

NUMPY CHEAT SHEET

What is Numpy?

Numpy is a numeric data manipulation that we use in Python. It is optimized for fast computations. We often use Numpy as a complimentary toolkit when modifying Pandas data, but Numpy is also very important for machine learning.

Axes

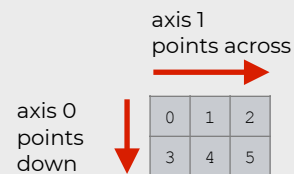
Axes are like directions along an array, like coordinate axes in a Euclidean geometric space.

We often use axes to perform Numpy computations and data wrangling operations.

IN A 1-D ARRAY, THERE IS ONLY ONE AXIS



2-D ARRAYS HAVE 2 AXES



Simple Array Creation Functions

Create array from list	<code>np.array([1,2,3,4])</code>
Create array from start to stop, in increments	<code>np.arange(start=1, stop=10, step=2)</code>
Crear array with num evenly spaced values	<code>np.linspace(start=0, stop=100, num=10)</code>
Create array with 1s	<code>np.ones(shape = (2,3))</code>
Create array with 0s	<code>np.zeros(shape = (2,3))</code>
Create array with 'junk'	<code>np.empty(shape = (2,3))</code>
Create array full of the same value	<code>np.full(shape = (2,3), fill_value=7)</code>

Save to and Load from .npy file

Save array to .npy file	<code>np.save('my_array_temp.npy', my_array)</code>
Load array from .npy file	<code>np.load('my_array_temp.npy')</code>

Numpy Random Functions

Set the seed for the Numpy pseudo random number generator	<code>np.random.seed(42)</code>
Create normal distributed data with specific mean and standard deviation	<code>np.random.normal(shape=3, loc=2, scale=5)</code>
Create array of integers within range of low/high	<code>np.random.randint(size=3, low=1, high=10)</code>
Create array of uniformly distributed values within range of low/high	<code>np.random.uniform(size=3, low=90, high=100)</code>
Create array of values, chosen randomly from a set of possible values	<code>coins = ['heads', 'tails'] np.random.choice(a=coins, size=3)</code>

Numpy Aggregation Functions

Compute the minimum value of an array	<code>min_0 = np.array([91,92,93,0,95]) np.min(min_0)</code>
Compute the maximum value of an array	<code>max_100 = np.array([1,2,3,100,5]) np.max(max_100)</code>
Compute the mean of the values of an array	<code>norm_5 = np.random.normal(size = 5) np.mean(norm_5)</code>
Compute the median of the values of an array	<code>norm_5 = np.random.normal(size = 5) np.median(norm_5)</code>
Sum the values of an array	<code>array_evens = np.array([0,2,4,6,8,10]) np.sum(array_evens)</code>

Numpy Array Splitting Functions

Split array horizontally at specific index position	<code>myarray = np.array([1,2,3,4,5]) np.hsplit(myarray, [2])</code>
Split array vertically at specific index position	<code>array_2d = np.array([[1,2],[3,4],[5,6]]) np.vsplit(array_2d, [2])</code>
Split array at specific position, along specific axis	<code>array_2d = np.array([[1,2],[3,4],[5,6]]) np.split(array_2d, [1], axis = 1)</code>

Save to and Load from .txt file

Save array to .txt file	<code>np.savetxt('my_numpy_data.txt', my_array)</code>
Load array from .txt file	<code>np.loadtxt('my_numpy_data.txt')</code>

Array Combination/Stacking Functions

Concatenate/combine arrays along specific axis	<code>zeros_1d = np.array([0,0]) ones_1d = np.array([1,1]) np.concatenate([zeros_1d, ones_1d],axis=0)</code>
Append new values along a specific axis	<code>ones_2x2 = np.ones(shape=(2, 2),dtype=int) extra_8s = np.array([[8,8]]) np.append(ones_2x2, extra_8s, axis = 0)</code>
Stack arrays horizontally	<code>np.hstack([[0,0],[1,1]])</code>
Stack arrays vertically	<code>np.vstack([[0,0],[1,1]])</code>
Repeat the elements of an array a specific number of times, along a specific axis	<code>array_2d = np.array([[6,7],[8,9]]) np.repeat(a=array_2d, repeats=2, axis=1)</code>
Repeats an array as a unit, like a repeatable tile	<code>np.tile(simple_array, reps = [3,2])</code>

Math Functions

Compute the log every value in an array	<code>np.log([1,2,3,4])</code>
Compute the exponential of every value in an array	<code>np.exp([1,2,4,9,16])</code>
Compute the square root of every value in an array	<code>np.sqrt([1,2,4,9,16])</code>
Compute the power of every value in an array	<code>np.power([0,1,2,3,4], 3)</code>

Misc Numpy Functions

Transpose the axes of an array	<code>np.transpose([[1,2,3], [4,5,6]])</code>
Output different values based on evaluation of logical condition	<code>myarray = np.array([0,1,2,3,4]) np.where(myarray > 2, True, False)</code>
Create coordinates for grid of values. (Often used for plotting)	<code>np.meshgrid([1,2,3], [5,6,7])</code>
Flatten a multi-dimensional array into a 1D array.	<code>myarray = np.array([[1,2,3],[4,5,6]]) myarray.flatten()</code>

Save and Load multiple arrays

Save multiple arrays to .npz file	<code>np.savez('my_arrays_temp.npz', array1, array2)</code>
Load multiple arrays from .npz file	<code>loaded_arrays = np.load('my_arrays_temp.npz')</code>