MMDS Lab Assessment
Lab-Assesment -1

Sujay Kumar 20BDS0294
https://github.com/sujaykumarmag/CSE3045
Computer Science Engineering with DataScience Specialization, VIT-Vellore
sujaykumarreddy.m2020@vitstudent.ac.in

September 26, 2023

1 Google Colab Link

https://colab.research.google.com/drive/1wx6PuXPtzfKKjSIIzW2QDMvCe2ftfXsQ?usp=sharing

2 Your task is to implement a program that performs eigenvalue decomposition on a given square matrix. Eigenvalue decomposition factorizes a matrix A into three matrices: P, D, and P-1, where P is a matrix containing the eigenvectors of A, D is a diagonal matrix containing the eigenvalues of A, and P-1 is the inverse of P.

```python
import numpy as np

# Input: Size of the square matrix
n = int(input())
# Input: Read the matrix A
A = []
for _ in range(n):
    row = list(map(float, input().split()))
    A.append(row)

A = np.array(A)

eigenvalues, eigenvectors = np.linalg.eig(A)


eigenvectors_inverse = np.linalg.inv(eigenvectors)

# Print the results
print("Eigenvalues:")
print(eigenvalues)

print("\nEigenvectors:")
print(eigenvectors)

print("\nInverse of Eigenvectors:")
print(eigenvectors_inverse)
```

2.1 Results

```
(base) sujaykumar@Sujays-MacBook-Air Application % python3 main.py
2
1 3
4 5
Eigenvalues:
[-1.  7.]

Eigenvectors:
[[-0.83205029 -0.4472136 ]
 [ 0.5547002  -0.89442719]]

Inverse of Eigenvectors:
[[-0.90138782  0.45069391]
 [-0.55901699 -0.83852549]]
(base) sujaykumar@Sujays-MacBook-Air Application %
```