Big Data Analytics ICP3A Report

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# Introduction

This report presents my work for the Big Data Analytics ICP3A assignment, demonstrating practical array operations, reshaping, and linear algebra computations using NumPy. These tasks provided hands-on experience with core numerical operations, which form the basis of many data science and machine learning workflows.

# Task A: Random Vector and Reshape

Generated a random vector of integers, reshaped it into a 3x5 matrix, printed its shape, and replaced the maximum element in each row with zero.

# Task B: 2D Array Properties

Created a 2-dimensional array of size 4x3 composed of 4-byte integer elements. Printed the array’s shape, type, and data type to understand its structure.

# Task C: Eigenvalues and Eigenvectors

Computed the eigenvalues and right eigenvectors of a given 2x2 square matrix using NumPy’s linear algebra module.

# Task D: Sum of Diagonal Elements

Calculated the sum of diagonal elements for a given 2x3 array to practice matrix trace operations.

# Task E: Reshaping Array

Reshaped a given 3x2 array into a 2x3 array without changing its data, demonstrating NumPy’s reshape capabilities.

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# Key Highlights

- Practiced core array operations using NumPy.  
- Performed linear algebra computations such as eigen decomposition.  
- Applied reshaping and element-wise operations for data transformation.  
- Strengthened understanding of how NumPy arrays store and handle data.

# Conclusion

Through these tasks, I gained practical experience with NumPy’s array manipulation, matrix operations, and linear algebra functions. These skills are essential for efficient data preprocessing and numerical computations in real-world data science projects.

**## Video Recording Link**

A screen recording of my full notebook walkthrough, including code explanations and output demonstrations, is available here:

<https://drive.google.com/file/d/1kjNilB_xgl4KVUp7fP8MpXLJ4hl4H2ur/view?usp=sharing>