Python NumPy

This Python NumPy Tutorial helps you learn NumPy from scratch so that you can use it effectively in your data science & machine learning projects.

What you'll learn

- Create single and multi-dimensional NumPy arrays
- Effectively use NumPy built-in functions & methods
- Perform mathematical operations on arrays
- Extract elements from arrays using slicing and indexing
- Select elements of arrays conditionally.

Section 1. Getting started

- What is NumPy (https://www.pythontutorial.net/python-numpy/what-is-numpy/) – learn what NumPy is and what it can do for you.

Section 2. Creating arrays

- Creating arrays (https://www.pythontutorial.net/python-numpy/create-numpy-array/) – show you how to create numpy arrays.
- zeros() (https://www.pythontutorial.net/python-numpy/numpy-zeros/) – create a numpy array of a given shape whose elements are filled with zeros.
- ones() (https://www.pythontutorial.net/python-numpy/numpy-ones/) – create a numpy array of a given shape whose elements are filled with ones.
- arange() (https://www.pythontutorial.net/python-numpy/numpy-arange/) – create a numpy array with evenly spaced numbers.
- linspace() (https://www.pythontutorial.net/python-numpy/numpy-linspace/) – create a new numpy array with evenly spaced numbers of a specified interval.

Section 3. Array indexing & slicing

- Indexing (https://www.pythontutorial.net/python-numpy/numpy-array-indexing/) – learn how to select elements using indexing.
- Slicing (https://www.pythontutorial.net/python-numpy/numpy-array-slicing/) – show you how to use slices to extract elements from an array.
- Fancy indexing (https://www.pythontutorial.net/python-numpy/fancy-indexing/) – learn how to index a numpy array using another numpy array.
- Boolean indexing (https://www.pythontutorial.net/python-numpy/boolean-indexing/) – guide you on how to index an array using another array of boolean values.
- View vs. copy (https://www.pythontutorial.net/python-numpy/numpy-copy/) – show you the difference between a view & copy of an array and how to use the copy() method to make a copy of an array.

Section 4. Aggregate functions

- sum() (https://www.pythontutorial.net/python-numpy/numpy-sum/) – return the sum of all elements
- mean() (https://www.pythontutorial.net/python-numpy/numpy-mean/) – return the average of all elements in an array.
- var() (https://www.pythontutorial.net/python-numpy/numpy-var/) – return the variance of all elements in an array.
- std() (https://www.pythontutorial.net/python-numpy/numpy-std/) – calculate the standard deviation of elements of an array.
- prod() (https://www.pythontutorial.net/python-numpy/numpy-prod/) – return the product of all elements.
- amin() (https://www.pythontutorial.net/python-numpy/numpy-amin/) – return the minimum value in an array.
- amax() (https://www.pythontutorial.net/python-numpy/numpy-amax/) – return the maximum value in an array.
- all() (https://www.pythontutorial.net/python-numpy/numpy-all/) – return `True` if all elements in an array evaluate to `True`.
- any() (https://www.pythontutorial.net/python-numpy/numpy-any/) – return True if any of the elements in an array is nonzero.

Section 5. Array operations

- reshape() (https://www.pythontutorial.net/python-numpy/numpy-reshape/) – give an array a new shape while keeping the same elements.
- transpose() (https://www.pythontutorial.net/python-numpy/numpy-transpose/) – return a view of an array with axes transposed.
- sort() (https://www.pythontutorial.net/python-numpy/numpy-sort/) – return a sorted copy of an array.

- flatten() (https://www.pythontutorial.net/python-numpy/numpy-flatten/) – return a copy of an array collapsed into one dimension.
- ravel() (https://www.pythontutorial.net/python-numpy/numpy-ravel/) – return a contiguous flattened array.

Section 6. Arithmetic operations

- add() (https://www.pythontutorial.net/python-numpy/numpy-add/) – return the sum of two equal-sized arrays.
- subtract() (https://www.pythontutorial.net/python-numpy/numpy-subtract/) – return the difference between two equal-sized arrays.
- multiply() (https://www.pythontutorial.net/python-numpy/numpy-multiply/) – return the product of two equal-sized arrays.
- divide() (https://www.pythontutorial.net/python-numpy/numpy-divide/) – return the quotient of two equal-sized arrays.
- Broadcasting (https://www.pythontutorial.net/python-numpy/numpy-broadcasting/) – show you how NumPy uses broadcasting to perform arithmetic operations on arrays with different shapes.

Section 7. Joining & splitting arrays

- concatenate() (https://www.pythontutorial.net/python-numpy/numpy-concatenate/) – join two or more arrays along an existing axis.
- stack() (https://www.pythontutorial.net/python-numpy/numpy-stack/) – join two or more arrays along a new axis.
- vstack() (https://www.pythontutorial.net/python-numpy/numpy-vstack/) – join two or more arrays vertically.

- hstack() (https://www.pythontutorial.net/python-numpy/numpy-hstack/) – join two or more arrays horizontally.
- split() (https://www.pythontutorial.net/python-numpy/numpy-split/) – split an array into subarrays.