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Programing Assignment 3 Part I

1. Filter

Filtered Inputs

X	X	X	X	X
X	4	4	3	X
X	-4	-1	0	X
X	-2	-1	0	X
X	X	X	X	X

X	X	X	X	X
X	-2	-2	0	X
X	2	3	2	X
X	2	2	3	X
X	X	X	X	X

Output Feature Map

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

2. Maximally Activating Patch

Maximally Activating Patch

-1	-1	-1
0	0	0
1	1	1

1	0	-1
1	0	0
1	1	1

3. Spatial Pooling

Max Pooled Output

2	3
2	3

4. Number of Learnable parameters

(i) The number of input channels to conv1: 1 channel

(ii) The number of input channels to conv2: 12 channels

(iii) The number of input channels to conv3: 10 channels

(iv)

$$Input: [512\ x\ 512]$$

$$After\ Conv1\ (8x8\ kernel):$$

$$subtract\ 7\ from\ each\ dimension\ \&\ output\ of\ 12\ feature\ maps$$
$$[505\ x\ 505\ x\ 12]$$

$$After\ Conv2\ (8x8\ kernel):$$
$$subtract\ 7\ from\ each\ dimension\ \&\ output\ of\ 10\ feature\ maps$$

$$[498\ x\ 498\ x\ 10]$$

$$After\ Conv3\ (6x6\ kernel):$$
$$subtract\ 5\ from\ each\ dimension\ \&\ output\ of\ 8\ feature\ maps$$

$$[493\ x\ 493\ x\ 8]$$

$$After\ MaxPool\ (3x3\ kernel):$$
$$\left(\frac{493}{3} = 164 + \frac{1}{3}\right) \rightarrow 164\ is\ new\ \#\ of\ pixels\ on\ each\ dimension.$$
$$[164\ x\ 164\ x\ 8]$$

$$If\ we\ flatten:$$
$$[215{,}168\ x\ 1\ x\ 1]$$

$$Therefore: 215{,}168\ dimensions\ going\ into\ fc1$$