ECGR 5106 Homework 2

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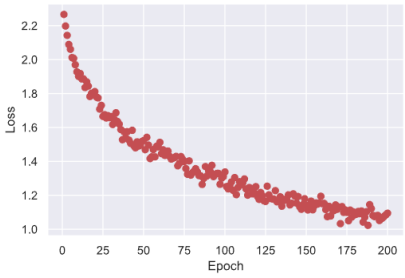
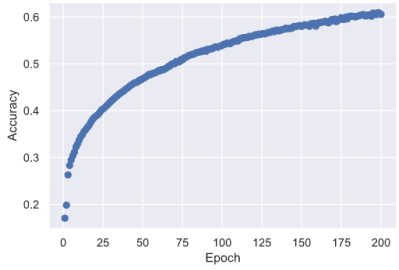
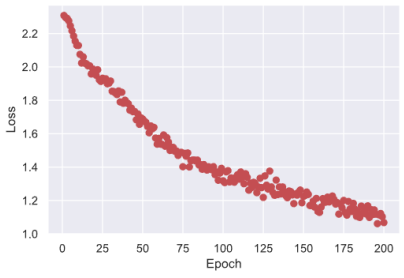


(a) Loss

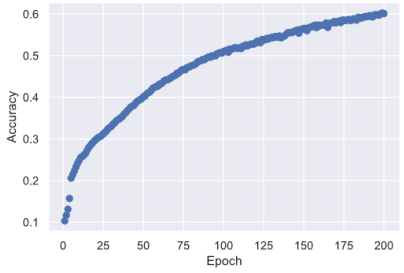


(b) Accuracy

Figure 1: Loss and Accuracy for 2 Hidden Layer Network for Problem 1



(a) Loss



(b) Accuracy

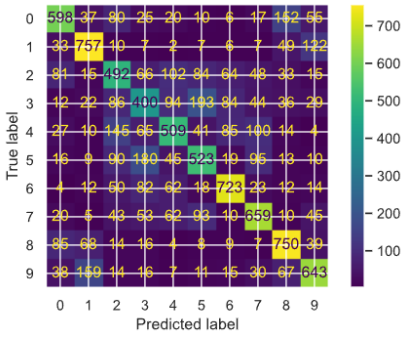
Figure 2: Loss and Accuracy for 2 Convolution Layer Network for Problem 1

I. Problem 1

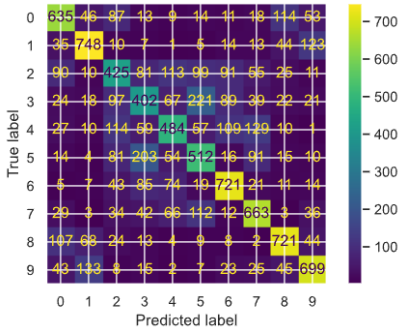
Problem 1 focuses on seeing the difference between adding another convolution layer for a 2 convolution layer network for the CIFAR 10 dataset. The training for both networks took 1871 and 1842 seconds respectively. Both networks were trained for 200 epochs and did not experience any overfitting. When compared to the fully connected network from the previous assignment, both networks trained faster by 200 seconds and had better accuracy by 10%. The computation complexity for both networks is 0.0 GMac and the first model has 18.35k parameters and the second model has 11.14k parameters. The reason why the second model has less parameters is because of the additional max pooling layer decreasing the number of features needed for the fully connected layer. Both networks were able to achieve an accuracy of 60%.

II. Problem 2

Problem 2 focuses on looking at ResNet-10 and the different regularization techniques (Batch Norm, Weight Reduction, and Dropout). Training the three models took 1972, 1963, and 1981 seconds respectively and all three were trained for 200 epochs. All three networks performed better than the CNN models from problem 1 by achieving an accuracy of over 65%. The model that used Weight Reduction regularization experienced

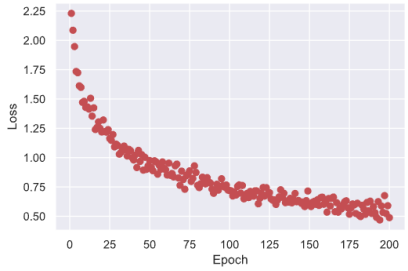


(a) Part 1 Confusion Matrix

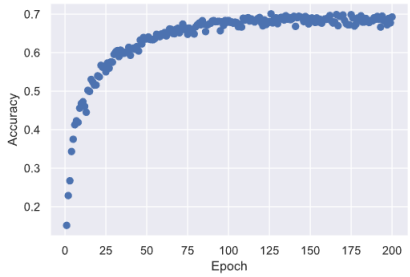


(b) Part 2 Confusion Matrix

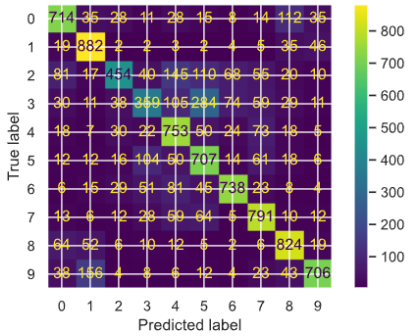
Figure 3: Confusion Matrix for Both Parts in Problem 1



(a) Loss



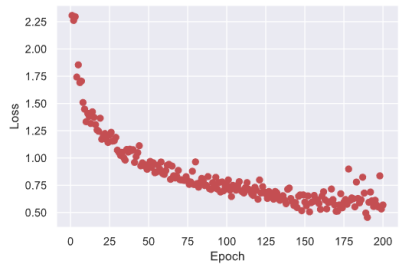
(b) Accuracy



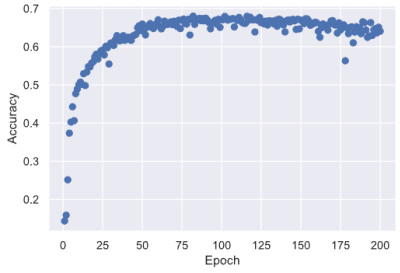
(c) Confusion Matrix

Figure 4: Loss, Accuracy, and Confusion Matrix for ResNet-10

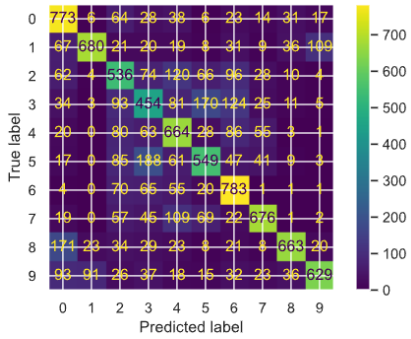
overfitting after 150 epochs with the decrease in accuracy. The size for the models are 76.07k, 76.01k, and 76.01k parameters respectively.



(a) Loss

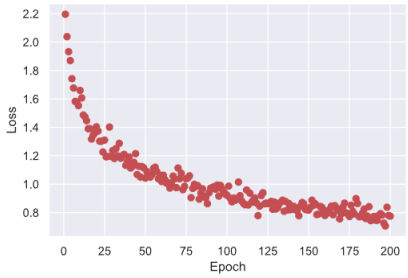


(b) Accuracy

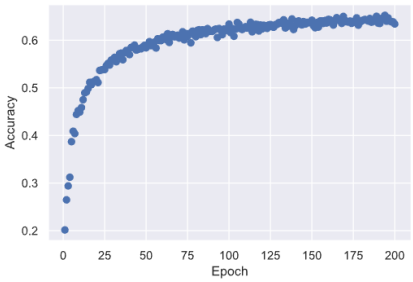


(c) Confusion Matrix

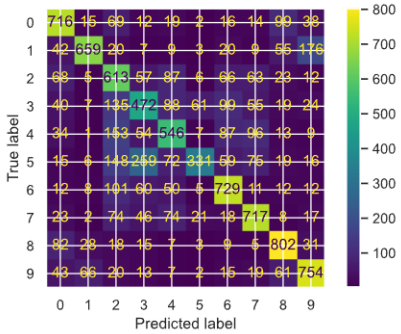
Figure 5: Loss, Accuracy, and Confusion Matrix for ResNet-10 with Weight Decay



(a) Loss



(b) Accuracy



(c) Confusion Matrix

Figure 6: Loss, Accuracy, and Confusion Matrix for ResNet-10 with Dropout