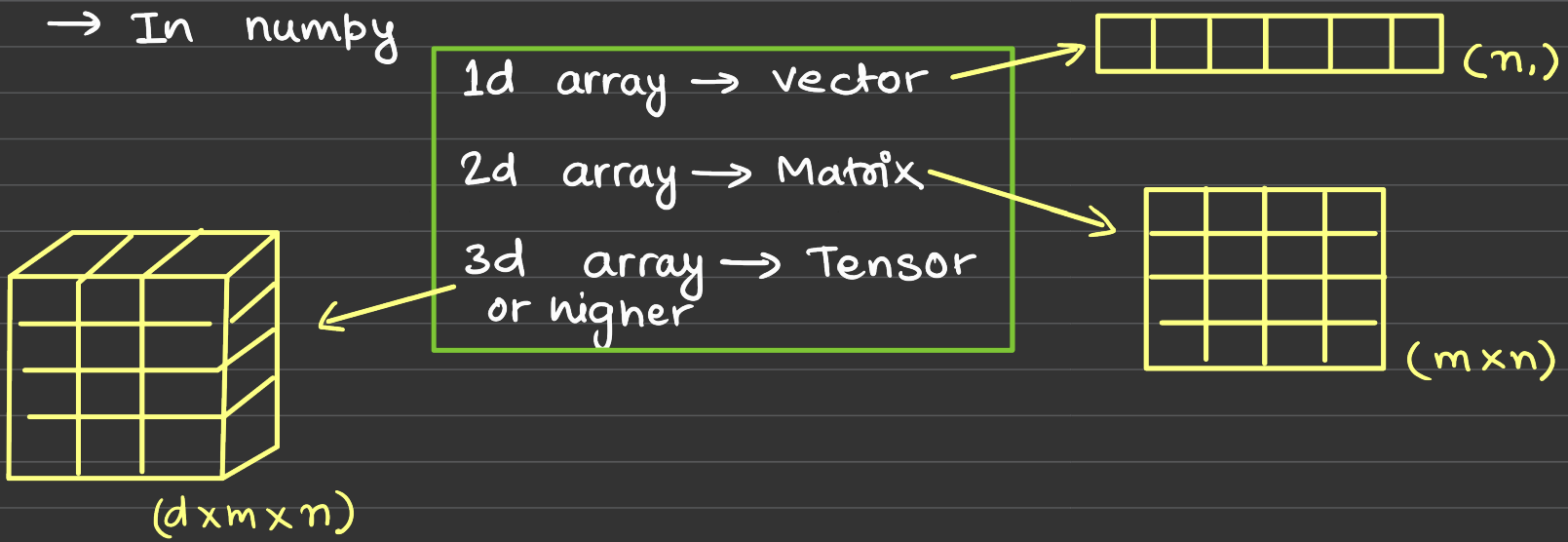
$$\alpha = [0.00001, 0.0001, 0.001, 0.01, 0.1]$$

↳ use above α value to evaluate best learning rate.

③ Matrix

→ In mathematics, a matrix is always 2 dimensional

→ In numpy



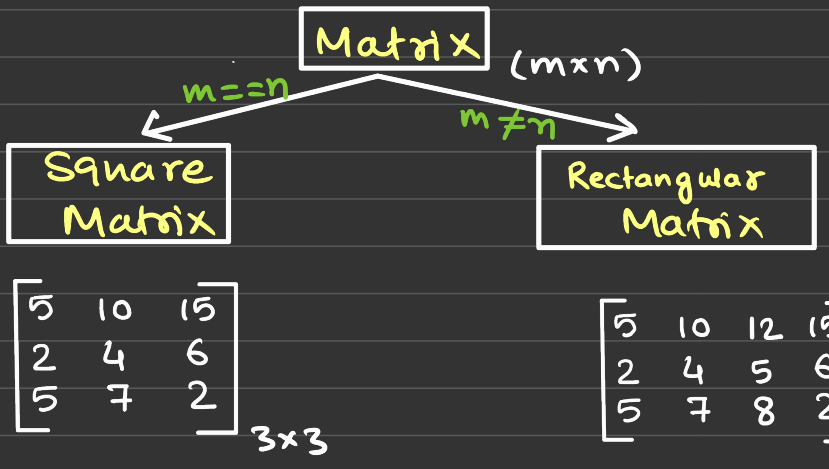
→ But today, our focus is on Matrix (2d Array)

2d Array [Matrix] → [[5, 10, 15], [2, 4, 6], [5, 7, 2]] → numpy Style

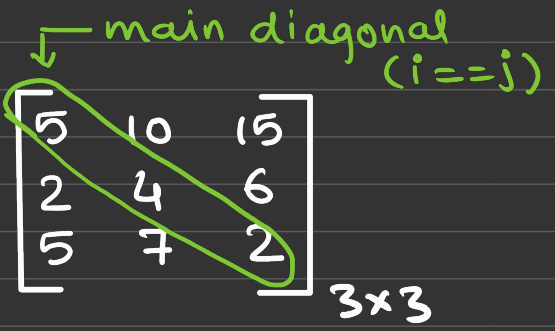
$$\begin{bmatrix} 5 & 10 & 15 \\ 2 & 4 & 6 \\ 5 & 7 & 2 \end{bmatrix}$$ Mathematical

→ 2 dimension
→ Shape → (3 x 3)
→ m = n, so square Matrix

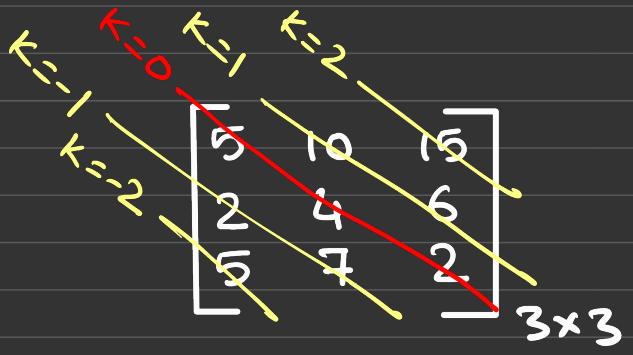
→ Generally matrix can be a square or Rectangular based on shape.



* Diagonal of a Matrix



→ diagonal parallel to main diagonal is identified using offset K



→ we will look into some special types of matrix which are only defined for square matrices.

① Diagonal Matrix

$$\begin{bmatrix} 5 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 2 \end{bmatrix}_{3\times3}$$

② Identity Matrix

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}_{3\times3}$$

③ Upper Triangular matrix

↳ zero below main diagonal

$$\begin{bmatrix} 5 & 10 & 15 \\ 0 & 4 & 6 \\ 0 & 0 & 2 \end{bmatrix}_{3\times3}$$

④ Lower Triangular Matrix

↳ Zero above main diagonal

$$\begin{bmatrix} 5 & 0 & 0 \\ 2 & 4 & 0 \\ 5 & 7 & 2 \end{bmatrix}_{3\times3}$$

→ In Pure Mathematics, both diagonal and Identity matrix are defined for square matrices.

→ Even a triangular matrix must be a square matrix.

→ But numpy allows above matrices for rectangular matrix as well for programmer's Convenience.

Random Number Generation

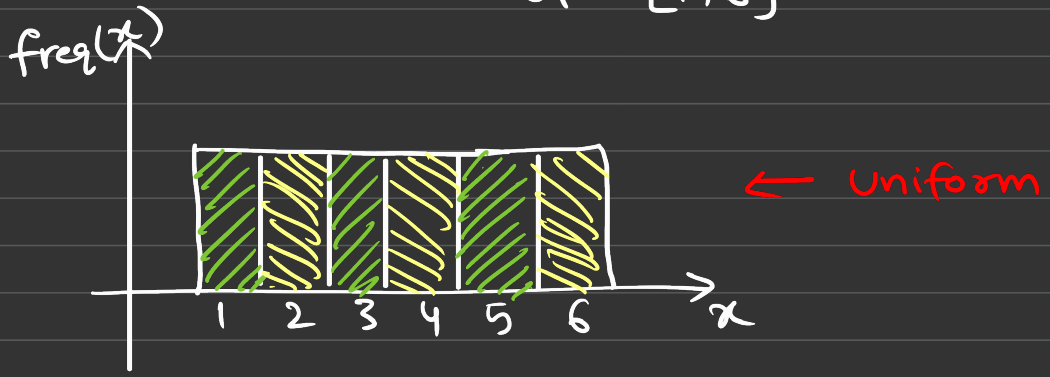
→ np.random.rand() → Uniform distribution
→ np.random.randn() → Normal distribution

Ex1: Select a random integer in your mind from [1, 10]

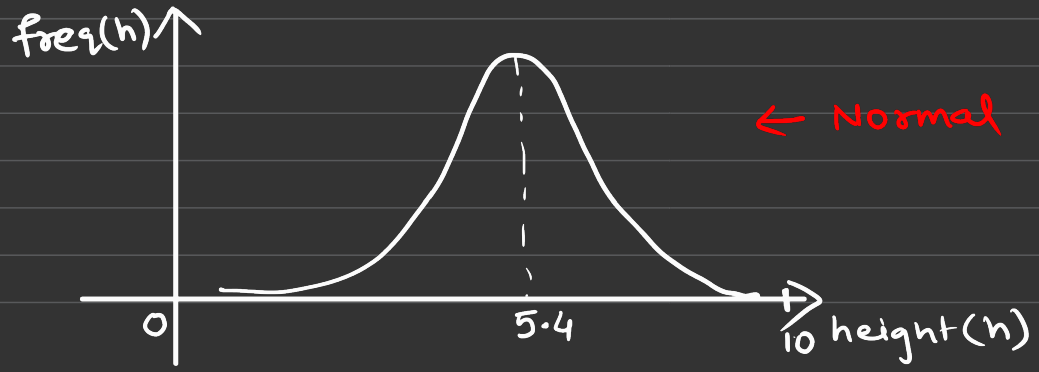
↳ Every no. has equal probability of selection = 1/10

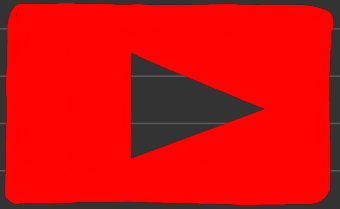
Ex2: Roll a dice 1 times → Random value [1, 6]

Roll one dice 10,000 times → and plot occurence of [1, 6]



Example 3 : Select a sample of 10,000 adults from India and plot the frequency V/s height graph.



Like  Subscribe