Class project for the module Human Psychophysics

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Project 1:

Construct a Kohonen network in order to carry out the classification of the vectors

(1 1 0 0)
(1 0 0 0)
(0 0 0 1)
(0 0 1 1)

Construct a network that is flexible in terms of the size of the input vector. This will permit you to easily utilize the patient and healthy subject data.

Pay attention to the adjustment in the learning rate. You may have to find the value that allows a convergence (i.e. synaptic weights that converge).

The vectors (1 1 0 0) and (1 0 0 0) should fall in one class I while the remaining two vectors should fall in class II.

Project 2:

Once the training is completed carry out a test with the vectors

(0, 0, 0, 0.9)
(0, 0, 0.8, 0.9)
(0.7, 0, 0, 0)
(0.7, 0.9, 0, 0)

As you might expect, the vectors (0, 0, 0, 0.9) and (0, 0, 0.8, 0.9) should fall in class II while the vectors (0.7, 0, 0, 0) and (0.7, 0.9, 0, 0) should fall in class I.

Project 3:

The text file contains the data from 4 subjects. You have to identify which ones are patients or controls based on the Kohonen network that you have already constructed.

To turn in the project, you must e-mail me *the identity of the 4 subjects (patient or control)* and your computer code for the self-organizing map.

Bonus points (2 points): What are some differences if any between a bio-inspired algorithm like the Kohonen SOM and two other well-known similar clustering

algorithms – the kmeans and k nearest neighbour algorithm? (Answer maximum length, half a page)