Lessons Learned from an Experiment in Crowdsourcing Complex Citizen Engineering Tasks with Amazon Mechanical Turk

Presenter: Matthew Staffelbach

Authors: Dr. Tracy Kijewski Correa, Dr. Greg Madey, Dr. Zhi Zhai, Dr. David Hachen, Peter Sempolinski, Dr. Daniel Wei, Dr. Ahsan Kareem, and Matthew Staffelbach

Department of Computer Science and Engineering
Department of Sociology
Department of Civil and Environmental Engineering and Earth Sciences
University of Notre Dame

Abstract

America’s dated infrastructure is failing to keep pace with its burgeoning population. In fact, the average grade in ASCE’s (American Society of Civil Engineers) 2013 report card for America’s infrastructure was a D+, with a 3.6 trillion dollar estimated investment needed by 2020 and needs for inspection and assessment that far surpass available manpower. Crowdsourcing is increasingly being seen as one potentially powerful way of increasing the supply of labor for problem solving tasks, but there are a number of concerns over the quality of the data or analysis conducted. This is a significant concern when dealing with civil infrastructure for obvious reasons: flawed data could lead to loss of lives. Our goal was to determine if workers on Mechanical Turk were capable of developing basic engineering analysis skills using only the training afforded by comprehensive tutorials and guided questionnaires. Crowdsourcing has been effectively applied in the sciences, even prior to the Internet. The Audubon society has been harnessing the power of the crowds in order to effectively plot the location of hundreds of bird species in the United States. Thousands of Audubon members would mail information stating the number, species of birds, and their locations. Now the Audubon society and the Cornell lab of Ornithology run a real-time, online checklist program called eBird. Some other famous instances of effective citizen science include Galaxy Zoo, a galaxy classifying website and Phylo a game that allows crowds to help align related DNA sequences. Our goal was to test the possibility of Citizen Engineering for complex engineering tasks.