Building your own Online Lab with Volunteer Science

Summary

New information technologies allow for new modes of data collection, provide unparalleled computational resources, and facilitate long-distance collaboration. These new technologies are increasingly being used in fields ranging from psychology to natural language processing and astronomy to create online laboratories. Programs like *Galaxy Zoo*, *Fold.It*, and *ReCAPTCHA* demonstrate the power of creating online studies and recruiting online volunteers as participants and contributors to research. Services like MTurk and Prolific provide diverse subject pools for this research. The greatest challenge to the broad adoption of these new methods is technical training. In this tutorial, we provide attendees with training in how to create, deploy, and recruit participants for a variety of online studies.

Online studies require a great deal of technical expertise to create and maintain, significant investments in subject management and recruitment, and present their own limitations as a mode of research. Most researchers ultimately create a single experiment using customized software which integrates only with their specific subject pool. The weakness of this decentralized, ad hoc approach is a continued dependence on narrow subject pools, studies that remain difficult to replicate or duplicate on other systems, and a continuous re-inventing the wheel as every researcher must solve the same problems like recruiting large numbers of participants.

The goal of this tutorial is to provide attendees with an overview of the resources in the field, provide them with access to cutting edge lab technology, and then sustained help in creating their own online studies. In the first half of our workshop, we will host presentations and discussions on performing online studies with human participants in different scientific fields. These talks will focus on the process of conducting online lab studies, including designing experiments and human-in-the-loop studies, the types of studies that can be conducted online, and how to recruit participants and validate subject behavior.

In the second half of the workshop, attendees will have the opportunity to work with developers and researchers to create their own experiments using Volunteer Science. Attendees will be given access to the experiment development system, system documentation, experiment templates, and testing platform. The workshop participants will be able to develop and test their own experiments or link survey-based experiments into Volunteer Science and, when possible, pilot their study. After the workshop, interested attendees who have IRB approval and meet basic usability guidelines will be able to post their experiments on VolunteerScience.com and recruit subjects.

Organizers

Jason Radford (Primary Contact)
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Bio: Jason Radford is a doctoral student in Sociology at the University of Chicago and Manager of the Volunteer Science website. His research focuses on how people create social order in organizations.

David Lazer
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Bio: David Lazer is Distinguished Professor of Political Science and Computer and Information Science, Northeastern University, and Co-Director, NULab for Texts, Maps, and Networks. His research focuses on the nexus of network science, computational social science, and collaborative intelligence. He is the founder of the citizen science website Volunteer Science.

Luke Horgan
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Bio: Luke Horgan is an undergraduate student in Computer Science at Northeastern University. He has developed experiments and built tools for computational social science on Volunteer Science for two years.

Duration

Six Hours

Schedule and activities

Hour 1:00-2:00
Overview of key challenges and resources for online laboratory research. (Tutors: David Lazer)
The organizers will provide an overview of cutting-edge developments in the field. They will describe the process of setting up virtual laboratories, recruiting participants, and conducting online lab studies. They will also describe resources available online to construct a variety of online studies from various platforms including *Zooniverse*, *Cognilab*, and *Veconlab*. The organizers will discuss reliability and validity in online study designs, as well as the extent to which web replications can reproduce results obtained in brick and mortar settings.

Hour 2:00-3:00
An overview of Volunteer Science (Tutors: Jason Radford)
After the broad overview of issues related to online laboratories, workshop attendees will be introduced to one available platform that can support online labs. Volunteer Science provides a scalable, open, and flexible framework for the development and deployment of online studies. It has been used for surveys, multi-person problem solving, reaction time experiments, image classification, and to collect data from subjects' mobile phones and web browsers. The VolunteerScience.com website is built on top of free open source development tools including Django, Bootstrap, HTML5, and JavaScript; enabling it to work

on any device with modern web-browsing technologies. The platform uses Amazon Web Services to provide high-performance and scalable on-demand resources.

Break

Hour 3:00-6:00
Lab Hackathon **(Tutors: Jason Radford, Luke Horgan)**
The second half of the day will be dedicated to a hackathon during which attendees will receive a lab account and create an online study. The session will begin with two minute talks from teams in attendance about the studies they intend to develop. Attendees will be given a lab account on Volunteer Science. This will provide them with access to the experiment development system, a webpage on Volunteer Science, and the ability to implement an unlimited number of studies. Developers and researchers will be on hand to answer questions about study design, user experience, the API, or subject recruitment and management. At the end of the session, attendees will present their study. By the end of the workshop, attendees will be aware of the basics issues involved in online social and behavioral research, familiar with the Volunteer Science system, and will have completed a functional prototype of their online study.

Audience prerequisites and outcomes
Attendees will be required to conceptually plan one survey-based and one interactive online study before the day of the tutorial. Organizers will provide feedback on the feasibility and technical requirements of the design, enabling attendees to do any background work before the tutorial.

Designing studies ahead of time will ensure that participants have a project to work on during the hackathon. Surveys are typically easy to create and integrate with Volunteer Science, thus they should provide a quick and easy way for attendees to get at least one study up on their lab page. The interactive study will force attendees to think about how to program their own advanced features whether through common languages like JavaScript and HTML or through advanced suites like Unity or Blender 3D.

By the end of the tutorial, attendees should have a basic understanding of the kinds of studies that can be done via online laboratories, have their own accounts for creating online studies, and have at least one study fully operational on Volunteer Science.

Expected number of attendees
25

Material to be available
Attendees will be given access to Volunteer Science accounts before the tutorial. These accounts include a dozen pre-made experiments they can adapt for their own studies. Attendees will be expected to bring their own computers to the tutorial.

Precedent
We have given this training twice before. Once as a workshop at Computer Supported Cooperative Work in February 2016 (see webpage) and once as a workshop at the International Conference on Computational Social Science in June 2016 (see Video Recording). The tutorial is like the CSCW workshop in structure: half informational, half hackathon. We found this format works well. However, this version

seeks to expand our frame to online studies rather than just online experiments. This broader approach should fit with the multi-disciplinary interests of ICWSM. In addition, this time we are requiring participants to design one survey and one interactive study rather than an experiment. At CSCW, participants did not finish their builds and therefore did not get a chance to use some features within the Volunteer Science environment. Requiring a survey-based study should help ensure that everyone will at least one study complete by the end of the day.

Special Requirements

Extension cords and outlets. Many people will be using their computers for several hours. This was a problem at both CSCW and IC2S2.