Quiz 5

EEL 4774 & 6777 Data Analytics

1 Artificial Neural Network

Consider a fully-connected artificial neural network with one hidden layer, i.e., a multilayer perceptron (MLP), which has 5 inputs, 3 neurons in the hidden layer, and 1 output neuron. The relation between the output y and the inputs $\boldsymbol{x} = [x_1, \ldots, x_5]$ is given by $y(\boldsymbol{x}) = f(\boldsymbol{w}, \boldsymbol{\phi}(\boldsymbol{x}))$, where $\boldsymbol{\phi}(\boldsymbol{x}) = [\phi_1(\boldsymbol{x}), \phi_2(\boldsymbol{x}), \phi_3(\boldsymbol{x})]$.

a) [50 pts] Draw the diagram that shows the inputs, nuerons, connections, corresponding weight parameters, and activation functions.

b) [50 pts] Explain the relation $y(\boldsymbol{x}) = f(\boldsymbol{w}, \boldsymbol{\phi}(\boldsymbol{x}))$: write the explicit relation, explain the role of functions f and $\boldsymbol{\phi}(\boldsymbol{x})$, and state examples of functions.