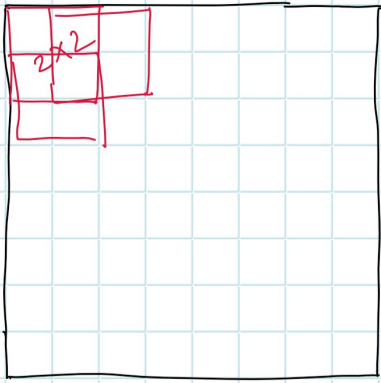


8x8

1



output image
size

- ① image size
- ② kernel (filter)
- ③ stride
- ④ pooling
- ⑤ conv.
- ⑥ n/n
- ⑦ flatten
- ⑧ layer

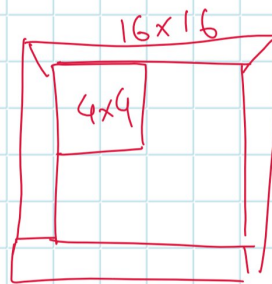
$$\Rightarrow \frac{n + 2p - F}{s} + 1$$

n - Input size 8x8

p - padding

F - filter size

s - stride

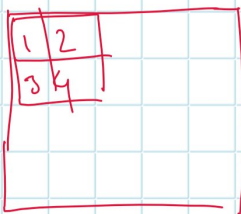


$$\Rightarrow \frac{8 + 2 \times 0 - 2}{1} + 1 \Rightarrow \frac{8 + (-2)}{1} + 1 \Rightarrow 6 + 1$$

output Image $\Rightarrow 7 \quad (7 \times 7)$

$$\Rightarrow \frac{8 + 2 \times 1 - 2}{1} + 1 \Rightarrow \frac{8 + 2 - 2}{1} + 1 \Rightarrow \frac{8}{1} + 1 \quad \frac{8 + 1}{1}$$

$\Rightarrow 9 \times 9$

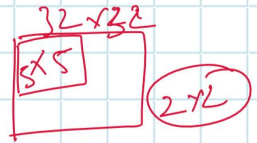


LeNet - 5

* vanilla Architecture

LeNet Architecture

① Input - 32×32 , 1 Grayscale



→ C_1 - convolution

kernel (filter) 5×5 , stride 1, padding 0
map 6 filter.

$$\text{Shape} = \frac{32 + 2 \times 0 - 5}{1} + 1 \Rightarrow (32 - 5) / 1 + 1 \Rightarrow 28 \quad (28 \times 28)$$

→ S_2 - Subsampling (Average pooling)

window size (2×2) , stride 2

1	2	1	3
1	2	1	3
1	4	1	2
1	2	1	3

1	5	2
2	1	4

$$\frac{28 + 2 \times 0 - 2}{2} + 1 \Rightarrow \frac{30 - 2}{2} + 1 \Rightarrow 14 \times 14$$

$14 \times 14 \times 6$

→ C_3 - convolution

→ kernel (filter) 5×5 , stride 1, padding 0

→ map - 16 no. of filter

$$\frac{(14 + 2 \times 0 - 5)}{1} + 1 \Rightarrow \frac{14 - 5}{1} + 1 \Rightarrow 10 \quad (10 \times 10)$$

→ S_4 Subsampling (Average pooling)

window size (2×2) , stride 2

$$\frac{10 - 2}{2} + 1 \Rightarrow \frac{8}{2} + 1 \Rightarrow 5 \times 5, 16$$

→ C_5 - convolution

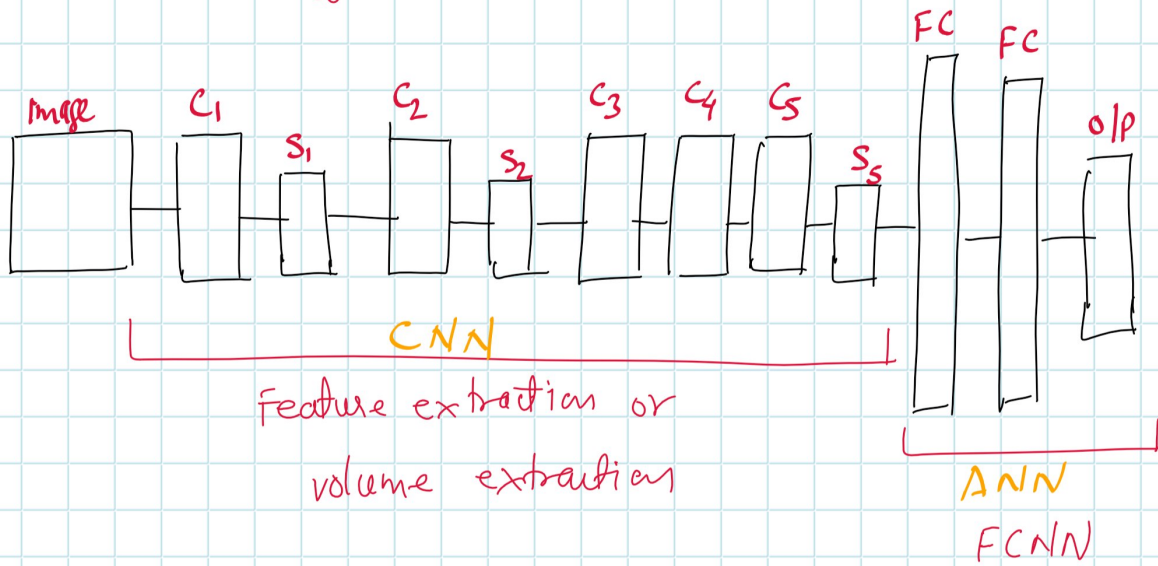
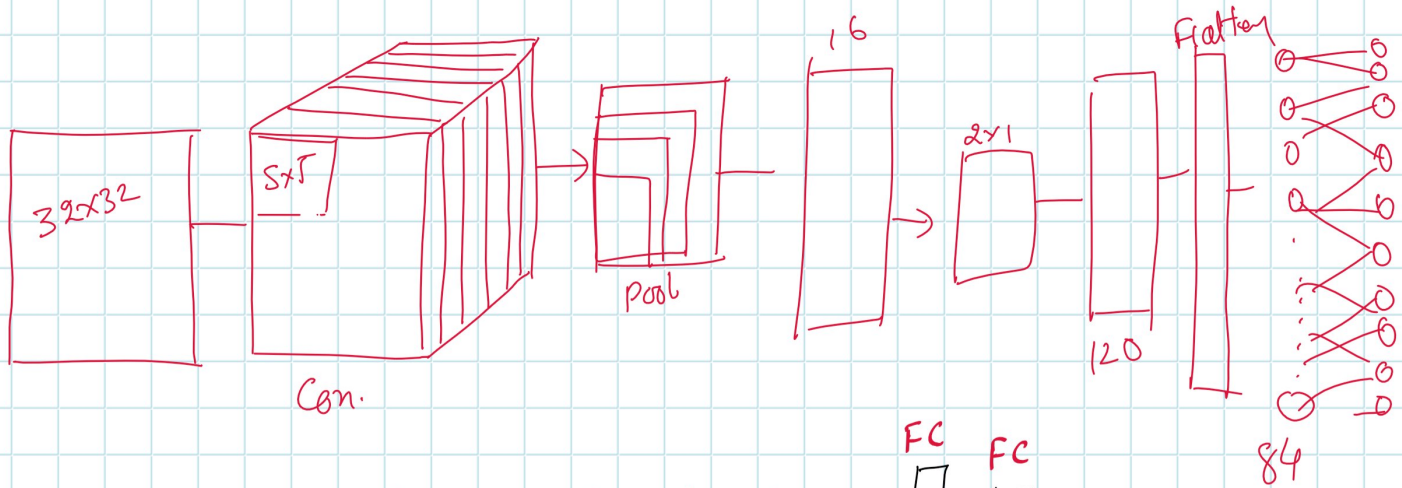
kernel (5×5) , stride - 1, padding 0

map - 120

$1 \times 1, 120$

1
conv.
+
mean pooling
Feature
extraction

2
conv.
+
mean pooling



2012