

2014

1st Week • 003-362

03

JANUARY

FRIDAY

03 // Tensor

~~Tensor~~ → medium to store no. in matrix

Tensor is basically a data structure - that define 'THE WAY' to store their data. It's mostly a 'CONTAINER' where 98.9% stores numbers, in some case 'string' might be.

A Tensor is a 'N-DIMENSIONAL' Matrix.

Tensor is important in ML & DL, - because - it provides a powerful & efficient way to represent & manipulate data.

Tensor is the 'FUNDAMENTAL BUILDING BLOCKS' for representing i/p data, model parameters.

TYPES  $\Rightarrow$

① 0D TENSOR - ALSO CALLED 'SCALAR'

A scalar is a 0-dimensional tensor.

- A SCALAR is a single Number.

- It has 0 axes.

- It has Rank of 0.

" `a = np.array(5)` "

[ 1 ]

② 1D TENSOR - ALSO CALLED 'VECTOR'

FEBRUARY

2014

M	T	W	T	F	S	S	M	T	W	T	F	S	S
10	11	12	13	14	15	16	17	18	19	20	21	22	23
24	25	26	27	28									

Notes:  
 - Python has no native built-in data structures.  
 - Hence  
 - np.array([1, 2, 3, 4])  
 - np.array([1, 2, 3, 4]).shape = [4, 1]

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2014

## SATURDAY

JANUARY

A vector is an array of numbers.

1	2	3
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1D - Tensor  
(vector)

- It has 1 Axis.  $(x)$
  - It has a Rank of 1.
  - It is a 1-Dimensional Tensor.

" q = np.array([1, 2, 5, 7]) "  
q.ndim  
1D Tensor | BUT | 6D vector

03

**2D Tensor** — ALSO called 'MATRIX'

1	2	3
4	5	6
7	8	9

## 2D-Tensor (Matrix)

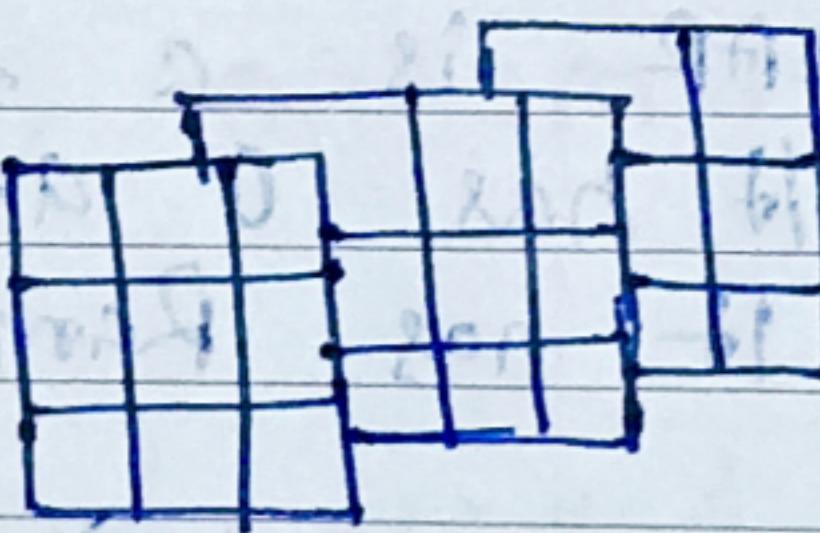
A Matrix is a 2-dimensional array

- It has 2 Axis. (x, y)
  - It has Rank of 2
  - It also collection of Vector.

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

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## N-D TENSOR



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*05 - Sunday*

## SCALAR

# VECTOR

# MATRIX

# TENSOR

6D10

4310

21

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Notes : Dim. of vector = no. of array's  
(elements)

$[1, 2, 3, 4, 5]$  = dim of vector = 5D vec  
= 1D Tensor