Advanced ML-
Dimensionality Reduction

Dimensionality Reduction

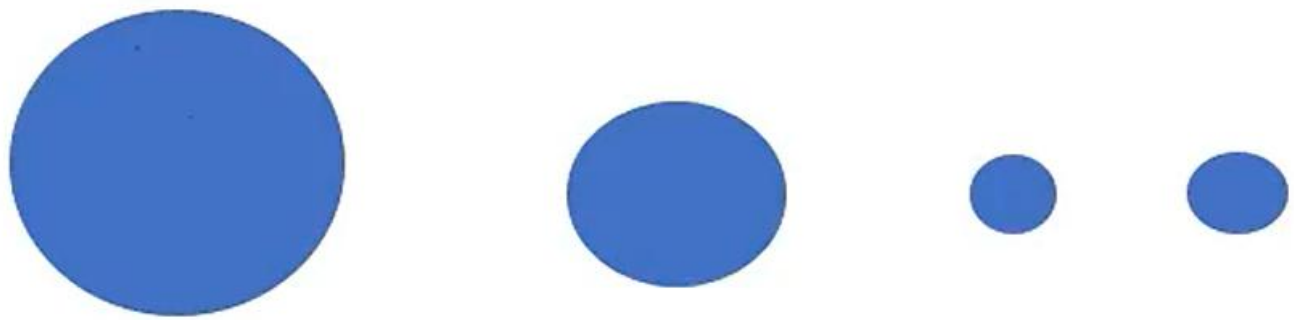
Dimensionality Reduction

Already we have feature selection methodology

Then why PCA?

Scalar and Vector

Scalar→ Magnitude

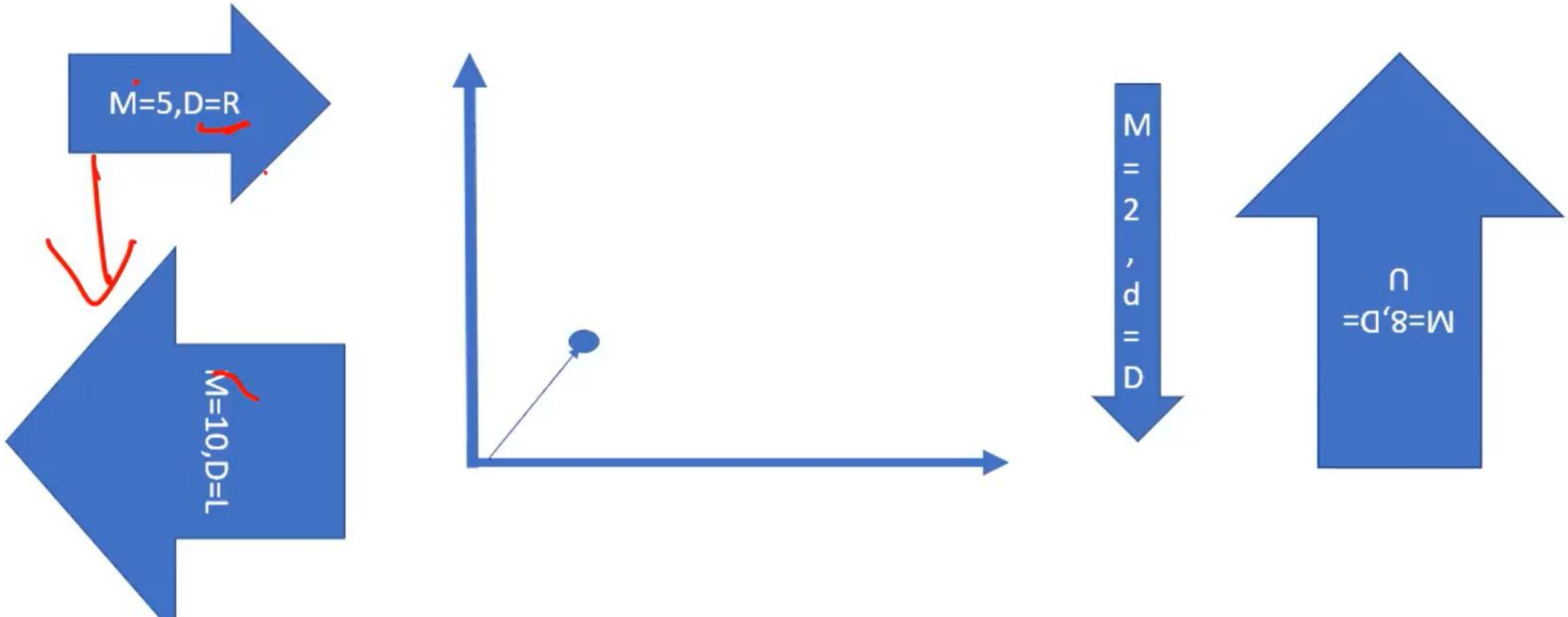


10 5 2 3

hramisha

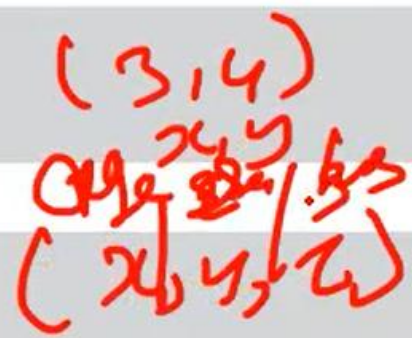
Scalar and Vector

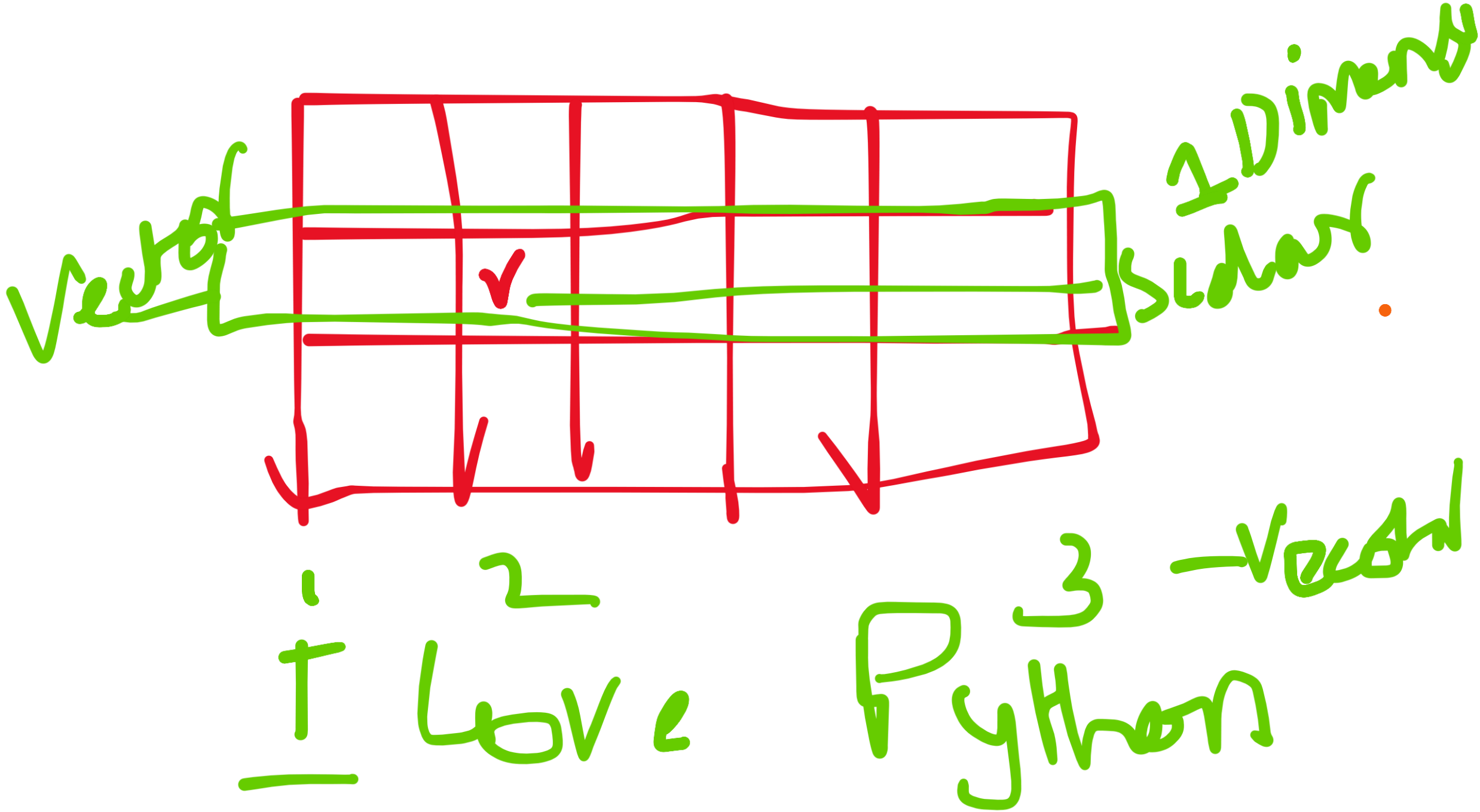
Vector→ Magnitude & Direction



Dimension

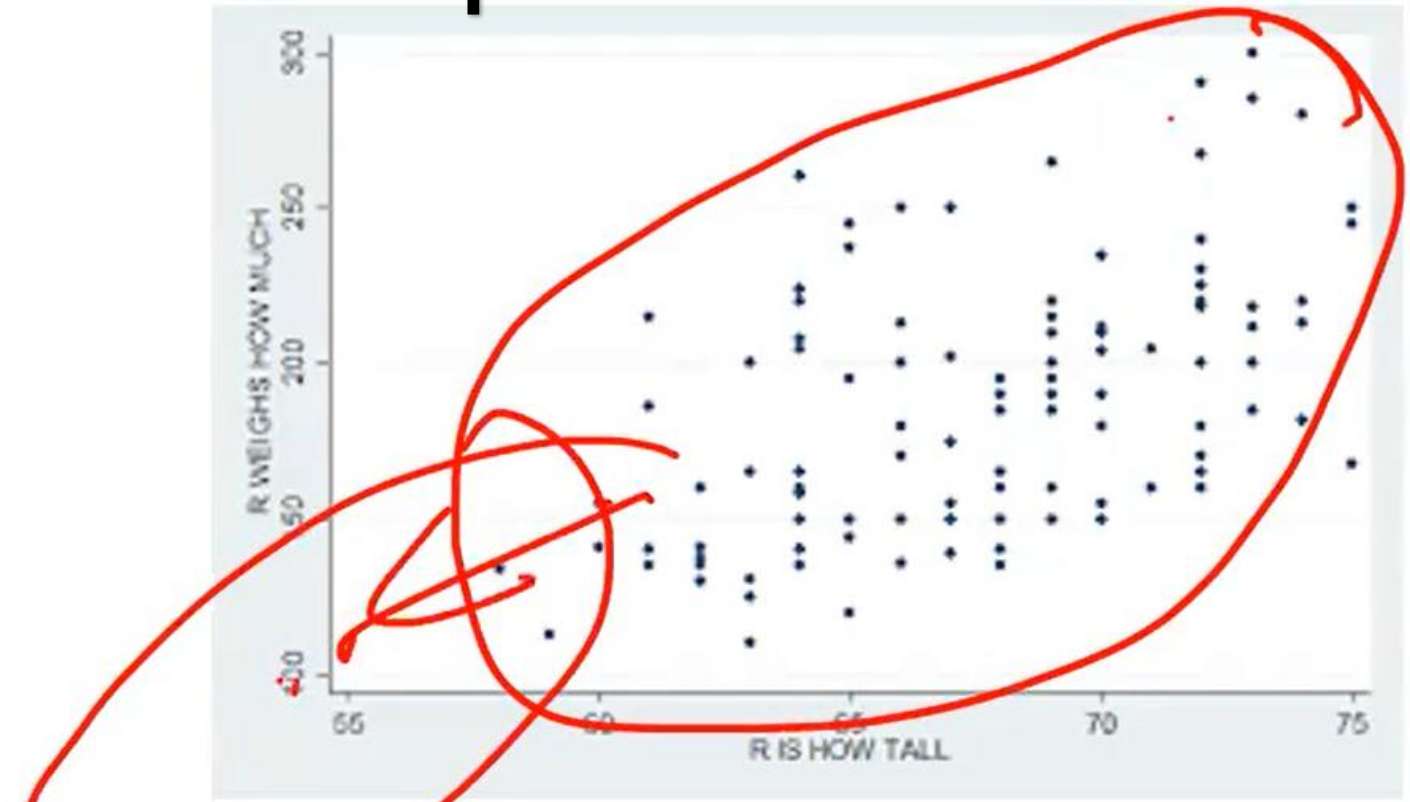
- Zero Dimension
- One Dimension
- Two Dimension
- Three Dimension




Vertical
2 Dimensional
Slider
I Love Python
1
2
3
Vertical

Principle Component Analysis

Un supervised learning



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Eigen Value and Eigen vector In PCA

Dataset

Population Covariance Formula

$$Cov(x,y) = \frac{\Sigma(x_i-\bar{x})(y_i-\bar{y})}{N}$$

Sample Covariance

$$Cov(x,y) = \frac{\Sigma(x_i-\bar{x})(y_i-y)}{N-1}$$

Matrix for Eigen Value and Eigen Vectors

Eigen Value and Eigen vector In PCA

Eigen Value

$$\begin{pmatrix} 0 \\ 2 \\ 4 \end{pmatrix}$$

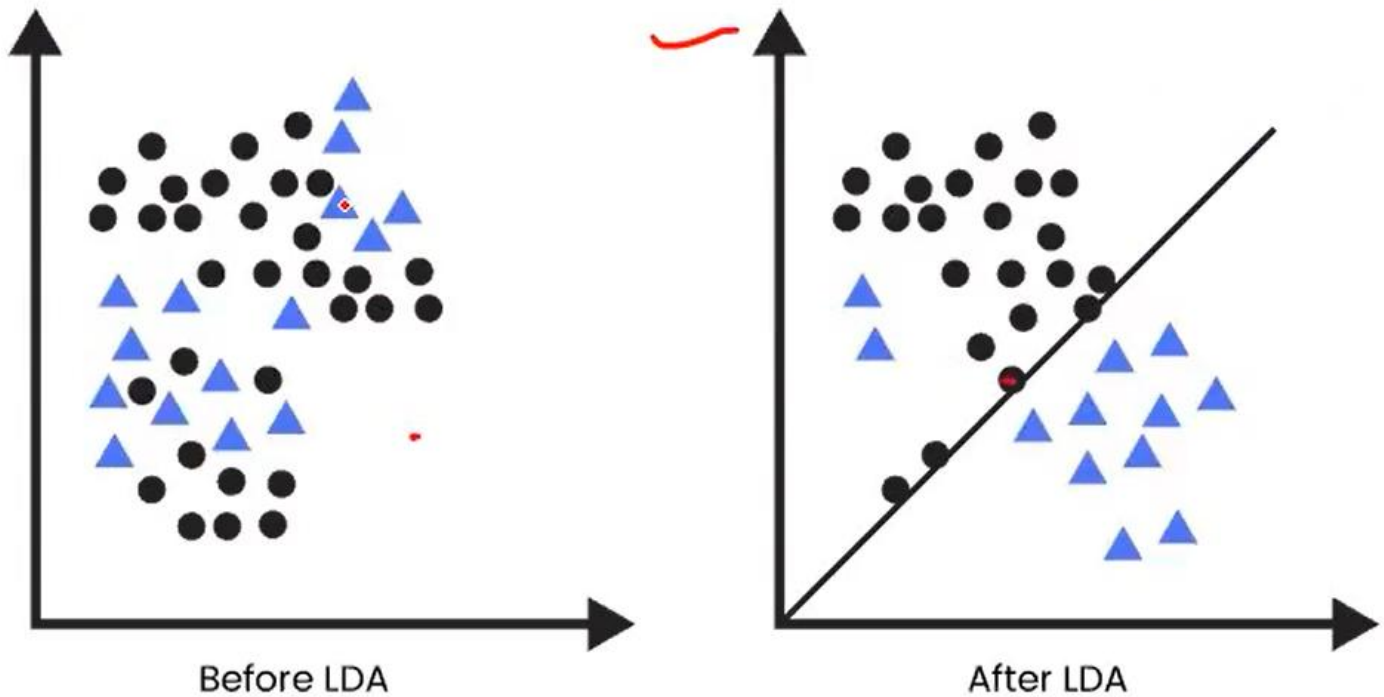
Eigen Vector

$$\begin{bmatrix} -1 & 1 & -3 \\ -1 & -2 & -5 \\ 1 & 1 & 3 \end{bmatrix}$$

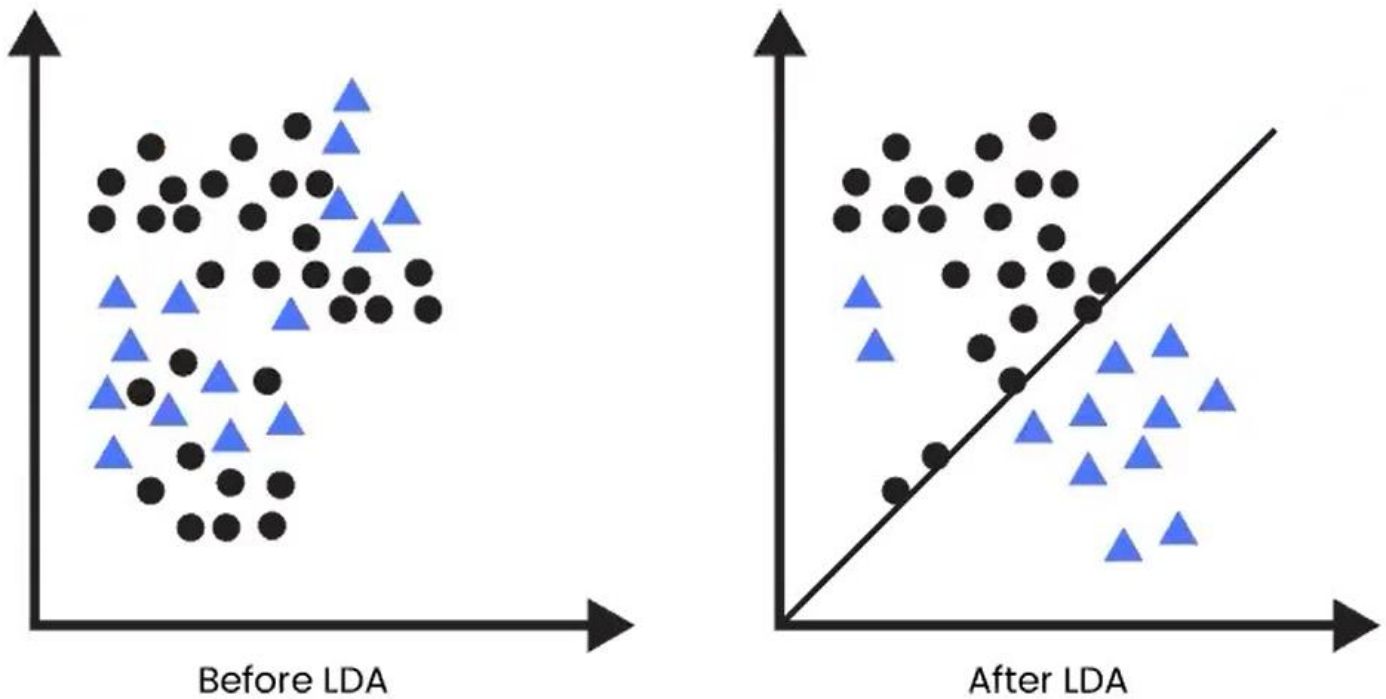
v_1 v_2 v_3

PCA

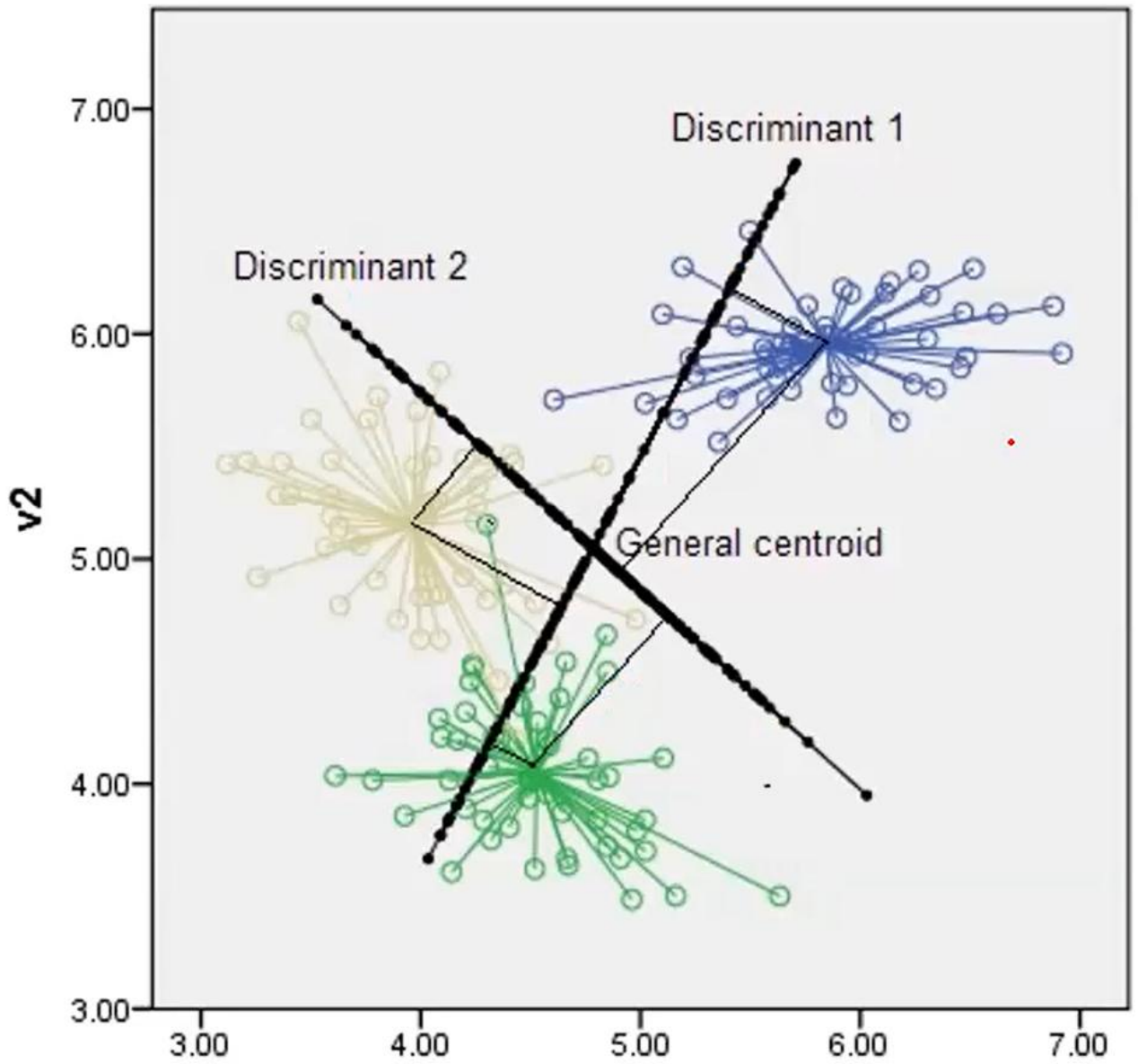
Linear Discriminant Analysis



Linear Discriminant Analysis

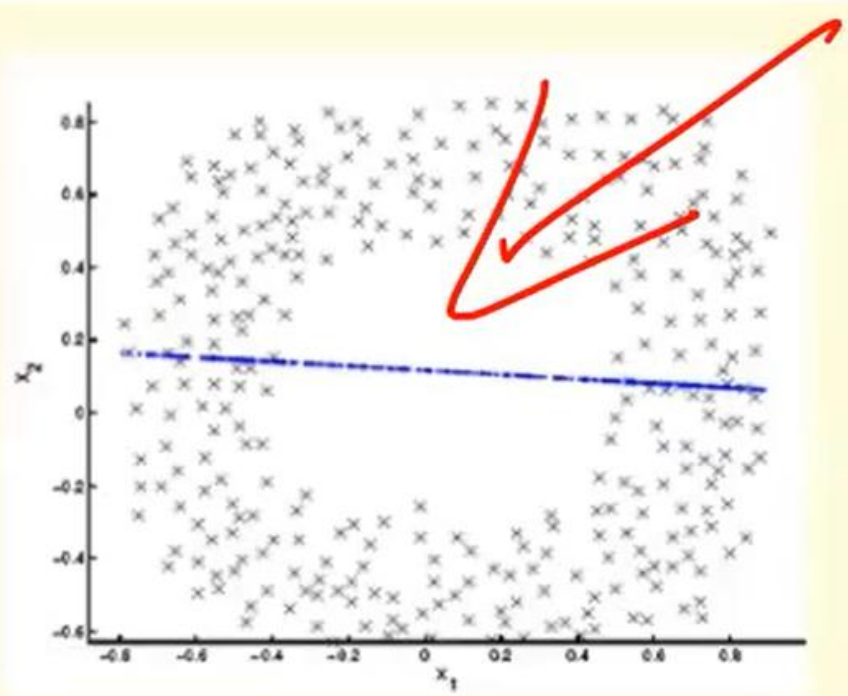


Linear Discriminant Analysis

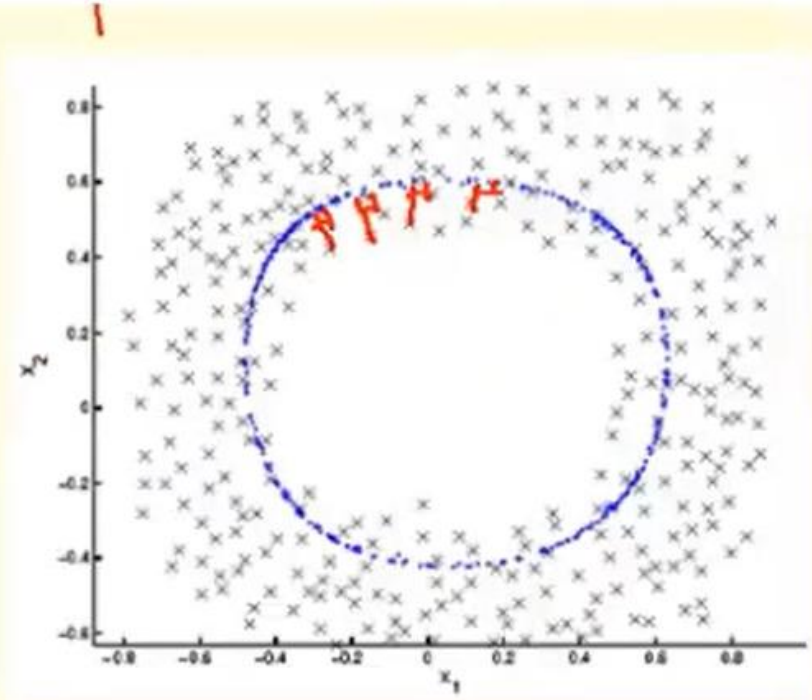


@hope_

Kernel PCA



PCA



KPCA