

CHAPTER 10

NumPy

NumPy is a Python library optimized for numerical computing. It bears close semblance with MATLAB and is equally as powerful when used in conjunction with other packages such as SciPy for various scientific functions, Matplotlib for visualization, and Pandas for data analysis. NumPy is short for numerical python.

NumPy's core strength lies in its ability to create and manipulate n-dimensional arrays. This is particularly critical for building machine learning and deep learning models. Data is often represented in a matrix-like grid of rows and columns, where each row represents an observation and each column a variable or feature. Hence, NumPy's 2-D array is a natural fit for storing and manipulating datasets.

This tutorial will cover the basics of NumPy to get you very comfortable working with the package and also get you to appreciate the thinking behind how NumPy works. This understanding forms a foundation from which one can extend and seek solutions from the NumPy reference documentation when a specific functionality is needed.

To begin using NumPy, we'll start by importing the NumPy module:

```
import numpy as np
```

NumPy 1-D Array

Let's create a simple 1-D NumPy array:

```
my_array = np.array([2,4,6,8,10])  
my_array  
'Output': array([ 2,  4,  6,  8, 10])  
# the data-type of a NumPy array is the ndarray  
type(my_array)  
'Output': numpy.ndarray
```