

PCA

Summary

PCA is one of the techniques for dimensionality reduction. The first axis is the eigenvector corresponds to the largest eigenvalue of the covariance matrix.

Examples

Consider two Gaussian distributions whose parameters are given as follows:

$$m_1 = \begin{bmatrix} 3 \\ 1 \end{bmatrix}, \Sigma_1 = \begin{bmatrix} 1 & 2 \\ 2 & 5 \end{bmatrix} \quad (1)$$

$$m_2 = \begin{bmatrix} 1 \\ 3 \end{bmatrix}, \Sigma_2 = \begin{bmatrix} 1 & 2 \\ 2 & 5 \end{bmatrix} \quad (2)$$

Apply PCA to the 2-d samples generated from the above two distributions by assuming two distributions as a single sample set. Draw the 1st principal axis on the scatter plot.

