EE 550 Artificial Neural Networks - Homework 2

Due: 21/03/2019

Implementation of Perceptron Model

a) Pick 100 arbitrary points in 3-D space, 50 of which are in the 1^{st} quadrant $(x_1 > 0, x_2 > 0, x_3 > 0)$ and the other 50 of which are in the 8^{th} quadrant $(x_1 < 0, x_2 < 0, x_3 < 0)$. For training of the weights, use 80 data points (40 from each class).

b) Plot these two classes in a 3-D space.

c) Build the perceptron model.

d) Update the weights and obtain $\omega_1, \omega_2, \omega_3, \theta$ values using 80 training samples.

e) With the trained model weights, plot the decision plane along with sample data points in the same plane.

f) Test the model with the training remaining 20 samples. Plot the output for at least 5 data points from this test data set.

g) Plot the cost function vs iteration index.

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 fullname and question number (i.e., FirstName LastNameEE550hw1Q1.m).