

CSCI 5521: Machine Learning Fundamentals (Spring 2024)

Quiz 3 (Mar. 28, 2024)

Due on Gradescope by 2:00 pm, Mar. 29

Instructions:

- This quiz has 3 questions, 30 points, on 1 page.
- Please write your name & ID on this cover page.

1. (9 points) Select all the correct statement(s).
 - (a) Adding more neurons to a single hidden layer of a Multilayer Perceptron always results in higher test accuracy.
 - (b) The weights in a Multilayer Perceptron are updated during the backpropagation phase based on an error function.
 - (c) A Multi-layer Perceptron with no activation functions cannot solve the XOR problem if provided with the right weights and biases.
2. (11 points) Pick **one bias term** and **one non-bias term** in a (Multilayer) Perceptron **without** any activation functions, and write their update equations. Start with writing the objective function.
3. (10 points) Give two examples of activation functions in Multilayer Perceptron (You can write either the name or the mathematical representation of the function). Answer whether the activation functions that you wrote down are linear or non-linear. And briefly describe the roles of activation functions in a Multilayer Perceptron.