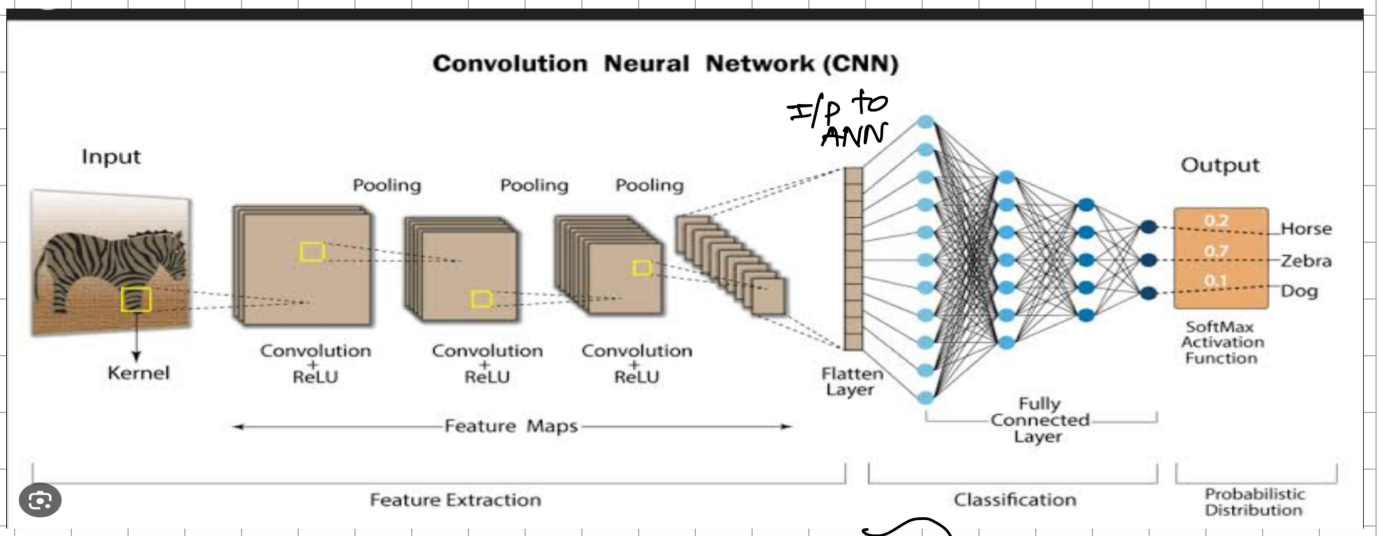
Biological Neuron Network

- dendrites → i/p (1)
- cell body (2)
- axon (3)
- synapse (4)

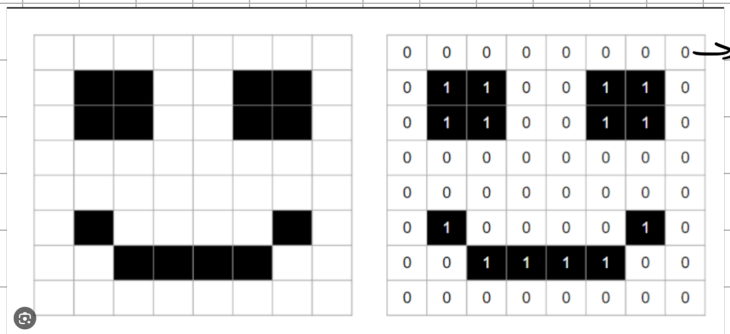
Convolutional Neural Network (CNN)



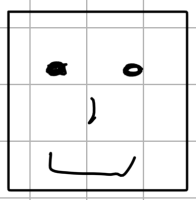
ANN

Types of Images

Binary Images – 0s and 1s



ORIGINAL IMAGE



pixel value – 0 to 255

each color have different value

Machine can only read based on pixel value

Grey Scale Images

coloured Image – RGB coloured Image

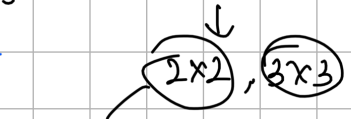
CNN Layers

* Convolution Layer } Feature
* pooling } Extraction o/p of pooling – matrix
* flatten Layer → matrix to vectors
* fully connected Layer → ANN

CNN

Image * Feature Detector = Feature Map

I/p pixel



small

Based on Img Resolution choose Filters

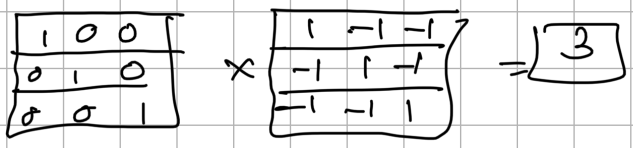
* If filters are not correctly chosen, feature extraction is difficult

* filter values are Randomly taken

Place 3x3 on i/p image

Since i/p image dimension is large

multiply the matrix value with i/p image pixel value



After this move the detector matrix 1 pixel right

This movement → Stride

Here we are using 3x3 detector for 6x6 i/p matrix

↳ Feature Map ↓ 4x4

But if we take 6x6 detector for 6x6 i/p matrix → feature map ↓ 1 value

↳ loss of info

As we know,

ANN can have many hidden layer

Similarly,

CNN can also have many convolution layer

feature map o/p of convolution layer will be i/p for Pooling layer

Pooling Layer

↓

MAX POOLING – Background removal — max value will be chosen

MIN POOLING → Object removal — min value will be chosen

4×4 → 3×3

moving 1 step ryt → stride

3	-1	-3	-1
-3	1	0	-3
-3	-3	0	1
3	-2	-2	-1

→ 3

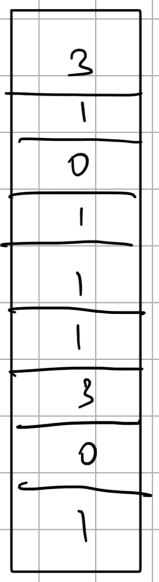
3	-1	-3	-1
-3	1	0	-3
-3	-3	0	1
3	-2	-2	-1

→ 3 | 1

o/p of Pooling layer

3	1	0
1	1	1
3	0	1

flatten layer → converts matrix to vector



fully connected layer