CosmoQuest: A Cyber-infrastructure for Crowdsourcing Planetary Surface Mapping and More. P. L. Gay, C. Lehan, J. Moore, G. Bracey, N. Gugliucci. The Center for Science, Technology, Engineering, and Mathamatics Research, Education, and Outreach at SIUE, Edwardsville, Illinois, 62025 info@cosmoquestX

Introduction: The design and implementation of programs to crowdsource science presents a unique set of challenges to system architects, programmers, and designers. The CosmoQuest Citizen Science Builder (CSB) is an open source platform designed to take advantage of crowd computing and open source platforms to solve crowdsourcing problems in Planetary Science. CSB combines a clean user interface with a powerful back end to allow the quick design and deployment of citizen science sites that meet the needs of both the random Joe Public, and the detail driven Albert Professional. In this talk, the software will be overviewed, and the results of usability testing and accuracy testing with both citizen and professional scientists will be discussed.

The Software: is designed to run on one or more LINUX systems running Apache webserver with MySQL and PHP. The interface is HTML5 and relies on javascript and AJAX to provide a dynamic interactive experience. CosmoQuest currently runs on Amazon Web Services and uses VBulletin for logins.

The public-facing aspects of CSB provide a uniform experience that allows citizen scientists to use a simple set of tools to achieve a diversity of tasks. This interface presents users with a large view window for data, a toolbar reminiscent of MS Word or Adobe Photoshop with tools from drawing circles or segmented lines, flagging features from a dropdown menu, or marking specific objects with a set marker. The toolbar also allows users to select checkboxes describing the image as a whole. In addition to the viewer and toolbar, volunteers can also access tooltips, examples, and a video tutorial.

The scientist interface for CSB gives the science team the ability to prioritize images, download results, create comparison data to validate volunteer data, and also provides access to downloadable tools for doing data analysis.

Both these interfaces are controlled through a simple set of config files, although some tasks require customization of the controlling javascript. These are used to point the software at YouTube tutorials, graphics, and the correct toolsets. The only part of the interface requiring direct CSB administrator attention is the uploading of new images/movies onto the server and uploading of meta-data about the data into the database. This step must be customized for each unique data set.

Initial research shows that professionals using the software toannotate images – marking craters on the moon to be specific – are as accurate with CSB as they are with their favourite professional software. It also shows that the results of members of the public are within error of the results of the professionals, with roughly the same level of error in each group and across many crater scales. Results of interviews with volunteers about their ease moving between interfaces for different projects, and response to the aesthetics of the site will also be discussed during this presentation

The Citizen Scientists: In order to handle the onslaught of data spilling from telescopes on the Earth and on orbit, CosmoQuest is designed to allow the public to collaborate with science teams on projects that would otherwise lack the necessary human resources. This second-generation citizen science site goes beyond asking people to click on images to also engaging them in taking classes, attending virtual seminars, and participating in virtual star parties. These features were introduced to try and expand the diversity of motivations that bring people to the project and to keep them engaged overtime – just as a research center seeks to bring a diversity of people together to work and learn over time.

In creating the CosmoQuest Virtual Research Facility, we sought to answer the question, “What would happen if we provided the public with the same kinds of facilities scientists have, and invite them to be our collaborators?” It had already been observed that the public readily attends public science lectures, open houses at science facilities, and education programs such as star parties. It was hoped that by creating a central facility, we could build a community of people learning and doing science in a productive manner. At this early date, All research points toward our community having a unique distribution of motivations that indicate both learning and science are of interest to our audience. These results will be presented.

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