

## CLRS720 – Computational Vision Science – Lab 4 – Pairs Indirect Scaling

**Objective** This lab is an exercise in the psychophysical method of indirect scaling using pairwise comparisons among image stimuli. This lab is essentially a quantified photo contest from the photo scavenger hunt. You will design a 2AFC experiment to present observers with pairs of images, have them evaluated based on image preferences, and produce an interval scale of perceived aesthetic quality.

### Instructions

The photos will be chosen from this year's scavenger hunt ([link here](#)). Use the images specified in the 'ImagesToUseInExp' file. Students will collectively choose  $K=5$  landmarks, and  $M=4$ -to-6 images for each landmark. The experiment will include all possible pairwise combinations of  $M$  images for each of  $K$  landmarks (how many total comparisons is that?) – There is no need to compare images of different landmarks to each other.

Build a GUI for the experiment that presents all possible pairwise comparisons of images within each landmark and asks “which image do you prefer?”. Each pair will be presented on the left and right side of the screen, and the observer will respond by pressing the left or right key, respectively. A few details to pay attention to:

- The question “which image do you prefer?” is meant to be a measure of aesthetic preference. In other words, you can also think of this question as “which image is more aesthetically appealing” or “which image would you rather buy and hang in your home”. The criteria for this judgment is subjective and can depend on anything the observer wants!
- Start with `pairs_2AFC_gui_demo.m` (if you want to).
- Compute all pairwise comparisons of  $M$  images for each of  $K$  landmarks.
- Some landmarks may have different  $M$  images.
- The images might need to be reformatted ahead of time (make them a similar size, same image file type? Similar image-naming convention?).
- Randomize presentation over the whole list (landmarks will NOT be presented in blocks)
- Randomize the image-presentation order within trials (the images in a pair will randomly be presented on the left vs. right side of the screen).
- Repeat the experiment (you will make 2 total judgments for each pair)
- The data output file should be structured such that rows=trials, col1 and col2 are the image identifiers for the images in a given pair, and col3 is the image identifier corresponding to the image that was chosen by the observer.
- TESTING (e.g., with images labeled “L”, “1”, “2” etc.) is useful!

Share your data with the group, the analyses will be conducted on the combined data for all observers. Conduct the full Thurstonian analyses for each landmark separately. This will result in 5 separate scales, one for each landmark. Make sure to correct for saturated ( $p=0$  or  $p=1$ ) comparisons, and compute 95% CIs. Plot the results for each landmark. Make sure to label the plots so that you can interpret the outcome (who ‘won’ for each landmark?). You will submit a

PDF writeup of the lab, the MATLAB file used to run the GUI, and the MATLAB file used to conduct the analyses.