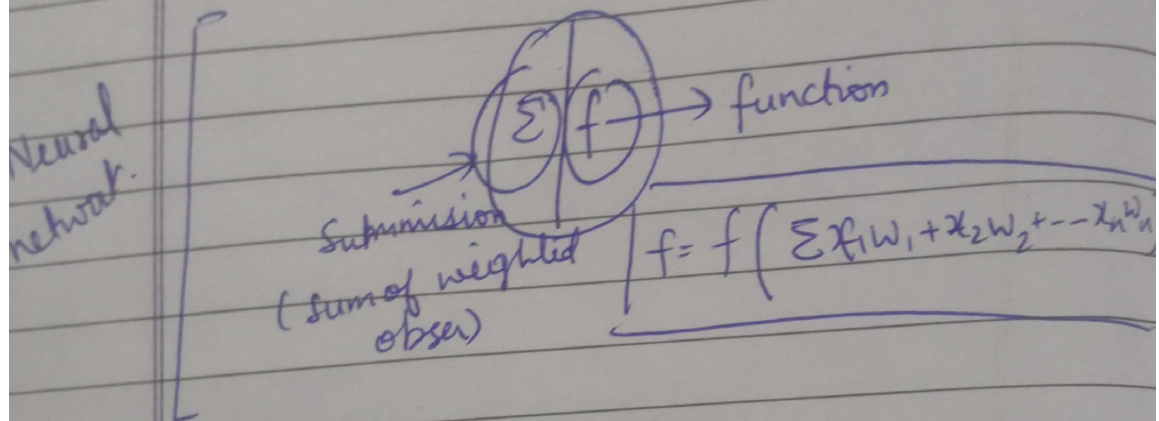


# Computer Vision

## Neural network

like brain have nerves, here we have  
nodes  
nodes have one  $x_1$  and its weight  $\rightarrow$  input/observation



## Accessing pixel in an image

pixels = image ~~image~~ [row, col]  $\rightarrow$  pixel cell location  
print(pixel)

intensity ranges between  $0 \rightarrow 255$

Accessing any plane of BGR  $\leftarrow$  Red green blue planes  
arranger

blue = image[i, j, 0]

print(blue)

green = image[i, j, 1]

print(green)

```
red = image[:, :, 2]
print(red)
```

### Shape and size of an image

image-name. shape → for shape  
image-name. size → for size

Ex

```
import cv2
```

```
img = cv2.imread('lena_rgb.tif', 1)
```

```
px = img[100, 100]
```

```
print(px) → print pixel value
```

```
blue = img[:, :, 0]
```

```
print(blue)
```

```
print(img.shape) ⇒ (512, 512, 3)
```

no. of rows    no. of cols    no. of planes.  
 ↑            ↑            ↑  
 (512, 512, 3)

```
print(img.size)
```

### types of lib :-

primary deep learning - KERAS

Abstract, graphs → TensorFlow, Theano

↓

used in deep learning  
but are not its  
framework.

## Benefits of Keras over tensorflow and Theano :-

- ↳ powerful underlying computation engine.
- API makes it easier to understand.

### Image has

↳ pixels → which are read as  
as <sup>hardware</sup> level → 1D array ⇒  
pixel brightness ⇒ single 8 bit  
number  
ranging from  
0 (black) to 255  
(white)