



King Mongkut's University of Technology

Machine Learning

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Take Home Quiz 6 Due Sun Mar 10, 2024

Name: _____

I.D. Number: _____

Score: _____ / 60

1. *15 points.* 1 hour. Using MLP Intro.ipynb, show that the OR, AND, NOT will work for a single layer perceptron, but the XOR will not be able to find a solution. For “NOT” your input will have 1 value, but for “OR”, “AND”, and ”XOR” it will have 2 values.
2. *15 points.* 1 hour. Use multilayer perceptron on sklearn’s diabetes data meant for regression using 25% test data, find the R-square.
3. *20 points.* 2 hours. Follow the instructions in the following site for MLPClassifier for MNIST data.
<https://towardsdatascience.com/classifying-handwritten-digits-using-a-multilayer-perceptron-classifier-mlp-bc8453655880> (I have put this in a PDF file “quiz6-p3-notes.pdf” in our shared folder). Use 50,000 data samples for training and 20,000 for testing. Note you should scale your data to be 0-1 by dividing it by 255. Report your accuracy and print out the confusion matrix.
4. *10 points.* 0.5 hours. Repeat problem #3, but also normalize the input data by dividing by variance on the scaled 0-1 data by using sklearn’s StandardScaler. Report your accuracy and see if it improves from problem #3.