

P318 Computational Modeling
Spring 2011
Week 2 Homework
Due in class Wednesday January 26th

The goal this week is to implement the Similarity Choice Model and the MDS-Choice Model. We will use these models in later assignments.

For those of you taking the course for credit, please turn in a hard copy of your code and your plots, or email them to me as attachments (preferred). Solutions will be posted online next week after class.

Note that this homework assignment and post future homework assignments ask you to generate plots (scatterplots, line plots, bar plots). All of the plots must be done within Matlab in code.

If there seems to be something missing or something is unclear, please email me right away.

For this assignment, you will need to use the following Matlab file online:

homework2.m

- Implement a function that calculates the probability of identifying object i with the label for object j as predicted by the Similarity Choice Model (SCM). Inputs to the function should be a vector of responses biases for all stimulus labels 1 through N , and an $N \times N$ matrix of similarities between object i and object j .
- *homework2.m* has a bias vector (*bias*) and similarity (*sim*) predefined for you. Generate the predicted confusion matrix using these parameter values and the function you just wrote.
- *homework2.m* has data from an identification experiment reported by Nosofsky (1985). Note that the original data reported in the paper was frequencies, not probabilities. I have included code that does the conversion. Create a scatterplot of *prd* (x axis) and *obs* (y axis) in Matlab.
- Test an equal bias version of the SCM using the same similarity parameters as above. Create a scatterplot of *prd* and *obs* using this special case of the SCM.
- Implement the MDS-choice model. As part of implementing the functions for this model, please make sure you implement a function that calculates similarity as a function of the coordinates for the two stimuli (S_i and S_j), sensitivity (c), distance metric (r), and similarity function (p).y
- Use the (x,y) coordinates and new bias vector in *homework2.m*, assume $c=1$, and generate predictions of the MDS-choice model assuming a Euclidian distance metric (plot *prd* versus *obs*) with a Gaussian similarity function.