ECGR 5106 Homework 2

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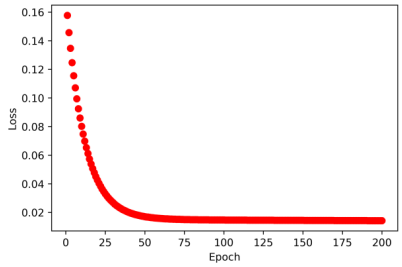
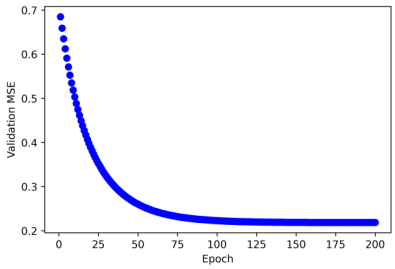
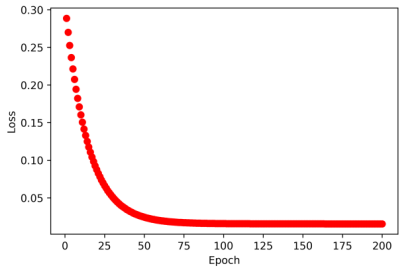


(a) Loss

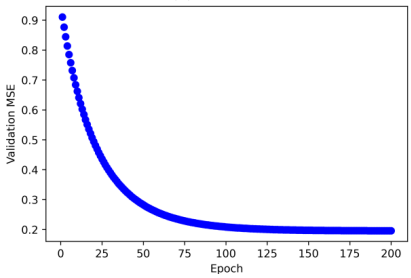


(b) MSE

Figure 1: Loss and Error for 1 Hidden Layer Network for Problem 1



(a) Loss



(b) MSE

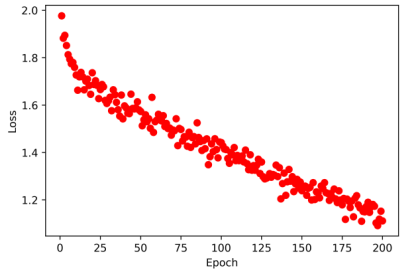
Figure 2: Loss and Error for 3 Hidden Layer Network for Problem 1

I. Problem 1

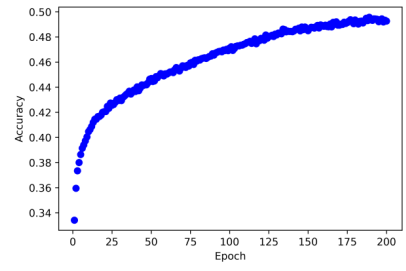
Problem 1 focuses on making a fully connected network with a hidden layer of 8 nodes and another network with hidden layers of 8, 4, and 2 nodes for the housing data set. The training for both networks took 0.078974 and 0.123006 seconds respectively. The loss for the training saturated at around 100 epochs for both networks and both networks have a mean squared error of 0.2 at the end of the training.

II. Problem 2

Problem 2 focuses on training a fully connected neural network for the CIFAR 10 dataset. The networks have a hidden layer of 512 nodes and another network with hidden layers of 512, 256, and 128 nodes. The training for both networks took 2090 and 2164 seconds respectively. Both networks used a mini-batch size of 1000 and both networks did not saturate after 200 epochs. For the network with 3 hidden layers, the accuracy and loss start to diverge near the end of the training. Both networks have an accuracy of 50% and a loss of approximately 1 at the end of the training.

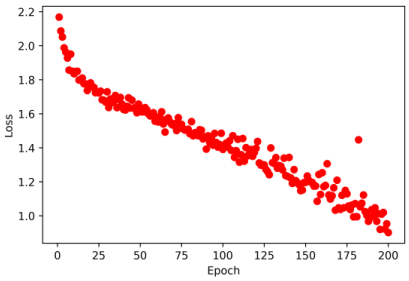


(a) Loss

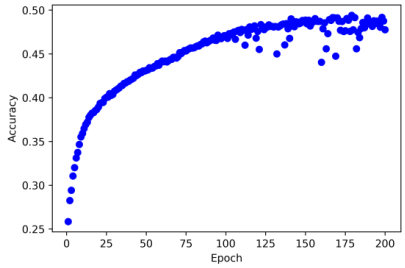


(b) Accuracy

Figure 3: Loss and Accuracy for 1 Hidden Layer Network for Problem 2

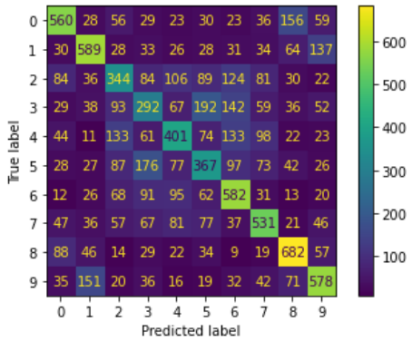


(a) Loss

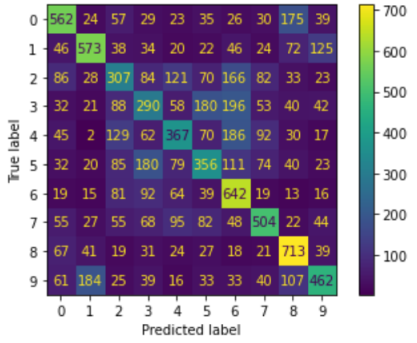


(b) Accuracy

Figure 4: Loss and Accuracy for 3 Hidden Layer Network for Problem 2



(a) Confusion Matrix for 1 Hidden Layer



(b) Confusion Matrix for 3 Hidden Layer

Figure 5: Confusion Matrices for 1 and 3 Hidden Layers