

AGENDA – DAY 8 – 07-DEC-2025 (SUN)

- **REACP – DAY 7 – MAX 10 MINUTES**
- **DAY 8 – UNSUPERVISED LEARNING**
 - **Dimensionality Reduction Techniques**
 - Importance of Dimensionality Reduction
 - Principal Component Analysis (PCA)
 - Linear Discriminant Analysis (LDA)
 - t-Distributed Stochastic Neighbour Embedding (t-SNE)
 - **Association Rule Learning**
 - Introduction to Association Rule Learning
 - Apriori Algorithm
 - Eclat Algorithm
 - **Anomaly Detection Techniques**
 - Isolation forest
 - **Model Evaluation in Unsupervised Learning:**
 - Silhouette Score for Clustering
- **Ensemble Learning**
- **Q & A**
- **SUMMARY, HEADS-UP FOR DAY 9 & CLOSURE**

REACP – DAY 7 – MAX 10 MINUTES

- Subjective Segmentation
- K-Means Clustering
- Hierarchical Clustering
- DBSCAN
- Agglomerative -bottom up
- Divisive
- Centroids
- elbow method – Deciding on the number of clusters
- silhouette score – Stability (compact) of the cluster

LINEAR TRANSFORMATION:

$$M \vec{v} = \lambda \vec{v}$$

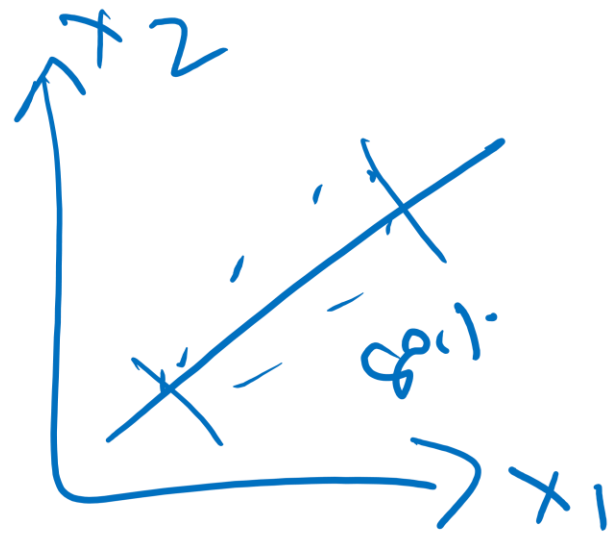
M → MATRIX

λ → EIGEN VALUE

\vec{v} → EIGEN VECTOR

λ → CONSTANT

\vec{v} → VECTOR

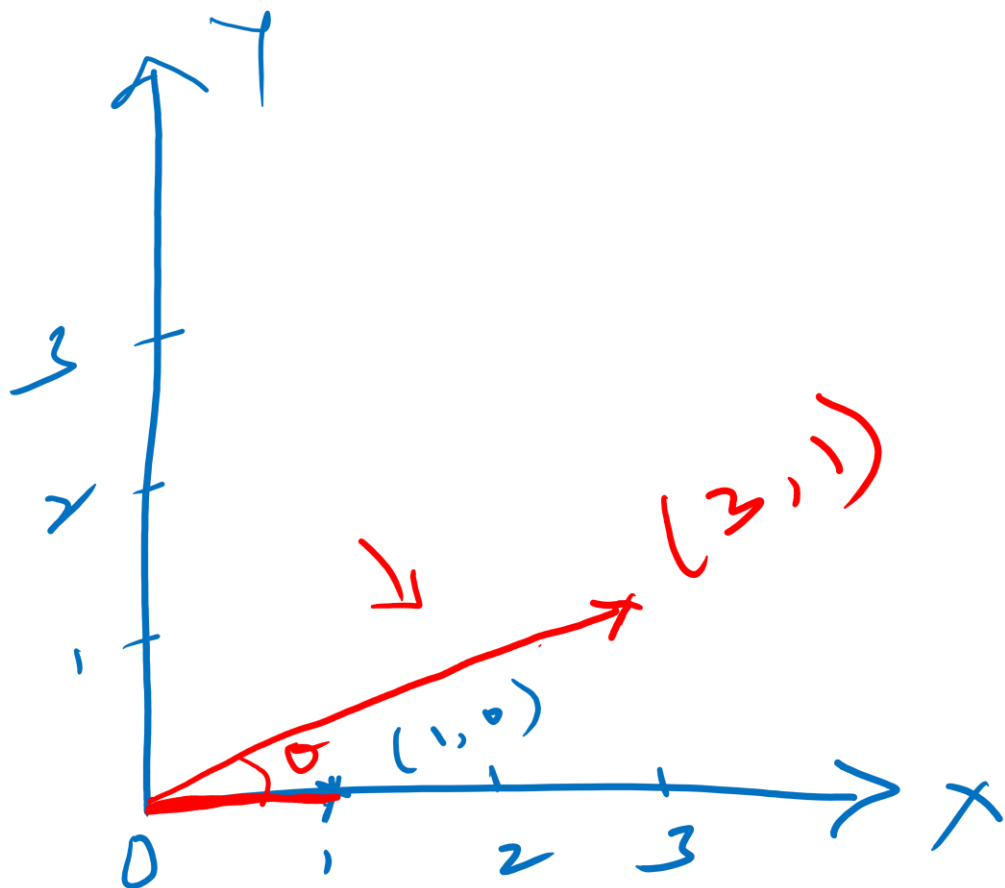


$$M \begin{bmatrix} 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 3 \\ 3 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 1 \end{bmatrix} = \textcircled{3} \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

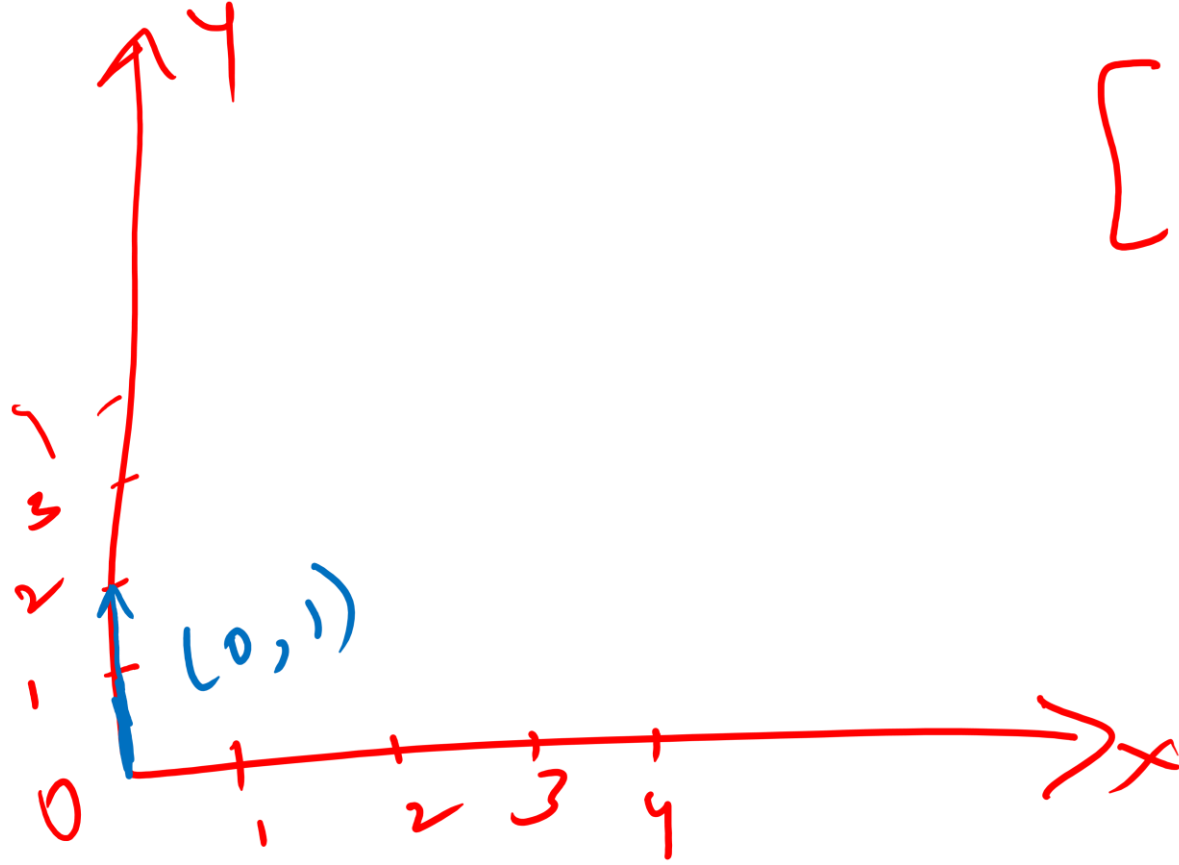
$\textcircled{3}$ → EIGEN VALUE

$\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ → EIGEN VECTOR



$$\begin{bmatrix} 3 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & x \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 3 & x \\ 1 & y \end{bmatrix}$$

\downarrow \downarrow
 STRETCHED & ROTATED



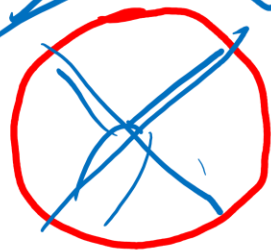
$$\begin{bmatrix} 3 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$$

STRETCHED
NOT
ROTATED.

SHAPIRO'S
TEST.

PS
TEST

360°

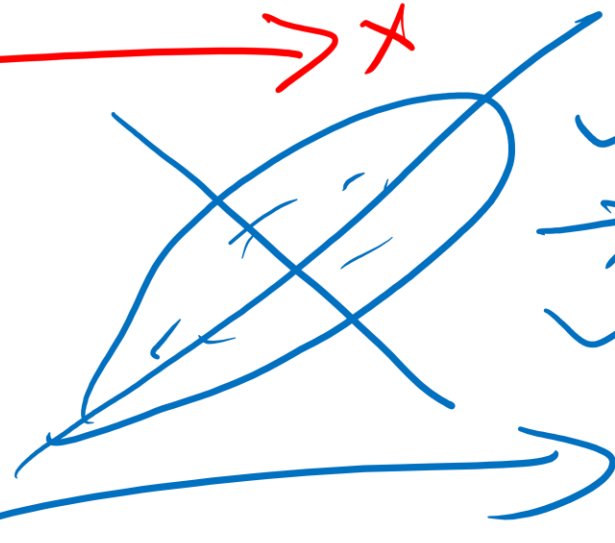


CIRCULAR
SPHERICAL.

→ DR
+ PCA POSSIBLE

PCA / DR
POSSIBLE

HYP
TEST



NOT SPHERICAL
YES
OF DR
PCA

$$\textcircled{PL_1} = \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \alpha_4 x_4$$

$$PL_4 = \partial_1 x_1 + \partial_2 x_2 + \partial_3 x_3 + \partial_4 x_4$$

D E A

	x_1	x_2	x_3	x_4
1				
100				

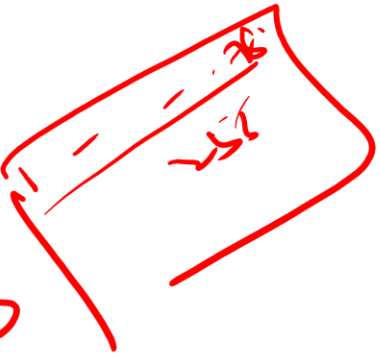
100 x 4

PCD

	PC ₁	PC ₂	PC ₃	DV
1	✓		✓	
100	✓			

100 x 6 100 x 3

8



$28 \times 28 = 784$
GRAY SCALE
IMAGE

