INSAID

Numpy Basics Cheatsheet 1.0

Import Numpy

import numpy as np

Shorthand used: arr | A NumPy Array object

Importing/Exporting Data

From a text file	np.loadtxt('file.txt')
From a CSV file	np.genfromtxt('file.csv',delimiter=',')
Writes to a text file	np.savetxt('file.txt',arr,delimiter=' ')
Writes to a CSV file	np.savetxt('file.csv',arr,delimiter=',')

Creating Arrays

One dimensional array	np.array([1,2,3])
Two dimensional array	np.array([(1,2,3),(4,5,6)])
1D array of length 3 all values 0	np.zeros(3)
3x4 array with all values 1	np.ones((3,4))
5x5 array of 0 with 1 on diagonal (Identity matrix)	np.eye(5)
Array of 6 evenly divided values from 0 to 100	np.linspace(0,100,6)
Array of values from 0 to less than 10 with step 3 (eg [0,3,6,9])	np.arange(0,10,3)
2x3 array with all values 8	np.full((2,3),8)
4x5 array of random floats between 0–1	np.random.rand(4,5)
6x7 array of random floats between 0–100	np.random.rand(6,7)*100
2x3 array with random ints between 0–4	np.random.randint(5,size=(2,3))

Inspecting Properties

Returns number of elements in arr	arr.size
Returns dimensions of arr (rows,columns)	arr.shape
Returns type of elements in arr	arr.dtype
Convert arr elements to type	arr.astype(dtype)
Convert arr to a Python	dtypearr.tolist()
View documentation for np.eye	np.info(np.eye)

Copying/sorting/reshaping

Copies arr to new memory	np.copy(arr)
Creates view of arr elements with type	arr.view(dtype)
Sorts arr	arr.sort()
Sorts specific axis of arr	arr.sort(axis=0)
Flattens 2D array two_d_arr to 1D	two_d_arr.flatten()
Transposes arr (rows become columns and vice versa)	arr.T
Reshapes arr to 3 rows, 4 columns without changing data	arr.reshape(3,4)
Changes arr shape to 5x6 and fills new values with 0	arr.resize((5,6))

Adding/removing Elements

Appends values to end of arr	np.append(arr,values)
Inserts values into arr before index 2	np.insert(arr,2,values)
Deletes row on index 3 of arr	np.delete(arr,3,axis=0)
Deletes column on index 4 of arr	np.delete(arr,4,axis=1)

Combining/Splitting

Adds arr2 as rows to the end of arr1	np.concatenate((arr1,arr2),axis=0)
Adds arr2 as columns to end of arr1	np.concatenate((arr1,arr2),axis=1)
Splits arr into 3 sub-arrays	np.split(arr,3)
Splits arr horizontally on the 5th index	np.hsplit(arr,5)

Adding/removing Elements

Returns the element at index 5	arr[5]
Returns the 2D array element on index [2][5]	arr[2,5]
Assigns array element on index 1 the value 4	arr[1]=4
Assigns array element on index [1][3] the value 10	arr[1,3]=10

Adding/removing Elements

Returns the elements at indices 0,1,2 (On a 2D array: returns rows 0,1,2)	arr[0:3]
Returns the elements on rows 0,1,2 at column 4	arr[0:3,4]
Returns the elements at indices 0,1 (On a 2D array: returns rows 0,1)	arr[:2]
Returns the elements at index 1 on all rows	arr[:,1]
Returns an array with boolean values	arr<5
Returns an array with boolean values	(arr1<3) & (arr2>5)
Inverts a boolean array	~arr
Returns array elements smaller than 5	arr[arr<5]

Scalar Math

Add 1 to each array element	np.add(arr,1)
Subtract 2 from each array element	np.subtract(arr,2)
Multiply each array element by 3	np.multiply(arr,3)
Divide each array element by 4 (returns np.nan for division by zero)	np.divide(arr,4)
Raise each array element to the 5th power	np.power(arr,5)

Statistics

Returns mean along specific axis	np.mean(arr,axis=0)
Returns sum of arr	arr.sum()
Returns minimum value of arr	arr.min()
Returns maximum value of specific axis	arr.max(axis=0)
Returns the variance of array	np.var(arr)
Returns the standard deviation of specific axis	np.std(arr,axis=1)
Returns correlation coefficient of array	arr.corrcoef()
Elementwise add arr2 to arr1	np.add(arr1,arr2)
Elementwise subtract arr2 from arr1	np.subtract(arr1,arr2)
Elementwise multiply arr1 by arr2	np.multiply(arr1,arr2)