Day 4 – 26 June 2024 Training Day 4 Report **Date:** 26 June 2024
**Topic:** Python Libraries Overview and Introduction to NumPy

**Summary:**
On the fourth day of the Machine Learning training, we started exploring Python libraries that are widely used in data science and machine learning. The trainer introduced us to the concept of libraries and packages in Python — collections of pre-written code that help perform specific tasks easily. We learned how to install libraries using the *pip install* command and how to import them in Python using the *import* statement.

The main focus of the session was on the **NumPy library**, which is one of the most important Python libraries for numerical computing. We learned that NumPy stands for *Numerical Python* and is used for handling large data efficiently using arrays. The trainer explained the difference between Python lists and NumPy arrays — NumPy arrays are faster, more memory-efficient, and support advanced mathematical operations.

We learned how to create NumPy arrays using the *array()* function, and also explored various functions like *zeros()*, *ones()*, *arange()*, and *linspace()*. The trainer demonstrated how mathematical operations such as addition, subtraction, multiplication, and division can be done directly on arrays without using loops.

We also practiced a few small programs to perform element-wise operations and explored the concept of array indexing and slicing.

**Key Learnings:**
• Learned what Python libraries and packages are and how to install/import them.
• Understood the importance and use of the NumPy library.
• Learned how to create and manipulate NumPy arrays.
• Practiced basic mathematical operations on arrays.
• Explored indexing and slicing in NumPy arrays.

**Conclusion:**
Day 4 of the training gave me a clear understanding of the importance of libraries in Python, especially NumPy. I realized how NumPy simplifies complex numerical operations and helps handle data efficiently, which will be very useful for future topics like data analysis and machine learning.