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CS 3600

Project 4 Neural Nets Analysis

**Question 5**

**Test Pen Data:**

Accuracy Average: 0.902858776444

Accuracy Standard Deviation: 0.00322624036127

Max Accuracy: 0.905946255003

**Test Car Data:**

Accuracy Average: 0.835209424084

Accuracy Standard Deviation: 0.0166204598737

Max Accuracy: 0.850785340314

**Question 6**

**Test Pen Data:**

|  |  |  |  |
| --- | --- | --- | --- |
| Perceptron # | Avg | Std | Max |
| 0 | 0.00 | 0.00 | 0.00 |
| 5 | 0.844082332762 | 0.004322711989 | 0.849628359062 |
| 10 | 0.887135506003 | 0.007468796246 | 0.901086335049 |
| 15 | 0.903201829617 | 0.908233276158 | 0.908233276158 |
| 20 | 0.898799313894 | 0.006818046969 | 0.909948542024 |
| 25 | 0.904917095483 | 0.003186477940 | 0.907661512087 |
| 30 | 0.905202973128 | 0.002189158344 | 0.909090909091 |
| 35 | 0.904631217839 | 0.001360248971 | 0.906232132647 |
| 40 | 0.900228702115 | 0.005660088586 | 0.904230989137 |

**Test Car Data:**

|  |  |  |  |
| --- | --- | --- | --- |
| Perceptron # | Avg | Std | Max |
| 0 | 0.700261780105 | 0.000000000000 | 0.700261780105 |
| 5 | 0.868324607330 | 0.009062659358 | 0.884816753927 |
| 10 | 0.851963350785 | 0.013379468093 | 0.870418848168 |
| 15 | 0.861387434555 | 0.008832896764 | 0.872382198953 |
| 20 | 0.874083769634 | 0.004313418077 | 0.881544502618 |
| 25 | 0.857068062827 | 0.015786230255 | 0.875654450262 |
| 30 | 0.852356020942 | 0.013744078769 | 0.867801047120 |
| 35 | 0.844895287958 | 0.010389075829 | 0.865183246073 |
| 40 | 0.846858638743 | 0.020077864777 | 0.872382199853 |

**Analysis of Data**

For the testPenData when the number of hidden layers is 0 the accuracy is also 0. The accuracy increases dramatically with just 5 perceptrons and it continues increasing until about 15 perceptrons. Once it reaches that point it seems to plateau. As for the testCarData the accuracy for the number of perceptrons is lower across the board. In this case the results are similar where there is a big increase with only 5 perceptrons followed by smaller increases until 20 perceptrons which is where it peaks at. The car data set also has a significantly lower amount of data compared to the pen data which makes it run much faster but at the cost of lower accuracy.