Programming Project:
Perceptron Learning and Digit Recognition

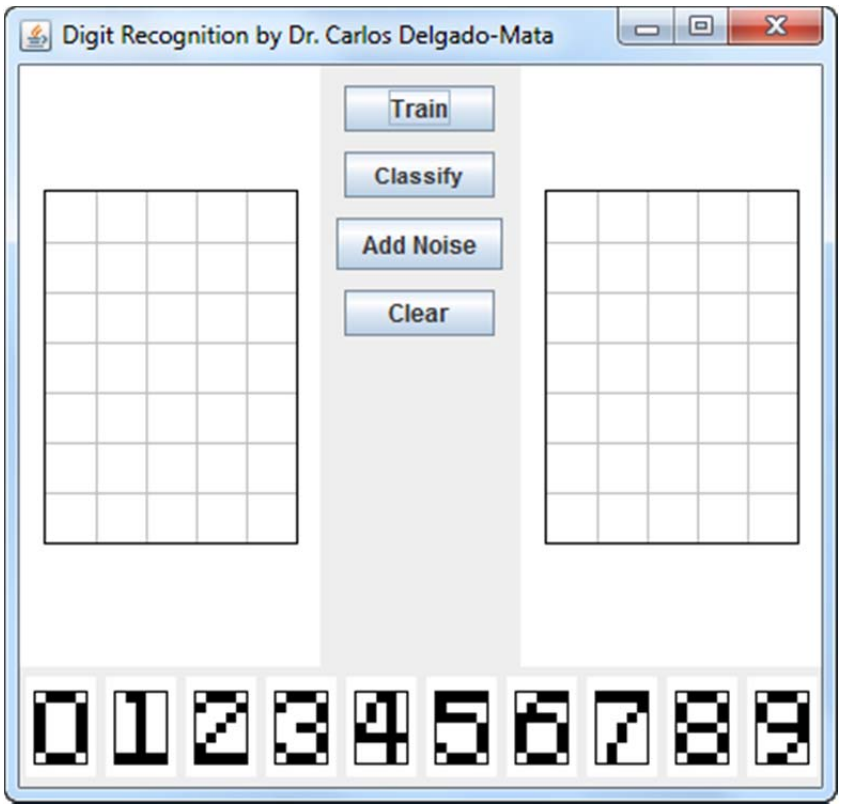
The final project for the Perceptron unit is to design and code the project described herewith below

Digit Recognition.

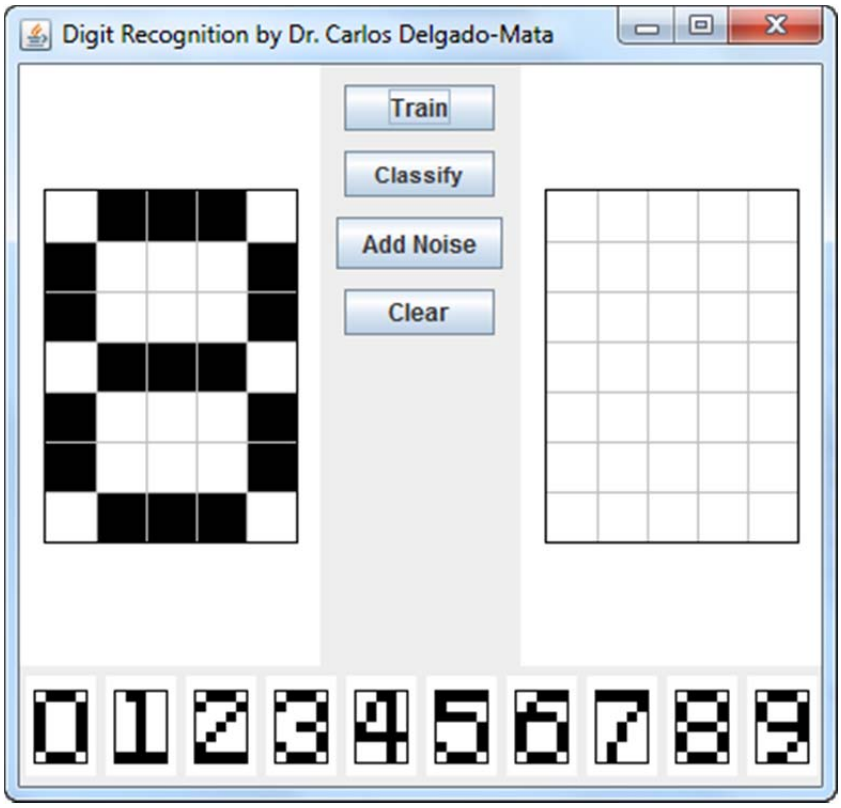
In this programming project assignment, you will use a *perceptron learning* method to train a simple neural network to recognize digits. The input to your system will be a set of 35 binary pixels from a 5x7 image, and the output should indicate which of the digits (0 – 9) is in the image. To do you will do the following.

1. Create the numbers as a binary image.
2. Create the train data set 30 images (1 without noise 29 with noise) for each number.
    a. You will end up with a set of 300 images.
3. Train 10 perceptrons (one for each digit).
    a. Use the train data set. You will use the 30 correct images with output recognized (1). You will use the other 270 images (the other digits) and the output not recognized (-1 or 0).
    b. Do the abovementioned for every digit.
4. Select a digit to be recognized.
    a. Select the digit using the digit buttons at the bottom of the screen.
    b. Add noise.
    c. Press the classify button.
    d. Go through the output of all the neurons. Chose the first one that is output is 1 (recognized). If no digit is recognized the output should be error (E)

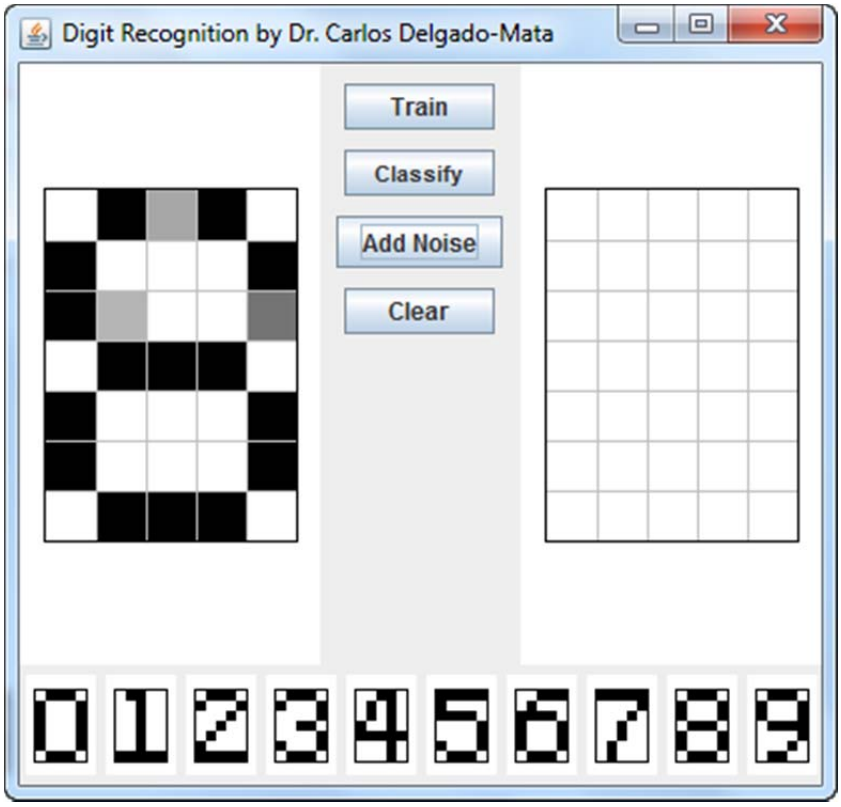
Sample user interface.



If you click on the eight number panel.



Clicking on the Add Noise



Press the classify button.