Projects for ISTA 370

Paul Cohen

January 8, 2012

The best way to get good at empirical research is to do it: Design experiments, collect data, visualize and analyze the data, figure out what went wrong, revise the experiment design, and, ultimately, produce results and explanations. Doing this on a large scale in the context of a class is challenging: Lab time is limited, human subjects research needs approval, and human subjects are themselves limited resources.

Each student is expected to serve as a subject in experiments. To help you calibrate the time requirement, if five experiments each require 40 human subjects for an hour, and there are 50 students in the class, then each student is expected to spend four hours participating as a subject in experiments over the course of the semester. (Keep in mind that some of these will be pilot experiments and some will be the real, final experiments, and one person generally shouldn’t participate in both an experiment and its pilot.)

How it will work Each student is responsible for formulating a research question and a preliminary experiment design and writing a preliminary design document (PDD). The question might or might not require an experiment with human subjects to answer it. The instructor will review and grade all of the PDDs. After that, the instructor will pick roughly ten PDDs for further exploration by teams of students. The instructor will base the selection of PDDs on many criteria, including the clarity of the PDDs, the likelihood of success, the load on lab resources, and getting a good balance of topics. Consequently, having your PDD selected or rejected does not affect your grade. (However, your PDDs are themselves graded, so do a good job!)

The instructor will post the selected PDDs. Students will have one week to review these PDDs and request assignments to research teams; each student should respond with a first, second and third choice. After this, the instructor will finalize the assignments of students to teams. From that point on, all empirical work will be done by teams. All reports will be signed by all team members, and the order of authorship must be explained.¹

January 25 Hand in a PDD – a document that describes the research question and the first version of your experiment design and protocol following the checklist in Section 3.6 of the textbook, Empirical Methods for Artificial Intelligence. Each student does this as an individual.

February 1 Each student sends the instructor a list of three projects, ordered by preference, that he or she wants to join.

February 13 Teams make oral presentations in class of the revised research question and their experiment design and protocol following the checklist in Section 3.6 of Empirical Methods.

¹Common methods are alphabetical authorship when the work was roughly equally divided, or authorship in order of who did the most work. Each team will produce several reports, so there will be opportunities for different team members to excel on different reports. Individuals who contribute less, overall, than their fellow team members will be graded less highly.
March 5 Teams make oral presentation in class of the results of their pilot experiments. The number of trials should be appropriate and justified. If the pilot went perfectly and the experiment protocol needs no tweaking, then a team can proceed to run the final experiment and collect data.

March 19 Teams make written reports of the results of the pilot experiment. For those teams for whom the pilot went perfectly, write up the results. Other teams should explain how they changed their protocols as a result of the pilot experiment.

The interval between March 5 and April 25 should be spent revising the pilot protocol (if needed), collecting data for the final experiment design, analyzing the data, and preparing to present the results.

April 25 and 30 Final oral presentations will be given in class. In addition a final written presentation is due on April 30.

In sum, the following reports provide five opportunities for each team to be evaluated and one opportunity (the project description document) for each student to be evaluated as an individual. So, how does an individual get a good score on the project part of this course? The same way that researchers do: By doing enough of the work, of sufficient quality, to be first or second author on one or more of the reports.

January 25 Individual students’ project description documents.

February 13 Oral presentations in class of of experiment design and protocol.

March 5 Oral presentations in class of the results of pilot experiments.

March 19 Written reports of the results of the pilot experiment.

April 25 and 30 Oral presentations of final results.

April 30 Written presentations of final results.