

SBE II: Homework 9

Experiment-1:

- a) In the case of a single iteration of training, the outputs of the perceptron for the pictures were as follows:

y =

[0.3547 -0.2305 -0.0088 0.0615 -0.2826 -1.0005 -0.8314 -0.4848
0.3604 -0.5692]

- b) We can see from this response vector that all of the responses except for image 4 are correct.
c) After a second iteration of training, the outputs of the perceptron for the pictures were:

y =

[0.6064 -0.3432 0.1325 0.1411 -0.3494 -1.1109 -0.9980 -0.6731
0.5722 -0.8029]

We can see that the responses for each photo are now correct.

- d) When we train the network 100 times using these images the outputs do begin to converge to the class labels (i.e. 1 or -1). The outputs are as follows:

y =

[0.9995 -0.9997 0.9990 1.0002 -0.9854 -1.0005 -0.9999 -1.0018
0.9995 -1.0000]

- e) When you arbitrarily set the sets as those posed in this question and retrain the classifier/perceptron, you actually get perfect classification in this case. This, however, is not to do with the actual qualitative content of the images in either case, but simply similarity in voxel intensities. The output vector is:

y =

[-0.4021 -0.1633 -0.1160 0.1724 -0.0552 0.6821 -0.4080 0.2144
-0.5115 0.5251]