

Hints and Additional Information for Homework 2, CS564 Fall 2001

Encoding issues:

In the following examples the blue portions of the vectors must be encoded using a population or a coarse coding scheme. The red portions will use a simple encoding by assigning each bit a particular value (for the color coding for instance, say bit 2 can represent yellow).

Assume that there are 4 colors: red [1000], yellow [0100], white [0010], black [0001] ([0000] means other)

Assume that the shape only tells whether the object has curved surfaces or not (00: undetermined, 01: has curved surface and no straight surface, 10: has straight surface but no curved surface, 11: has both curved and non curved surfaces)

Example input encoding:

[01][0100][000000000][000000000]

Shape color width/diam height/length

Example grasp coding

[001][000000000]

Grasp Aperture
type size

Example IT coding

[00000]

Comparing AIP and IT weights:

The important thing here is that, even there are two separate networks their input layer is actually the same. So you can look at the weights of each network to see which features they pick from the input vector.

WTA:

As you may have noticed, a simple bit-by-bit WTA will not work for the grasp selection (Why?). So, devise a method to compare the outputs of AIP and RX and to do a WTA selection. You can program this part conventionally. You don't need to create a neural network to do that (You are welcome to do though)

Training set:

If you are confused and could not make up a reasonable training set, the below input set should give you some inspiration. Don't forget to specify the output values in a thoughtful manner. You cannot apply a precision pinch to a big cylinder for example!

Cylinders (3 diam.)x(3height)x(3 colors) = 27 cylinders

Lipstick (1 diam)x(1length)x(1 color) = 1 lipstick

Pencil (4 length)x(1 width)x(4 colors) = 16 pencil

Spool of thread (1 length)x(3 width)x(2 colors) = 6 spools

Beer glass (1 diam)x(1 height)x(1 color) = 1 beer glass

Sphere

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