



DAILY WORK
REPORT
TR-02

INFOWIZ
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Day 7: NumPy Basics

Summary: Today, we embarked on our journey into data manipulation and numerical operations in Python using NumPy, a fundamental library for scientific computing. NumPy's array-based computing capabilities enable efficient handling of large datasets and implementation of mathematical operations essential for machine learning.

Key Learnings:

1. Introduction to NumPy:

- **Arrays:** Explored NumPy arrays as a powerful data structure for representing homogeneous multidimensional data. Compared to Python lists, NumPy arrays offer optimised operations and efficient memory usage.
- **Array Creation:** Learned various methods to create NumPy arrays, including initialising arrays from Python lists, using built-in functions like `np.zeros()` and `np.ones()`, and generating arrays with linearly spaced or random values.
- **Array Attributes:** Examined essential attributes of NumPy arrays, such as shape (dimensions), size (total number of elements), dtype (data type), and strides (memory layout information).

2. Array Operations:

- **Element-wise Operations:** Explored how NumPy facilitates element-wise operations on arrays, allowing efficient computation of arithmetic operations, logical comparisons, and mathematical functions across array elements.
- **Broadcasting:** Introduced to broadcasting rules in NumPy, enabling operations between arrays of different shapes by automatically aligning dimensions where possible, promoting code simplicity and efficiency.

3. Practical Applications:

- Applied NumPy arrays and operations to perform basic data manipulation tasks essential for machine learning:
 - Calculated descriptive statistics (mean, median, standard deviation) of dataset columns.
 - Reshaped arrays to conform to input requirements of machine learning models.
 - Implemented vectorized operations to enhance computational efficiency and code readability.