

PSY 628: Perceptual Processes

Homework 2: Receptive fields and convolution

Due: Tuesday, 17 September at 5 pm

This homework explores the process of convolution, which is similar to how receptive fields analyze/filter an image.

1. On the class web page the homework assignment includes a link to R code that defines a receptive field “kernel” and convolves it across an image. Download the files (and install necessary libraries in R) and make sure the code runs properly.
2. For the provided Mountains.jpeg image, systematically vary the orientation (theta) of the oriented filter and perform the convolution. Measure the overall strength the responses to the image for that orientation by summing the resulting image. “sum(convolvedImage)”. Plot the sum of responses for the different orientations.
3. Repeat the steps in 2 with the provided square.jpg image.
4. Explain the responses x orientation profile for the two images.
5. Relate the responses x orientation profile for the square.jpg image to orientation preferences of simple cell receptive fields.

Send your completed homework to Dr. Francis at gfrancis@purdue.edu