EE 550 Artificial Neural Networks - Homework 2

Due 21/03/2018

1) Implementation of Perceptron Model

- **a.** Generate 2-D example with sample/training vectors $\vec{x} = [x_1,\ x_2,\ x_3]^T$ chosen to be in two classes distributed in separate quadrants of a 3-D cube. Assume the midpoint of the cube is placed at the origin. Pick 40 arbitrary points, 20 of which are in the 1^{st} quadrant ($x_1 > 0,\ x_2 > 0,\ x_3 > 0$) and the other 20 of which are in the 8^{th} quadrant ($x_1 < 0,\ x_2 < 0,\ x_3 < 0$).
- **b.** Plot these two classes in a 3-D space.
- **c.** Implement the perceptron algorithm.
- **d.** Plot the error function vs iteration index.
- **e.** After convergence, show the weights i.e., $w_1,\ w_2,\ w_3$.
- **f.** Finally, plot the hyperplane separating these two classes.

For submission of your homework, use Moodle system to upload all of your matlab codes (or any other programming language) and reports in a single compressed file including your name and homework number (HwX_LastName_FirstName). Also, make sure each file in the compressed one is named using your full name and question number (i.e. FirstName LastNameEE550hw2Q1.m).