

CS 2104 Homework Assignment 2b

Problem 1. Group work. 30 points.

To begin, each group member installs the latest version of *Mathematica* available through VT software distribution. He will familiarize himself with the very basics of it by following any of the tutorials.

The group will use an already available piece of Mathematica code to research the following issue: how large is the variation in individual image recognition ability? That is if a group of people are presented with the same sequence of images that represent the same object at increasing level of detail, will they all begin to recognize the object at the same or different levels of “fuzziness”?

Specifically, you will be using a smooth curve to “fit” a set of points on the plane that are supposed to represent a well-recognizable object if the fitting is done well. A single variable — number of free parameters (constants) that describe the curve’s mathematical form — controls the quality of the fit and hence the degree of realism of the image.

The group leader (and only the group leader!) downloads the Mathematica notebook for this assignment from class website. He/she will play with it first, to see how it works. A “dial” at the very top of the image controls the number of parameters (constants), which can be changed from 2 to 30.

Once the group leader has familiarized himself with the code, he will “test” his group members. She will start with the lowest number of details (number of constants = 2) and then “dial them up” all the way to 15 or 20. She will demonstrate each result to his group members, and they will write down the name object they perceive. At the end of the exercise, each group member will have a two-column table “apparent object” vs. “number of fit constants”. For example, the first couple of entries may look like “a blob” ”1”, “US map” ”2”. Needless to say, the team members are not expected to see each other’s responses until the end of the exercise. At the end, they compare the responses and compute the average value of the “number of fit constants” at which the object becomes recognizable. The standard deviation will provide the spread in perception.

Submission of problem II Strictly follow the “General Assignment Guidelines” (required group assignment) on the course web-site. Provide the average and standard deviation computed above, plus add a short conclusion summarizing your results and their possible significance. You might want to include pictures of some of the images (if you figure out how to make them) if you feel these help you weave the story better. No more than 1 page total.