CS398 HW5: Deep Residual Neural Network

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In this assignment, I used PyTorch to train a Deep Residual Neural Network model. Firstly, I set up transformations for training and test data, so that when I load the data, I will have them normalized. In addition, I used vertical and horizontal flips for data augmentation in this step. Then I set up two kinds of blocks with batch normalization. One is for layers that change output dimension, and the other is for no change. Then I set up my network with dropouts and pooling. The model is trained with RMSprop optimizer. Learning rate is set to 0.001, and batch size is set to 500. After 23 epochs, I got 79.39% accuracy.

For part 2, I firstly resized the training set and testing set. To accelerate the process, I only applied optimization on the fully connected layer accoding to the instructions on piazza. And the batch size is also reduced to 100. After 19 epochs, I got 81.16% accuracy.

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0 31.330000000000005 102.08743524551392
1 41.769999999999996 101.11889314651489
2 44.6 100.77701020240784
3 45.05 100.7674777507782
4 46.0 100.76136088371277
5 52.82000000000001 100.79638648033142
6 56.67 100.78478002548218
7 61.5 100.76740503311157
8 64.28 100.80066657066345
9 64.91999999999999 100.78054070472717
10 69.78 100.7766797542572
11 69.76 100.78750920295715
12 73.25999999999999 100.75708842277527
13 72.91 100.80188059806824
14 72.9 100.7957546710968
15 74.22 100.80025005340576
16 76.5 100.76637101173401
17 77.39000000000001 100.77023386955261
18 77.35999999999999 100.78206443786621
19 77.30000000000001 100.7634289264679
20 78.27000000000001 100.77511668205261
21 76.96000000000001 100.77054238319397
22 77.83000000000001 100.78133225440979
23 79.39 100.77022361755371
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0 77.78 165.9500868320465
1 78.86 174.47075128555298
2 79.15 175.42264556884766
3 79.99 174.56844973564148
4 78.89 175.25296545028687
5 79.51 174.8038637638092
6 80.39 174.7560203075409
7 80.55 174.71494507789612
8 80.54 175.30552101135254
9 80.97 174.61673521995544
10 80.57 174.5995159149 17
11 80.06 174.96979904174805
12 80.25 175.09897589683533
13 80.65 175.67518281936646
14 80.59 174.81498384475708
15 80.5 174.96821451187134
16 81.08 174.91597771644592
17 80.74 174.9909589290619
18 80.71 174.6322615146637
19 81.16 175.62104439735413
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