

Exercise 4

The dataset below represents casino customer behavior with two features per customer.

Use principal component analysis to project the data from 2 dimensions to 1 dimension

Show complete solutions

Casino Customers Dataet

Customer	Avg Bet per Visit (USD)	Visits per Month
A	1	2
B	2	3
C	3	4
D	4	5

Tasks

1. Plot the dataset on a 2 dimensional plane.
2. Compute the mean of each feature.
3. Center the dataset by subtracting the mean from each sample.
4. Write down the centered data matrix.
5. Compute the sample covariance matrix of the centered data.
6. Compute the eigenvalues of the covariance matrix.
7. Compute the corresponding eigenvectors.
8. Normalize the eigenvectors.
9. Check if the eigenvectors and eigenvalues are correct using $Av = \lambda v$
10. Identify the **first principal component**.
 - Explain why this component is chosen over the others.
11. Project the centered data onto the first principal component.
12. Write down the resulting 1-dimensional representation of each sample.