Numpy

July 1, 2020

1 Basics of Numpy_Module1

1.1 Different ways of creating and initializing a Numpy Array

1.1.1 Importing Numpy Library

[1]:
```
import numpy as np
```

1.1.2 1) Creating Arrays from Python Lists

[2]:
```
#integer array
np.array([1,2,3,4])
```

[2]:
```
array([1, 2, 3, 4])
```

If the types doesnt match numpy will **upcast** if possible

[3]:
```
np.array([1,2,3.0,4.6])
```

[3]:
```
array([1. , 2. , 3. , 4.6])
```

We can explicitly set the datatype of the array

[5]:
```
np.array([1,2,3,4],dtype='float')
```

[5]:
```
array([1., 2., 3., 4.])
```

Multi-dimensional array

[6]:
```
np.array([[1,2,3],[4,5,6],[7,8,9]])
```

[6]:
```
array([[1, 2, 3],
       [4, 5, 6],
       [7, 8, 9]])
```

1.2 2) Creating Arrays from Scratch

[7]:
```
# create an array of lenght 10 whose elements are zeros and whose datatype is int
np.zeros(10,np.int)
```

[7]:
```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0])
```

[8]:
```
#create a multi-dimensional array of size (3,3) with all the elements as ones
np.ones((3,3),np.int)
```

[8]:
```
array([[1, 1, 1],
       [1, 1, 1],
       [1, 1, 1]])
```

[10]:
```
#create a 3X5 array filled with same element
np.full((3,5),45)
```

[10]:
```
array([[45, 45, 45, 45, 45],
       [45, 45, 45, 45, 45],
       [45, 45, 45, 45, 45]])
```

[11]:
```
#create an array with linear sequence starting at 0 and ending at 10 with step␣
 ↪value as 2
np.arange(0,10,2)
```

[11]:
```
array([0, 2, 4, 6, 8])
```

[12]:
```
#create an array of 5 elements evenly spaced between 0 and 2
np.linspace(0,2,5)
```

[12]:
```
array([0. , 0.5, 1. , 1.5, 2. ])
```

[17]:
```
#create a 3X3 array whose elements are uniformly distributed between 0 and 1
np.random.random((3,3))
```

[17]:
```
array([[0.81837567, 0.29440202, 0.82997585],
       [0.19343424, 0.46879125, 0.97998668],
       [0.16599682, 0.1363086 , 0.82401529]])
```

[19]:
```
#create an array of size 3X4 whose values lie between (0,20)
np.random.randint(0,20,(3,4),np.int32)
```

[19]:
```
array([[18,  9, 13,  9],
       [ 6, 17,  1, 10],
       [10,  3, 17,  7]])
```

[23]:
```
#create an identity matrix of size 4X4
np.eye(4,4)
```

[23]:
```
array([[1., 0., 0., 0.],
       [0., 1., 0., 0.],
       [0., 0., 1., 0.],
       [0., 0., 0., 1.]])
```

[25]:
```
#create an array with uninitialized integers
np.empty((3,3))
```

[25]:
```
array([[0.81837567, 0.29440202, 0.82997585],
       [0.19343424, 0.46879125, 0.97998668],
       [0.16599682, 0.1363086 , 0.82401529]])
```

[1]:
```
#above values are not initialized, they are the values present it current memory␣
 ↪location
```

[ ]:
```

```