Assignment 11

Perceptron and MLP

1. Using your own words, explain what a perceptron is.
   1. A perceptron is a simulation of a single neuron. It accepts inputs, multiplies them by weights, and adds the weighted inputs to an internal value to derive a single output value. The output may be used as an input for other perceptrons and is used to separate values into different classifications.
2. What is the difference between a perceptron and a MLP?
   1. A perceptron is a single function that takes inputs and returns an output that isn’t very complex. An MLP is an artificial neural network with multiple layers of perceptrons that feed into subsequent layers of perceptrons. The layering enables the ANN to create more complex boundaries between classifications. [1]
3. What happens to a MLP when we add more hidden layers and more neurons within the hidden layers? Explain in terms of how the function f() used to express the output y as a function in the input X changes. Refer to the video/classroom discussion for details.
   1. As more layers are added, the boundaries may become more complex and more precise. With no hidden layers, the value y returned by f() is simply a sum of weighted values. As more hidden layers are added, the weighted values become more complex, as each value is then the result of f() itself, however with possibly different weights.

References:

1. Brownlee, J. (2022, August 2). Crash course on multi-layer perceptron neural networks. MachineLearningMastery.com. Retrieved April 17, 2023, from https://machinelearningmastery.com/neural-networks-crash-course/