19、

import numpy as np

X=np.array([

[1, -1],

[-1, -1]

])

np.cov(X)

output is

[[2., 0.],

[0., 0.]]

20、

The probability density of multivariate normal distribution is controlled by the eigenvector of covariance matrix, and the scaling is controlled by the eigenvalue

21

The first principal component explains the dimension projection of the part with the largest variance in the data.

22

The Principal Component Dimension is K hyperparameter, which means PCA will compress the data into a K dimensional space.

Principal Component Vector are typical independent: like:

[0, 1, 0]

[1, 0, 0]

30

No. For those two Gaussian distribution with different means and variances. Their decision boundary are not the same.

34

Yes. As we can see. The WetGrass depends on both Rain and Sprinkler. Hence, Rain and Sprinkler is not independent. If we knew it rained, it more likely to be on.