P318 Computational Modeling
Spring 2014
Week 4 Homework
Due Monday February 3rd

Your assignment for this week is to implement the Similarity Choice Model (SCM) and the MDS-Choice Model we discussed in class. We may use these models in later assignments.

For those of you taking the course for credit, please email your code to me as an attachment. To grade your homework, I will examine your code and I will try to run it. Solutions will be posted online next week after class.

Note that this homework assignment and future homework assignments ask you to generate plots (e.g., scatterplots, line plots, bar plots, 3D plots). All of the plots must be done within Matlab in code. All plot elements should be labeled appropriately. As I noted in class, you can check out GraphExamples.m for some simple examples to get started. And you can check out the graphing lecture notes from my PSY319 course online (http://catlab.psy.vanderbilt.edu/palmeri/psy319/).

When I run your code, I should be able to step through each part of the assignment in your code. Use %% to demarcate subsections of your code and clearly label the subsections.

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

For this assignment, you will need to use the following Matlab file online:
homework4.m

- Implement a function that returns the array of predicted probabilities of identifying each 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 NxN matrix of similarities between object *i* and object *j*. The function should return an NxN matrix of predicted probabilities.

- homework4.m contains code for a bias vector (bias) and similarity matrix (sim) predefined for you. Generate the predicted confusion matrix using these parameter values with the function you just wrote above.

- homework4.m has data from an identification experiment reported by Nosofsky (1985). Note that the original data reported in the paper were 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 defined 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 (Si and Sj), sensitivity (c), distance metric (r), and similarity function (p).

- Use the (x,y) coordinates and new bias vector defined in homework4.m, assume c=1, and generate predictions of the MDS-choice model assuming a Euclidian distance metric with a Gaussian similarity function. Plot predicted versus observed as above.