Day-1

Artificial Neural Network.

09.00

10.00 ● Multiple Neurons → I/P → Brain → O/P → Senses environment, processes & then predicts an O/P (appropriate)

11.00 Neural Network

12.00 * When same functionality of human brain is achieved artificially, it is ANN.

01.00

02.00 * Neuron ⟷ Node (both are replica of each other, perform same function.

03.00 * Node → 2 parts

04.00 Summation Σ → $\sum x_i w_i = x_1 w_1 + x_2 w_2 + \dots x_n w_n$ (Input to activation function).

05.00 Function f → $y = f(\sum x_i w_i)$ → Activation function

Evening

* $x_1, x_2 \dots x_n$ are many signals which are received from various sensory organs / nodes. With ~~every~~ each signal, a weight is associated respectively ($w_1, w_2 \dots w_n$)

Meeting ✓ Think To Do ✓ Important Calls ✓

→ Summation Σ calculates the weighted sum

$$= x_1w_1 + x_2w_2 + \dots x_nw_n.$$

→ This weighted sum goes as an I/P to function/ activation func^n which an appropriates ~~an~~ O/P for a particular node.

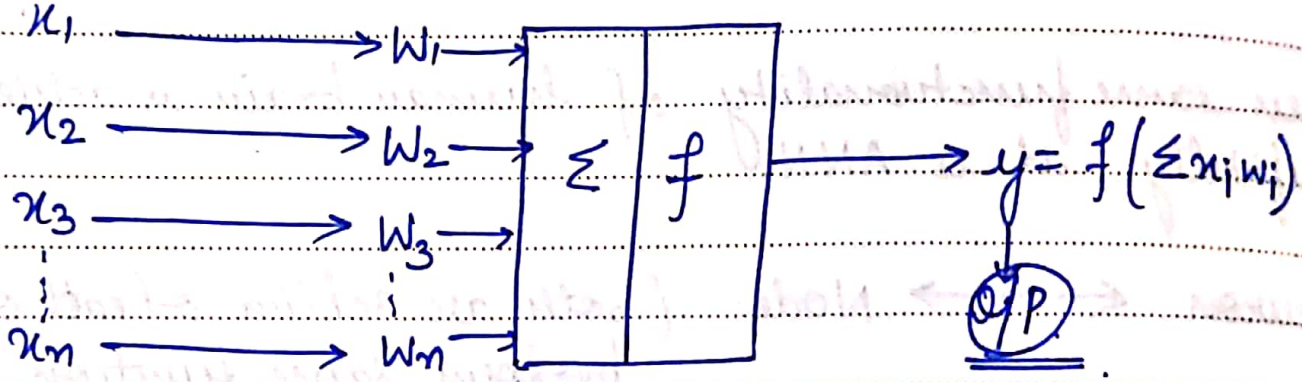
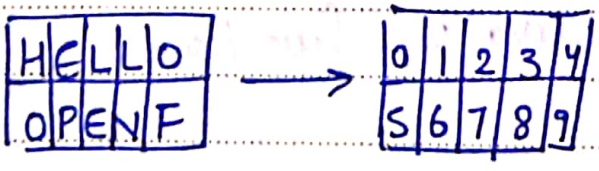


Image processing through Open CV in python:-

* Each pixel's brightness in an Image is represented by a single 8 bit number, whose range is from 0 (black) to 255 (white).

In a computer memory, pixels are stored as a continuous array (1-D array).



HELLO OPENF

↑↑↑ . . . .

In memory

Computers ~~it~~ read these colours as a series of 3 values- Red, Blue, green → RGB on the 0-255 scale.

To colourise any image we need its i X j X 3 values

Evening

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✓ Think To Do

✓ Important Calls

① Accessing pixel in an Image. → Using Array Indexing

09.00 pixel = image_name[100,100] # @ 100,100 position
print(pixel) → gives (BGR) values

10.00

Intensity range : 0 to 255

11.00

② Accessing any plane of BGR

12.00

In open CV, the planes are present in order of BGR.

01.00 blue = image_name[:, :, 0] # all rows & all columns of 0th plane (blue)
print(blue)

02.00

03.00 green = imagename[:, :, 1] # greenplane

04.00 red = image_name[:, :, 2] # redplane.

05.00

③ Shape & size of image

06.00

image_name.shape
image_name.size

Evening

Ex:- To read a file (image) into variable, we use imread() func^n.

```
import cv2
img = cv2.imread('<image_name>', 1)   # 1 → for RGB image
```

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Introduction to Libraries :-

09.00

Tensorflow & Theano → used for defining abstract, general purpose computation graphs. They are not deep learning frameworks, but used widely in deep learning.

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Keras → Deep learning framework that provides a well defined API to faciliate building DL models.

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Benefits of Keras
- powerful computation engine.
- An API that makes it easier for us to build our own DL
- We can integrate Tensorflow code directly into Keras models when needed.

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02.00

03.00

In keras

Define (Network) → Compile → Fit → Evaluate → Make prediction

04.00

05.00

Deep Neural Networks have multiple layers (deep). They have Input, Hidden & output layer. Each layer is a matrix operation. On each layer, a set of mathematical operation are performed.

06.00

Evening

Keras V/S Tensorflow

Keras	Tensorflow
→ Simple & easy	→ Gives Keras as framework.
→ Complex models can be easily build.	→ Tough to code.
→ Written in python	→ Written in python & C++
→ Simple debugging	→ more errors
→ Training models takes more time.	→ Less training time.

Meeting

Think To Do

Important Calls

Scanned with CamScanner

→ Can be used for small datasets	→ Large datasets.
→ High API, runs on top of Tensorflow, Theano, etc.	→ Low level API.
→ Low performance	→ High performance.

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10.00
11.00

Code

12.00

```
from PIL import Image
import numpy as np
img_w, img_h = 200, 200
data = np.zeros((img_h, img_w, 3), dtype = np.uint8)
for i in range (50, 75):
        for j in range (50, 75):
                data[i, j] = [255, 255, 255]

for i in range (50, 75 ):
        for j in range (125,150) :
                data [i, j] = [255, 255, 255]

for i in range (125, 135):
        for j in range (75, 125):
                data[i, j] = [255, 255, 255]
```

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Evening

```
img = Image.fromarray (data, 'RGB')
img.save ('test.png')
img. show ()
```

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FEB MAR APR MAY JUN