Machine Learning HW#6

Multi-Layer Perceptron

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Results

Classification Accuracy Results					
	Perceptrons Per Hidden Layer				
Hidden Layers	5	10	15	20	25
0	83%	83%	83%	83%	83%
1	84%	84%	**91%**	82%	90%
2	71%	82%	82%	80%	82%
3	40%	59%	66%	63%	60%

- Fixed Epochs = 100
- Initial Learning Rate = 10
- Weight Matrix ~ U[-0.05, 0.05]
- Rng(55555) used to fix random number generation to **strictly** observe effects of hidden layers and perceptrons only
- Also helpful to fix random dumber generation to replicate results I have gathered above

Analysis

- **For hidden layer 0, the row values are the same since there are no hidden layer perceptrons so that is reasonable**
- **Highest Classification 91% achieved with 15 perceptrons which is in between the number of input features and number of classes (0.5*(10+17) ~ 14)**
- **1 hidden layer was most ideal since it can approximate any continious function while 0 hidden layers implies we have linearly seperable data which is not a good assumption**
- **For 2 and 3 hidden layers, results are not good most likely because there are too many parameters in comparison to training data available**
- **91% is pretty good considering this is a multi-layer perceptron and not a convolutional neural network that works well for this image classification problem**