Agendas

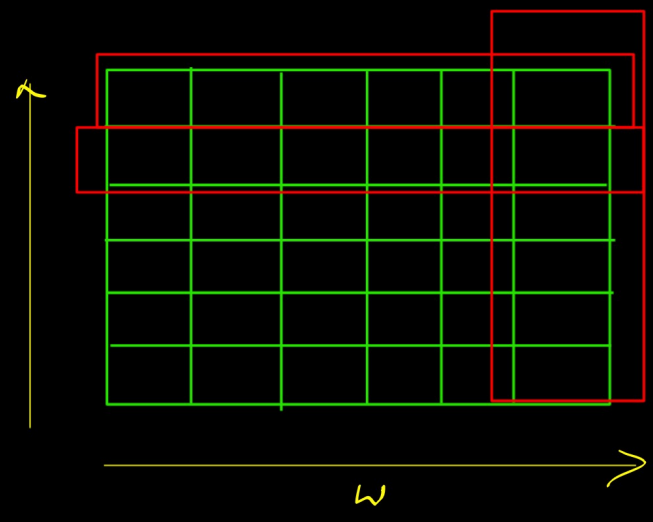
1. CNN — convolutional Neural Network
2. Feature Extractor

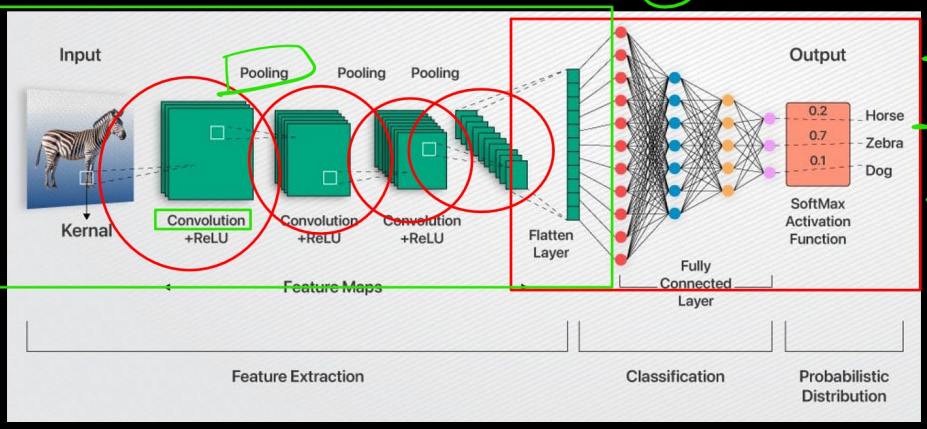
Deep Learning :

1. ANN — Artificial Neural Networks
2. CNN — Convolutional Neural Networks
3. RNN — Recurrent Neural Networks

what is CNN ?

convolutional Neural Networks also known as convnet CNN, are the special kinds of Neural Networks for processing data that has a known grid like topology.





① ANN / FC / Dense

② → convolution

→ Pooling

→ FC layer

CNN

① ANN → Matrix Multiplication

② CNN → Convolution

1998 — Yann Lecun → AT and T Lab For Document

→ LENET-5

Recognization

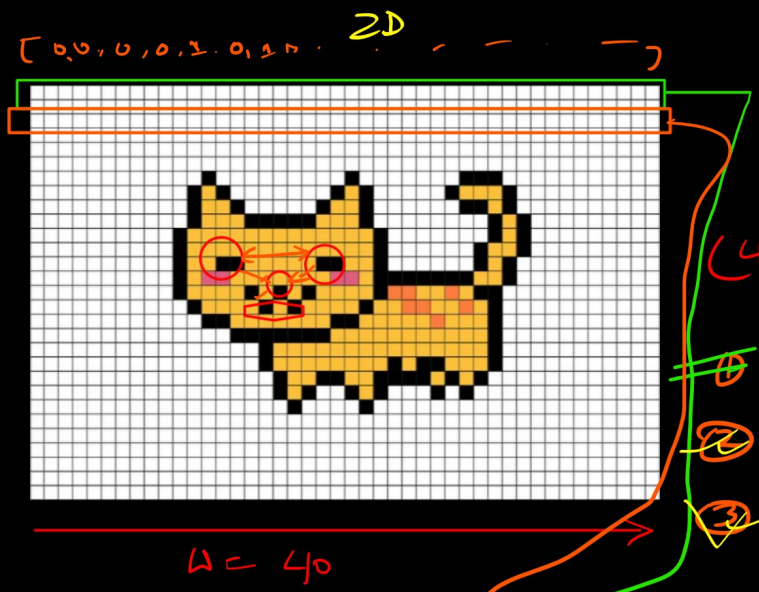
① Digit

② Alphabet

Resnet-50, Inception, VGG16, Alexnet

So on - - - -

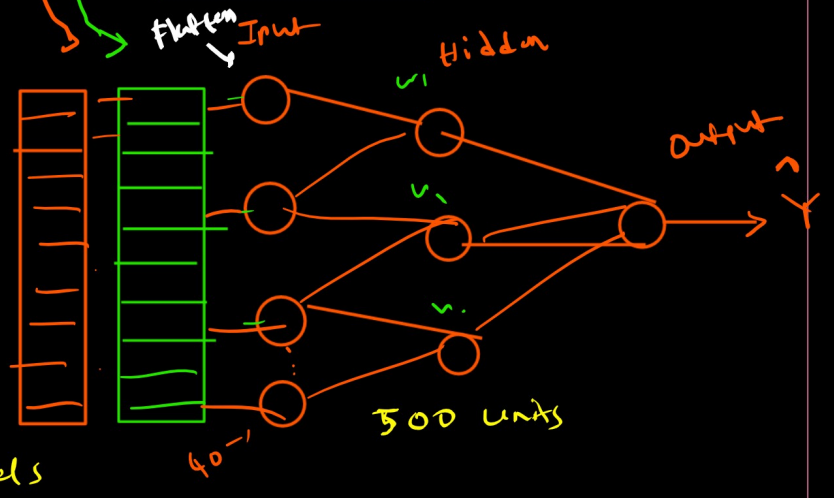
Why not to use ANN ?



1. High computation cost
2. Overfitting issue
3. Loss of important spatial features/ pixels

40 x 40 = 1600 pixels

ANN



1600 x 500

⇒ 800000 weights

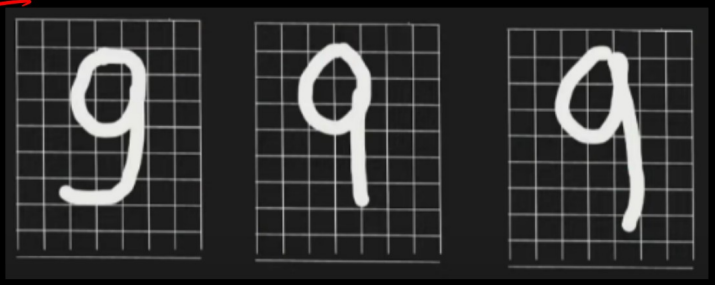
1000 x 1000

⇒ 1000 000 pixels

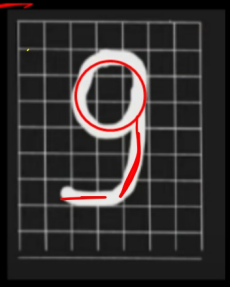
1000000 x 500

⇒ 500 000 000 → parameters size.

CNN:

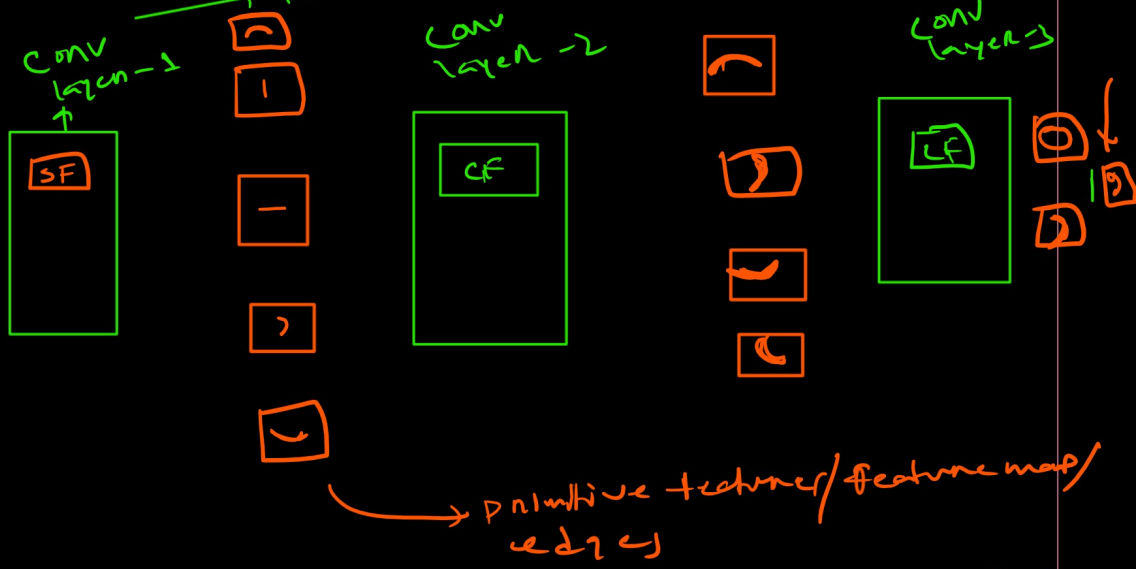


→ primitive features / edges



→ Features

Feature Extraction → Filters



→ primitive features / feature map / edges

2 type cell

① Simple cell → small feature → small receptive field

② Complex cell → Big feature → Big receptive field

Filters ⟶ Matrix (3,3), (5,5), (7,7)

3

3

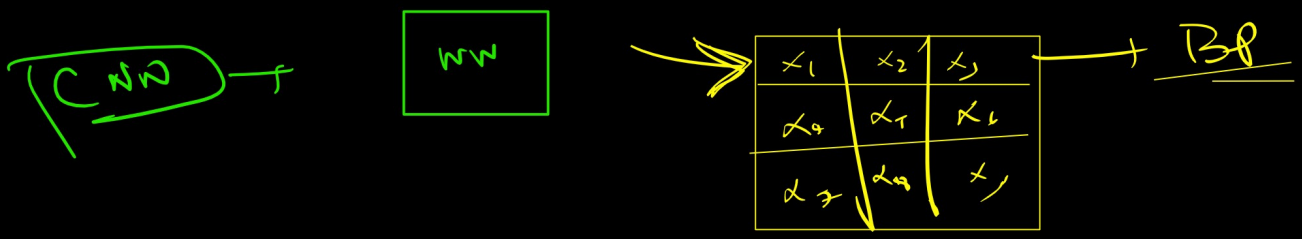
-1	0	1
-2	0	2
-1	0	1

⟶ Sobel Filter
Vertical edge Detection

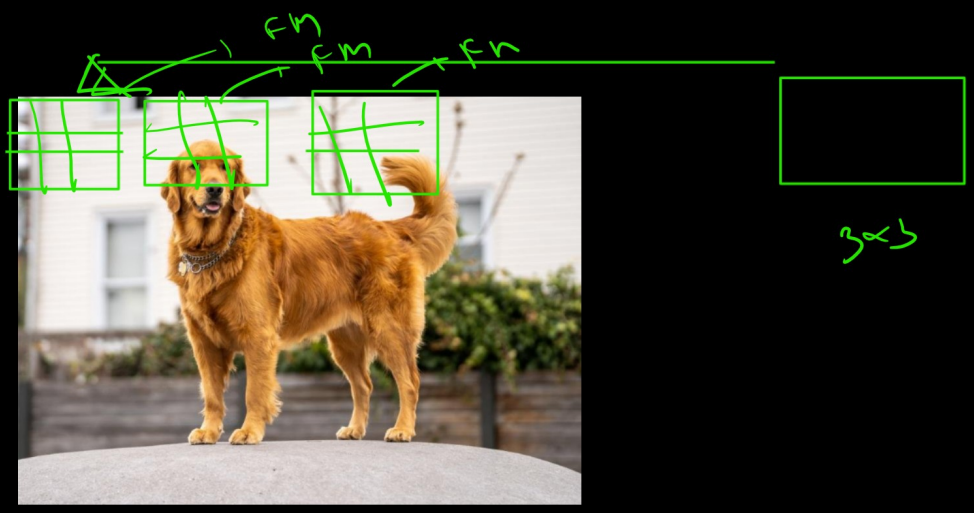
(3,3)

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

⟶ Sobel filter
Horizontal edge Detection



CNN — NN



Convolution

① Conv layer
② Pooling layer
③ Fc layer
④ RELU

① CNN Architecture:

① Conv layer
② Pooling "
③ padding
④ Stride
⑤ Activation function
⑥ Data Augmentation
⑦ CNN vs ANN
⑧ BP in CNN

→ project → Classifier system

→ Popular CNN Architecture

- → LENET-5
- → RESNET
- → VGG
- → Inception

So on ...

#1 Transfer Learning ←