

Neural Net Report

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Question 5: Learning With Restarts

1. testPenData:

- Max accuracy: 90.7376%
- Average accuracy: 90.5031%
- Standard deviation: 0.1766

2. testCarData:

- Max accuracy: 98.0000%
- Average accuracy: 97.6000%
- Standard deviation: 0.3742

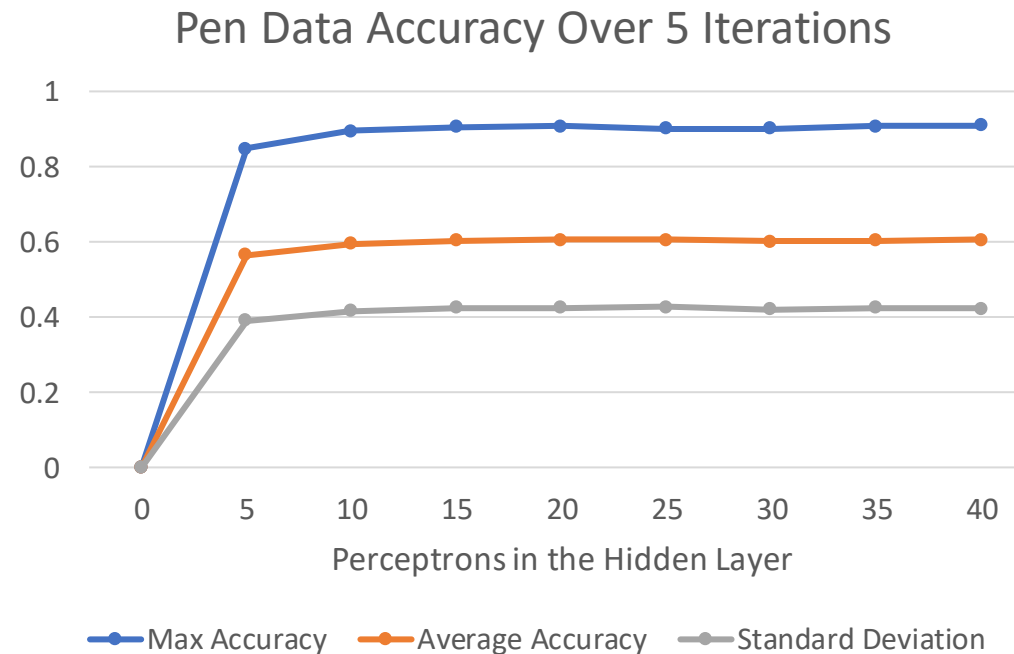
Question 6: Varying the Hidden Layers

Statistic table for **testPenData** – report the max, average, and standard deviation at various amount of perceptrons.

	Number of Perceptrons at the Hidden Layer								
	0	5	10	15	20	25	30	35	40
Max Accuracy	0	0.848	0.896	0.905	0.907	0.911	0.902	0.907	0.909
Avg Accuracy	0	0.566	0.596	0.603	0.605	0.606	0.601	0.604	0.606
Standard Deviation	0	0.390	0.416	0.425	0.424	0.426	0.421	0.425	0.423

Question 6: Varying the Hidden Layers

Create a learning curve for **testPenData** where the number of hidden layer perceptrons is the independent variable and the average accuracy is the dependent variable.



Question 6: Varying the Hidden Layers

For **testPenData**, discuss any notable trends you saw related to increasing the size of the hidden layers in your neural net.

Answer: When testing the pen data, the most significant data was observed when the hidden layers has a size of 0. In this case, the neural net had 0% accuracy in the tests. Then, over a size increase of 10, the average accuracy becomes steady at around 0.6. Therefore, it can be concluded that after a certain size increase to the hidden layers, the effect is negligible.

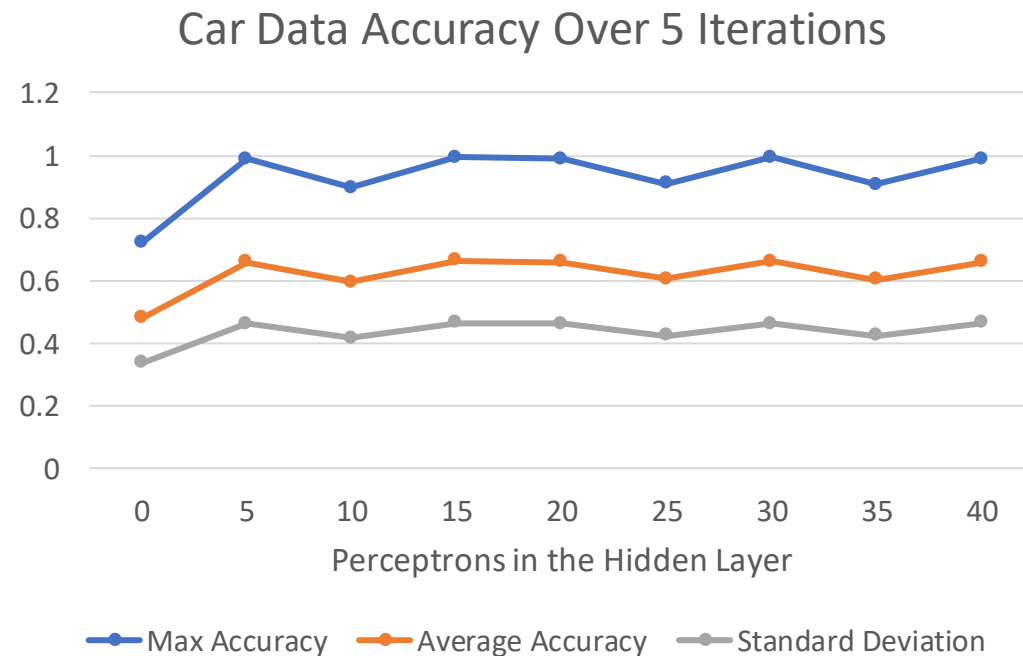
Question 6: Varying the Hidden Layers

Statistic table for **testCarData** – report the max, average, and standard deviation at various amount of perceptrons.

	Number of Perceptrons at the Hidden Layer								
	0	5	10	15	20	25	30	35	40
Max Accuracy	0.72	0.99	0.896	0.995	0.99	0.911	0.995	0.907	0.99
Avg Accuracy	0.48	0.659	0.596	0.663	0.660	0.606	0.663	0.604	0.660
Standard Deviation	0.339	0.462	0.416	0.466	0.464	0.426	0.464	0.425	0.465

Question 6: Varying the Hidden Layers

Create a learning curve for **testCarData** where the number of hidden layer perceptrons is the independent variable and the average accuracy is the dependent variable.



Question 6: Varying the Hidden Layers

For **testCarData**, discuss any notable trends you saw related to increasing the size of the hidden layers in your neural net.

Answer: Most notably, the accuracy was significantly lower with 0 perceptrons at the hidden layer. From 5 onward, the average accuracy fluctuated around 0.6.

Question 7 (extra credit): Learning XOR

Report the max accuracy, average accuracy, and standard deviation of the neural net that you have trained with 1) no hidden layer, and 2) a hidden layer with various amount of perceptrons (at least 3 different amounts)

	No Hidden Layer	Hidden Layer		
		___ perceptrons	___ perceptrons	___ perceptrons
Max Accuracy				
Avg Accuracy				
Standard Deviation				

Question 7 (extra credit): Learning XOR

Report the behavior of the trained neural net **without a hidden layer**.

Answer:

Question 7 (extra credit): Learning XOR

Report the behavior of the trained neural net **with a hidden layer**. Are the results what you expected? Explain your observation.

Answer:

Question 8 (extra credit): Novel Dataset

List the name and the source of the dataset that you've chosen.

- Name: _____
- Source (e.g., URLs): _____
- Briefly describe the dataset: _____

Question 8 (extra credit): Run Stats

- Max accuracy: _____
- Average accuracy: _____
- Standard deviation: _____

Question 8 (extra credit): Novel Dataset

Describe how to run the code that you've set up to train the selected dataset.

Answer: