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CSC 411

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HW4 Write-Up

1. a)

Layers	# Units	# Weights	# Connections
Convolution Layer 1	290 400	34 848	105 415 200
Convolution Layer 2	186 624	307 200	223 948 800
Convolution Layer 3	64 896	884 736	149 520 384
Convolution Layer 4	64 896	663 552	112 140 288
Convolution Layer 5	43 264	442 368	74 760 192
Fully Connected Layer 1	4 096	37 748 736	37 748 736
Fully Connected Layer 2	4 096	16 777 216	16 777 216
Output Layer	1 000	4 096 000	4 096 000

Table 1: AlexNet Network Size

b)

i) To reduce the amount of parameters, we can reduce the size of the filters and double the amount of filters at each convolution layer. For example, two 3x3 filters constitute less parameters than one 5x5 filter. Taking for example layer 2 seen below in figure 1, if we change the filter to two 3x3 filters, we get a 3x3 filter and 256 x 2 = 512 kernels. Therefore, no. parameters = (3 x 3 x 48 x 256) x 2 = 221 184 parameters < 307 200 parameters! We could also remove the two fully-connected layers and only have convolution layers. This decreases the total amount of weights drastically.

ii) Similarly, by removing the fully-connected layers, you remove a drastic amount of connections making the test run time much less than before.

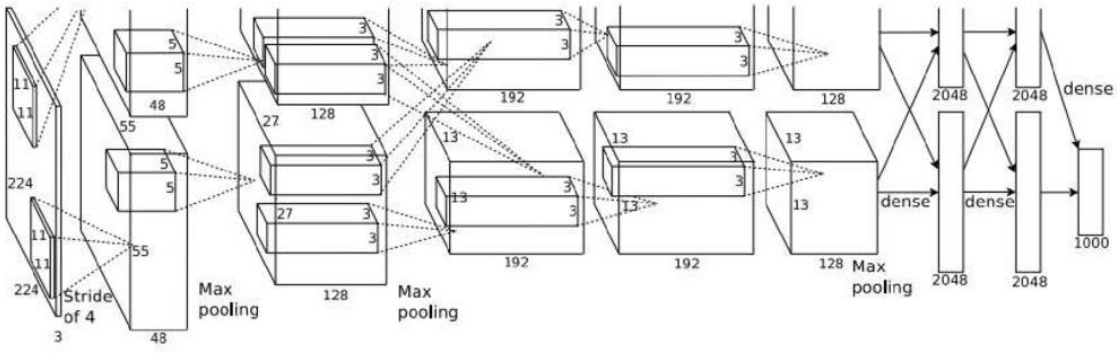

Figure 1: AlexNet Architecture

2. a)