

Summary

NumPy

NumPy or Numerical Python is the mathematical library of Python that operates on arrays.

Introduction to arrays

Initialising an array using a list:

| Operator | Example (Input) | Example (Output) |
|------------|--|----------------------|
| np.array() | array_1d = np.array([2, 4, 5, 6, 7, 9]) print(array_1d) | [2 4 5 6 7 9] |
| | array_2d = np.array([[2, 3, 4], [5, 8, 7]]) print(array_2d) | [[2 3 4] [5 8 7]] |

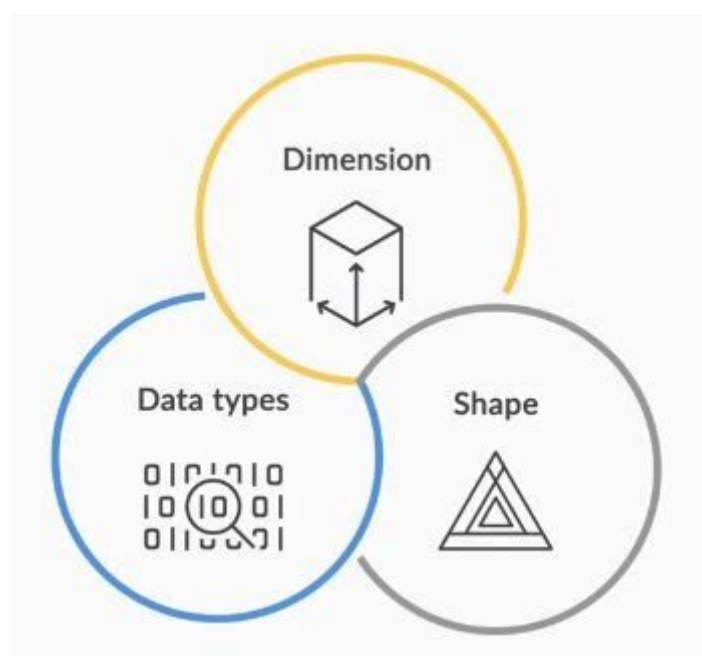
Creating and Initialising an array

Different ways of creating and initialising an array:

| Operator | Explanation |
|-----------------------------------|--|
| <code>np.array()</code> | Convert lists or tuples to arrays |
| <code>np.ones()</code> | Create an array of 1s |
| <code>np.zeros()</code> | Create an array of 0s |
| <code>np.random.random()</code> | Create an array of random numbers between 0 and 1 |
| <code>np.arange()</code> | Create an array with increments of a fixed step size |
| <code>np.linspace()</code> | Create an array of fixed length |
| <code>np.full()</code> | Create a constant array of any number 'n' |
| <code>np.tile():</code> | Create a new array — by repeating an existing array — for a particular number of times |
| <code>np.random.randint():</code> | Create a random array of integers within a particular range |

Structure and Content of an Array

Important attributes of an array and how to identify them:



| Operator | Explanation | Example |
|------------------------|--|---|
| <code>.shape</code> | Shape of array (n x m) | <code>print("Shape: {}".format(rand_array.shape))</code> |
| <code>.dtype</code> | data type (int, float etc.) | <code>print("dtype: {}".format(rand_array.dtype))</code> |
| <code>.ndim</code> | Number of dimensions (or axes) | <code>print("Dimensions: {}".format(rand_array.ndim))</code> |
| <code>.itemsize</code> | Memory used by each array element in bytes | <code>print("Item size: {}".format(rand_array.itemsize))</code> |

Loading, Indexing and Iterating through an Array

Navigating through an array:



Basic Statistical Operations in NumPy

The different functions:

| Operator | Explanation | Example |
|--------------------------|--|--|
| <code>np.mean()</code> | Calculate the mean of an array (of the entire array or along either of the axis) | <code>np.mean(array_name, axis)</code> |
| <code>np.median()</code> | Calculate the median of an array (of the entire array or along either of the axis) | <code>np.median(array_name, axis)</code> |
| <code>np.std()</code> | Calculate the standard deviation of an array (of the entire array or along either of the axis) | <code>np.std(array_name, axis)</code> |
| <code>np.var()</code> | Calculate the variance of an array (of the entire array or along either of the axis) | <code>np.var(array_name, axis)</code> |

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