ORFE Senior Thesis Prospectus

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Title: Towards a More Effective Online Reputation System in Crowd-Sourcing and Beyond

Abstract: The literature on crowd-sourcing is largely scarce when it comes to modeling methods of aligning the incentives of workers and requesters. Some attempts have been made to recreate a "reputation" system, but these models are still highly idealized and disconnected from the extremely simple models seen in practice (i.e. Amazon's average star rating or Ebay's net positive reviews). This paper helps fill the gap in the existing literature by exploring the desirable characteristics of an online reputation system, offering a protocol for a cryptographic online reputation system that can be standardized across a variety of different platforms and proving certain incentives arise within the crowd-sourcing marketplace as a result of this system.

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Introduction / Prospectus

Many of our daily interactions run smoothly because of a background process that we don't often think about. The reason why people wear clothes, make polite small talk and honor their commitments is due, at least in part, to the social construction of reputation. Reputation is a way for an individual to build an image through consistency with some ideal social norms, and thus increases the perceived likelihood that this individual will continue to conform to those norms. It's a way of preserving information about a person's previous choices so as to inform our future projections of their choices.

In the online world, such reputations are more difficult to come by. Forums are plagued by flame wars and YouTube comments are vitriolic because Internet users feel less like their reputation is at stake. Although this can be annoying to the average user of the Internet, the lack of a coherent, pervasive reputation system takes on a new meaning in the context of online business transactions.

When money is exchanged in the real world, there are certain implicit guarantees that a business reputation can provide. A store with a physical presence and previous satisfied customers is likely to provide good service to an individual. This use of reputation in smoothing (and vetting) business transactions online begins to break down since there's no unified or standard way to know if a buyer or seller on the internet is legitimate and of good reputation. Although some sites, like Amazon or Ebay, are well established and have rudimentary customer rating systems, there is no analogue to the real-world reputation that guides our lives so closely.

The lack of a robust online reputation system also plagues crowd-sourcing platforms, which connect workers and requesters. When a worker accepts a task, he has little to no information about whether or not the task-requester will pay him. On the other hand, the task-

requester often has to make a payment decision before he's had the chance to verify the quality or authenticity of the worker's work. In this scenario, reputation seems to be a way to allay some of the inherent informational asymmetry in crowd-sourcing and to allow the crowd-sourcing market to function normally.

The goal of this thesis is to present a method for building an online reputation system that provides a close analogue to real-world reputation in order to align incentives and increase crowd-sourcing market efficiency. I want to first decide what features of a universal online reputation system would be useful to have (and would result in "optimal" behavior). Then, I want to come up with a model of reputation that could be implemented cross-platform and could be verified independently by anyone (to imitate word-of-mouth reputation). Finally, I want to spend time discussing what sorts of behaviors and marketplace would result in equilibrium.

There has been a certain degree of modeling done in the literature, and in this context, I think my thesis can take two approaches. One would be to take an existing model and design a realistic way to implement it on a crowd-sourcing platform, and the other would be to come up with a new mathematical model of building and verifying reputation online.

My initial thoughts are to devise a new reputation scoring system based on game theoretic principles and cryptography. For example, in the virtual currency of BitCoins, cryptographic hash functions are used to validate the amount and authenticity of the currency. Such a system could potentially be used to produce a unique "reputation score" that could be validated by anyone, and each reported interaction in turn could be verified independently (i.e. to prevent fraudulent or spammy reviews). Since I'm doing the certificate program in Computer Science as well as majoring in ORFE, this would be a way to combine a study of an "optimal" incentive system and implement it using cryptographic principles of computer science.

Additionally, the articles that I've read on online reputation systems focus on making sweeping and simplifying assumptions and then analytically proving that certain equilibria exist. While this makes sense, there is an opportunity here to fill in the gaps by making more realistic assumptions for the reputation system and then empirically determine equilibria and/or optimal behavior through simulation.

I welcome your thoughts on this idea. My primary questions are:

- Do you think that there's space for a more advanced model of online reputation in crowdsourcing?
- Do you think that it makes sense to try and use simulation to prove equilibria for more realistic conditions?
- What do you think about the potential application of cryptography?
- Do you think that there's enough ORFE-related material here to be a compelling thesis?

Thanks for reading, and looking forward to hearing your feedback.

Best,

Akshay