NUMPY

DAY 1

(DAY 11 OF DATA SCIENCE)

First install numpy :-

Open command in window>run “pip install numpy”

Now, there is a question developed.

Why numpy(Numerical Python)?

Answer :-

As a we know list is an alternative of array.

But when data science introduced then large number of data is being stored in list but time complexity of list is very high because list use dynamic and referential array concept. That's why numpy is introduced to solve this problem because it is memory efficient, used for working with array. A numpy array is like special list in python with same data type.

So, we will create Array and deal with array in numpy or we can say that we will convert lists into arrays.

Creation Of An Array

# creation of an araay

arr = np.array([25,41,63,66,85,74])

arr

type(arr)

# ndarray -> n dimensional array

arr.size #no. of item

len(arr)

To Check Dimension Of An Array

# to check the dimension of array

arr.ndim

To Check Data Type Of Array

# to check data type of array

arr.dtype

As we know, array take similar type of items.

If a single element in array is string then array will convert all element into string.

And same for float.

arr2 =np.array([25,41,63,66,85,74,'upflairs',True]) # make all data into string

arr2.dtype

print(arr2)

Indexing And Slicing In This Same As List As We Learn Earliar

# slicing is same as previous

print(arr[3])

print(arr[-1])

print(arr[2:5])

print(arr[:6]) # print from start

print(arr[2:]) # print till end

print(arr[2::2]) # jump is 2

To Update/Manipulate Value Of Array

arr[-1]=53

Add, Subtract,... Specific Number To Every Element In An Array

arr + 2 # add 2 in every element

**Now Let's Consider 2 Dimensional Array(arrays Under An Array).It Means There Are Several Single Dimension Array In An Array :-**

Create 2D list: -

ls = [[1,2,3],[4,5,6],[7,8,9]]

type(ls)

print(ls[0][2])

Now change list into array or we can define array independently

arr3 = np.array(ls) # here we convert list into array

print(arr3)

print(arr3.ndim)

Find Shape Of Array

# find no. of rows and column

arr3.shape #(row,column)

Excessing in 2 dimensional array.

print(arr3[0]) #excessing single row

print(arr3[0][1]) #excessing a single element

print(arr3[2][2])

# excessing multiple rows

arr3[0:2] # it will show 0th and 1st index row

# excessing multiple elements

# arr[row,column] -> [row start:row end,col start : col end]

print(arr[1:,1:]) # print 5,6,8,9

We Can Instant Make An Array With Random Number In Which We Can Decide Number Of Elements And Range In Which Random Numbers Should Lie.

arr4 = np.random.randint(1,200,500) #it will instant make array of 500 element from 1 to 200

arr4

Now For Understanding Filter All Those Elements That Are Less Than Equal To 100 In Above Array.

# arr filter all those items that are less than equal to 100

# count =0

# for item in arr4 :

# if (item<100 or item == 100) :

# count+=1

# print(count)

arr4<=100 # give true and false in array

arr4[arr4<=100] #filter above arr4 which have true

arr4[arr4<=100].size

len(arr4[arr4<=100])

Creating 2 D Random Array

arr2 = np.random.randint(1,200,(10,6))

arr2

Creating Random 3 D Array

arr2 = np.random.randint(1,200,(10,6,3))

arr2

Creating Single Dimensional Array Having Value 0 For Every Element

arr = np.zeros(10) #single dimensional array with 10 element having 0 value

arr

2 D:-

arr = np.zeros((10,5)) #2 d array

arr

Creating Single And Two Dimensional Array Having Value 1 For Every Element

arr = np.ones(10)

arr1 = np.ones((10,5))

Creating A List In A Range

ls = list(range(0,10)) #creating a list in a range

ls

Creating An Array In A Range

# arange create only single dimension array

arr = np.arange(60) #creating an array in a range

arr

If We Want To Convert 1d Into 2d Array Then We Have To Decide No. Of Rows And Column

arr = arr.reshape(10,6)

# arr.reshape(10,7) # can't divide 60 element into 10,7

arr

DAY 2

Creation of 3D Array

# Creation of 3D array

# arr = [2D,2D,2D,2D....]

# these are lists given below,not actual array

arr1D = [1,2,3]

arr2D = [[1,2,3],[1,2,3],[1,2,3]]

arr3D = [[[1,2,3],[1,2,3],[1,2,3]],[[1,2,3],[1,2,3],[1,2,3]]]

Now Convert arr3d List Into Array

arr = np.array(arr3D)

Create Random Array Of 3d Array

arr3 = np.random.randint(1,200,(3,5,3))

arr3

# (table no. =3 , rows no.=5 , column no.=3)

Indexing Of 3 Dimension Array :-

indexing --> arr[table,row,column],

arr[table-start:end,row-start:end,column-start:end]

arr3[1,4,0:]

arr3[2,:2,1:]

Accessing First Row Of Every Table Of Arr3

arr3[:,1,:] #accessing first row of every table

**Some Functionality Of Numpy**

Let's Consider An Array

arr = np.array([9,7,8])

Minimum Of Array

# minimum of array

min(arr)

Maximum Of Array

# maximum of array

max(arr)

Mean Of Array

# mean of array

np.mean(arr)

Sum Of Array

# sum of array

np.sum(arr)

Index Of Minimum Element

# index of minimum element

np.argmin(arr)

Index Of Maximum Element

# index of maximum element

np.argmax(arr)

Sorting Of Array

# sorting of array

arr.sort() #ascending order

arr

Descending Order

arr[::-1] #descending order

So Till Now We Learn Accessing , Manipulating An 1d,2d,3d Array.

Creating Instant Array And Sum Functions Like Min, max,sum,mean,sort,argmin,argmax Etc.