

CSCI 5561: Assignment 4 - Neil Patel

Using a single-layer linear perceptron, with a learning rate of 0.001, a decay rate of 0.9, 2000 total iterations, a batch size of 32, and the decay applied every 1000 iterations, an accuracy of 0.837 is achieved, seen in Figure 1 below. Initial weights are taken from a uniform distribution from 0 to 1.

Single-layer Linear Perceptron Confusion Matrix, accuracy = 0.837

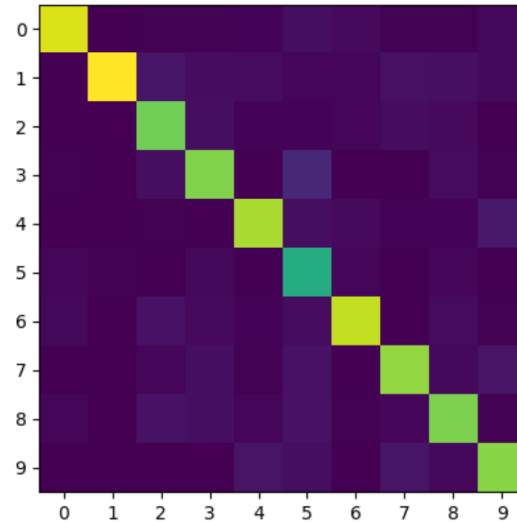


Figure 1. SLP Linear confusion matrix

Using a single-layer perceptron, with a learning rate of 0.01, a decay rate of 0.9, 2000 total iterations, a batch size of 32, and the decay applied every 1000 iterations, an accuracy of 0.891 is achieved, seen in Figure 2 below.

Single-layer Perceptron Confusion Matrix, accuracy = 0.891

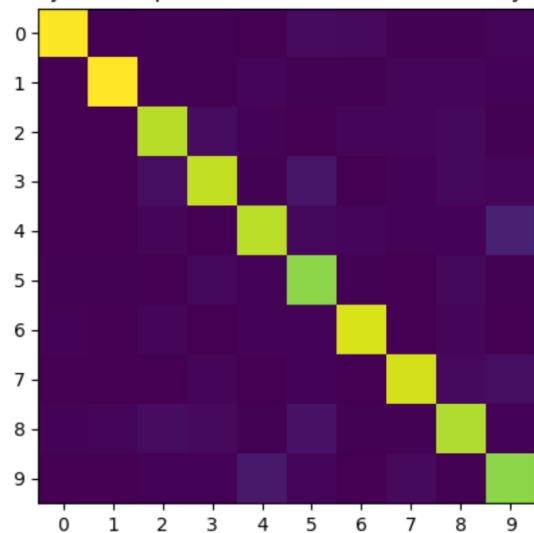


Figure 2. SLP confusion matrix

Using a multi-layer perceptron, with a learning rate of 0.01, a decay rate of 0.9, 20000 total iterations, a batch size of 32, and the decay applied every 500 iterations, an accuracy of 0.903 is achieved, seen in Figure 2 below. A leaky ReLU with an epsilon of 0.99 was used.

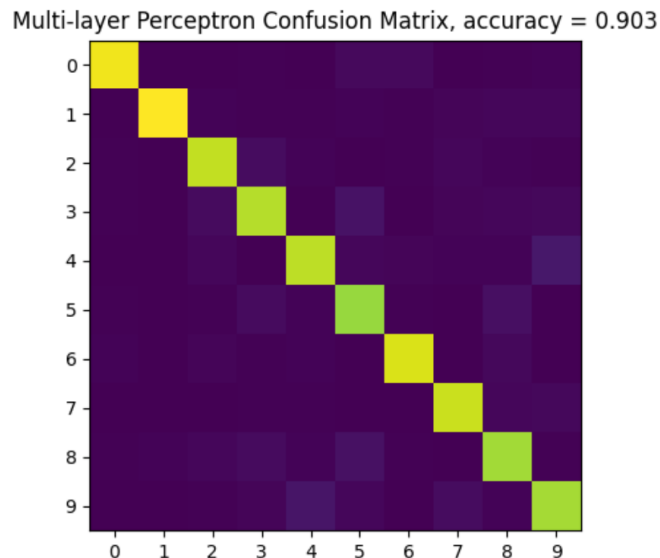


Figure 3. MLP confusion matrix

Using a convolutional neural network, with a learning rate of 0.01, a decay rate of 0.9, 100 total iterations, a batch size of 32, an accuracy of 0.902 is achieved, seen in Figure 2 below. A leaky ReLU with an epsilon of 0.9 was used.

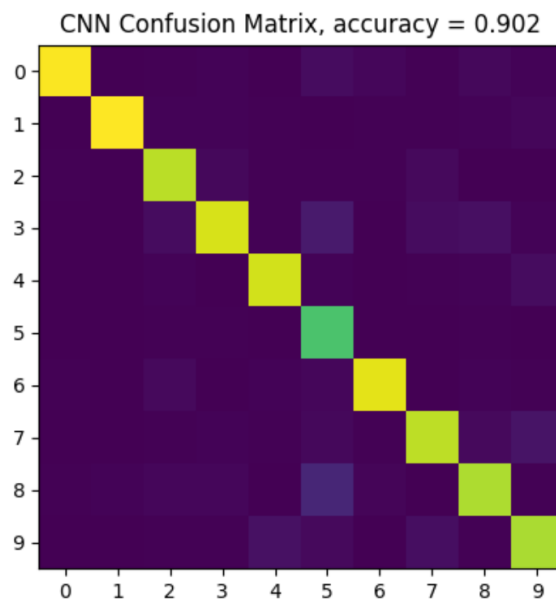


Figure 4. CNN confusion matrix