Homework 4

October 24, 2019

Chapter 5

1) Exercises: #2
   Remarks:
   - Use $\eta = 0.1$.
2) Give it some thought: #1, #2
3) Computer Assignment: #1, #2
   Remarks.
   - In both problems, use two hidden layers and one output layer. The number of output neurons in the output layer is equal to the number of classes. The number of hidden neurons in each hidden layer is equal to the number of attributes.
   - Initial weights are randomly selected in the range $[-0.1, 0.1]$.
   - In problem 1, assume that the learning rate is 0.1. In problem 2, compare five learning rates $0.1, 0.2, 0.3, 0.4$, and 0.5.
   - Define convergence in problem 2 to be the condition that the absolute fraction of change in MSE is less than 10^{-4}, i.e
   $$\left| \frac{MSE(t+1) - MSE(t)}{MSE(t)} \right| \leq 10^{-4},$$
   for epoch t, where $MSE(t)$ is the mean-square-error defined in Eq. (5.3) for epoch t.
   - Use the data set in ILMS for problem 2.
   - Only C and Python are acceptable. No built-in functions on machine learning are allowed.

Due dates.

- Due date for the exercises and give-it-some-thought problems: 5 pm, Thursday, Oct. 31, 2019.
- Due date for the computer assignments: 5 pm, Thursday, Nov. 7, 2019.