Homework #2 (CMSC 396H, Fall 2016)  
Due September 14, 9:00AM

1 Overview

The goal of this assignment is to gain experience with critically reading, analyzing, and writing about technical papers. We are covering the topic of ethics, which will be part of our in-class discussion. We will read two papers, but you only should review the first one:


In class on September 14, we will have an interactive discussion about these papers, wherein we will discuss and debate their merits, and possible ethical concerns about them.1

What you will need to do before then—writing a paper review—is given in Figure 1. There are a couple differences between this review and those in the peer-review process; primarily, when evaluating whether or not to accept a paper into a conference or journal, each review would also include a numeric score, ranging from “definitely reject” to “definitely accept”. Also, in the peer-review process, reviews would be delivered to the paper’s authors: I will not be sending the authors your reviews!

2 Paper Strengths and Weaknesses: What makes research good?

There are many ways you can reason about the strengths and weaknesses of a paper. In fact, the target can move over time: the demand for larger datasets or more true-to-life simulations often grows as a particular field matures.

That said, there are a few aspects of a paper that are consistent, reasonable measures for the paper’s quality. These include: is the paper novel? Does it compare to related work thoroughly and accurately? Are there any technical flaws? Are there potential flaws to the way an experiment was run or analyzed that lead you to question the paper’s conclusions?

This blog post discusses an approach to writing peer reviews of technical papers:

“Advice on reviewing papers,” M. Hicks, August 2014.

http://www.pl-enthusiast.net/2014/08/21/advice-reviewing-papers/

Cultivating your own view of “good research”. Let this paper help inform how you approach your review of the “All Your Contacts” paper. (Another paper with advice on writing reviews is the following: “Writing reviews for systems conferences”, T. Roscoe, March 2007.) But as you grow as researchers, you will not only learn how your research community values and evaluates a paper’s quality—you will also cultivate your own perspectives and beliefs as to what makes a paper good (or not).

1Originally, we were going to read “Encore: Lightweight Measurement of Web Censorship with Cross-Origin Requests”, by Burnett and Feamster, but feel that the Social Phishing paper is better for various reasons. However, if you are interested in ethics, we encourage you to consider reading this paper, too.
Writing Task 1: Paper review. For future papers, you will be writing a concise synopsis of and insight into the work, but for this assignment, you will be doing a slightly more thorough review of the paper, to get into the habit of thinking critically about the strengths and weaknesses of a paper. To this end, you will be writing your review of the “All Your Contacts” paper in the template of what is common for peer-reviewed conferences and journals:

- **Paper Summary** (roughly one paragraph in length): A neutral description of the paper. Some common things to include in the summary: what problem does the paper seek to solve, how does it try to do so, what are some of the techniques it uses to evaluate or build the solution, and what are some of the main take-away results.

- **Paper Strengths** (itemized list of about one sentence each; details come later): What you think the contributions are; what you think the paper does right/well, or what you found interesting. Was it a good problem, a good solution, an evaluation rooted in a realistic setting, was the paper well-written, etc.

- **Paper Weaknesses** (itemized list of about one sentence each; details come later): What do you think the paper did not do well.

- **Detailed Comments** (at a minimum, one short paragraph for each of the paper weaknesses): This is the part of the review that provides the rationale for behind each of the items you listed as weaknesses of the paper: Why did you disagree with the problem, the solution, the results, how it wrote about related work, etc. You can also add extra detail about why you liked aspects of the paper. Essentially, this is where a review presents its case for why the paper should be accepted for publication (or not). What could the authors do to improve the paper to better meet your expectations (e.g., run another experiment, prove a property about some aspect of the system, etc.)?

Figure 1: Main task for this homework assignment
3 Ethics

As mentioned above, we chose these papers in part to seed a discussion on ethics in computer science research.

A major part of research is performing experiments, and often these experiments involve “human subjects.” Some examples are relatively straightforward: human participants in a drug trial, or psychological experiments like the Stanford Prison Experiment. In the Stanford Prison Experiment, volunteers were randomly categorized into prisoners and prison guards, and they simulated running a prison on campus at Stanford. The goals of the research were to study how conflict arises among prisoners and prison guards. In a surprisingly short period of time, the “prison guards” began physically and psychologically torturing the “prisoners”—and even though they were allowed to opt out of the experiment at any time, almost all of the “prisoners” accepted the punishment. Eventually, an external party raised objections to those running the experiment, and they shut it down in less than a week.

Due to events such as these, the scientific community has adopted a set of guidelines and standards for how to go about running experiments that involve “human subjects.” These are encompassed in the Institutional Review Board (IRB) Process. More information about the IRB process in general and in particular at UMD can be found here:

http://www.umresearch.umd.edu/RCO/New/IRBProcess.html

And the federal guidelines for research involving human subjects can be found here:

http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html

The IRB process concerns “human subjects” research, and seeks to protect the rights and welfare of “human subjects” participating in research studies. I keep putting “human subjects” in quotes because (a) it is an official term, and (b) particularly in CS, it is important to take a step back and consider what constitutes a human subject.

When does an experiment involve human subjects? For the experiments mentioned above, it is clear that they directly involve human subjects. And there are others where it is clear that no human subject is involved, such as when running a local simulation of protein folding on a computer. But then there are other experiments that involve humans in a somewhat indirect way—such as those that interact with software other humans are running, storing files on their computers.

What distinguishes these two classes of experiments? How do we know when there are human subjects involved? The HHS defines a human subject as follows:

Human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains

1. Data through intervention or interaction with the individual, or

2. Identifiable private information.

But what do “intervention” and “interaction” mean in CS, when we can interact with someone remotely, or cause software running on their machines to perform certain acts?
Informed consent  When an experiment does involve a human subject, written informed consent must be obtained from all participants when possible (otherwise, the researchers must provide proper justification and obtain a waiver). Participants must be able to ask questions before, during, and after the experiment, and it must be the case that participation is always voluntary.

Here, too, questions arise: when is it possible to obtain written consent and to field questions from participants in a CS research study, particularly when our experiments may include collecting data from hundreds of millions of users? What technical solutions are there to inform so many users, obtain consent, and field questions? Under what conditions should these rules be relaxed?

Risk versus benefit  Ultimately, any experiment involving human subjects carries some risk with it. The federal guidelines for ethical research defines the notion of “minimal risk”:

Minimal risk means that the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

However, were we to require that all research impose no more than minimal risk, there are many worthwhile experiments that would not be able to take place: experimental drugs, new workout or training regimens, or even psychological analyses. So then where is the line?

The IRB process seeks to find a balance between the risk imposed on the human subject participants and the potential reward to society from the research. What is this balance? Whose decision is it? How do you quantify the risks from a CS research experiment, and the potential benefits? What role does the research community play?

Ethical angle  When reading these papers, and writing your review of the first, consider the following questions. We will discuss their answers in class.

• Which experiments in this work involve human subjects? Why or why not? Did the paper acknowledge this, and if so, do you agree with their assessment?

• Did the authors of this work seek out informed consent? If so, do you think they did so in an effective manner? In either case, do you think informed consent was necessary (i.e., should they have sought it)? How would you have gone about obtaining informed consent from the participants?

• What are the potential risks faced by the participants in the study, if any? Do you believe the paper described these sufficiently, and did they communicate them to their users?

• What are the benefits of this study, and do they outweigh the risks?

• Finally, include some concluding thoughts: Do you think that the paper (or any paper, for that matter) should be rejected based on ethical grounds alone (irrespective of the overall quality of the paper)? What role do you believe the Program Committee (PC) has in making such decisions?

4 Submitting

You may simply post your write-ups as private Piazza posts to me.

These are due by 9AM the morning of our next class (Wednesday September 14), so that I can have time to read through all of them and discuss them during class.