**Experiment in Color Saliency**

This documentation goes through over all the files and data used either to prepare, run or analyze results of the experiment.

All files are located in the RIT my\_shares folders, specifically into the following patch:

smb://cias-files/myshares/Sergis share/

Inside this directory it can be find four different folders:

* **Functions and Data:** It includes all the Matlab functions used for the experiment in ‘.m’ format and all the raw data extracted in ‘.mat’ format.
* **TABLES:** Different Excel tables. ALLINFORMATION.cvs contains all the different data from the experiment in a single file. ProbabilityPlots.xlsx has the different probabilities of reporting and fixating for each hue, chroma, lightness and observer. Index.xlsx serves as an index to associate each stimulus to a Lightness, Hue, Trial and Chroma.
* **STIMULUS:** Is where all the stimuli where created and saved as PNG images. Since the computational cost of creating each stimulus (1440x1440 pixels) is high, they need to be created a priori of running the experiment. Each observer will see a different set of stimuli, which are created in different folders. There are already 30 set created, although only 12 has been used. The stimuli are named numerically by their order of creation, sorted in the following way: 3 different chromas x 3 trials x 18 hues x 4 lightness. In this way the stimuli number 004 will be the 1st set of chroma, 2nd trial, 1st hue and 1st lightness. The files starting with ‘S’ refer to the stimuli, meanwhile the ones which start with ‘L’ will refer to the legend of each stimulus of where the patches were located.

In the following work, it is described the process in how to prepare, run and analyze the experiment.

**Prepare Experiment**

A priori of running the experiment, the stimuli have to be created. Each stimulus is a PNG image of 1440x1440 pixels. The high computational requirements make impossible to create the stimuli real time meanwhile running the experiment.

All the files and scripts needed in order to prepare the stimuli are found in the folder ./PREPARE/

The first needed thing is to know all the possible CIELAB values that the monitor on which the experiment will be run, and then apply a proportional space in terms of all chroma for all the different hues. The script MAKEPOINTS.m is designed for doing this, it simply need to be run with the path to the Monitor ICC profile in the line 8 of the code. The script will create a file on the same folder named PointsLab.mat with all the information needed.

Next and last step is to create the actual set of stimuli. The script PREPARESTIMULI.m already does that for you, but is needed to edit variables in lines 7 and 8, by setting how many sets are to be created and which one is the last one created (so it does not overwrite it). Once you run it, the function may take several hours to complete the process, depending in how many sets has to create.

The function is set to create the stimuli in the way it was set up for the experiment, therefore it will straight away create in the STIMULI folder a new directory with a new set number, and fill it with all the 648 stimulus, sorted in the following way: Chromas / Trial / Hue / Lightness (Please refer to ./TABLES/Index.xlsx for a complete list of all the stimuli and its correspondent characteristics). Both background and patches were of a random distribution with specific means and deviations. Patches locations were set randomly within all possible locations. If any of these parameters should be changed, it is important to have a complete knowledge of how PREPARESTIMULI.m and all its sub-functions proceed.

PREPARESTIMULI.m is simply a function which loops all over the different characteristics for each stimulus and then calls CreatePatt\_MeanValue.m. The function is called a total of 648 times, each of them giving as an output a stimulus. There are four blocks starting in lines 20, 61, 103 and 145 which repeat the same process but using different Lightness mean (L\_Target) and deviation (Deviation). Each specific lightness has three loops: hue (for hue = 10:20:350), trial (for invi=1:3) and chromas (for i=1:3). For each loop, the function CreatePatt\_MeanValue.m is called in with the specific stimulus characteristics, with the following inputs:

* 8 patches chroma values generated randomly:

choi = randperm(length(MEANSTOCHOI));

meansvalues = MEANSTOCHOI(choi((i-1)\*8+1:(i\*8)));

* Lightness mean, deviation and hue values for patches:

L\_Target = 50;

Deviation = 1;

HueRange = [hue-10 hue+10];

* Lightness mean, deviation and hue values for surround (background):

SL\_Target = 50;

SDeviation = 1;

sHueRange = [0 360];

The output of the function gives:

* the image of the stimuli,
* the information of the characteristics in CIELAB of each of the patch,
* the legend image with the location of each of the patches,
* and the CIELAB values of the background.

Then the function stores all the information of each stimuli inside the set in the variable called info which is finally saved inside the folder /STIMULISinfo as a ‘.mat’ file named as the number of the set. It also saves both PNG images (stimuli and legend) in the **external** folder /STIMULI.

The function CreatePatt\_MeanValue previously called takes all the details of the stimulus characateristics and returs images and info. The function needs both ICC profiles (monitor and generic LAB) to be in the function folder. It also needs to load the PointsLab.mat file which has to be in the same folder.

This function returns a single stimuli and