EE 550 Artificial Neural Networks - Homework 1

Due 13/03/2018

1) Implementation of Binary Hopfield Model

    a. Pick 4 letters or numbers of your choice.

    b. <u>Plot</u> these in $8x8$ grid by setting high (dark) and low (light) on the grid to visualize those numbers.

    c. Convert each letter/number to a 64-element vector. These will be your sample patterns.

    d. Implement the algorithm given in the class.

    e. Initialize your network with randomly chosen inputs (i.e. $\mu_i(0) = \mu_0$, $i = 0, \ldots, N$ 1). μ_0 can be taken as a random variable from a normal probability distribution (Gaussian).

    f. Choose μ_0, such that its mean value is 0, variance is σ. Choose 3 different values for σ.

    g. Distort the original sample patterns by adding randomly generated points to each pattern and iterate each case until convergence for each pattern and variance (12 cases). <u>Plot all iterations for each case</u> graphically in 2-D images.

For submission of your homework, use Moodle system to upload all of your matlab codes (or <u>any other programming language</u>) 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).