

# **A Socio-Technical Framework for Enhancing the Quality and Trust of Citizen Science Data**

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The number of “citizen science” projects, that involve volunteers, with little or no formal training contributing data and other information to scientific programs, is rapidly growing. The Internet, Web 2.0 and social networking technologies are enabling the establishment of online communities of volunteers who are contributing to projects that range from astronomy to bird watching and air quality. In particular, the issues of climate change and associated environmental impacts are mobilizing people who want to contribute to the monitoring, management and maintenance of ecosystem health by capturing observational data. Such projects are “democratizing science” in that they enable public citizens to actively participate in scientific programs, and allow them to access and use both their own data and the collective data generated by others.

However there are some inherent weaknesses to citizen science, and crowd sourcing more generally – the often limited expertise and anonymity of the contributors can lead to poor quality, misleading or even malicious data being submitted. This limits the potential value and re-use of the data within scientific programs.

In this paper we describe a socio-technical framework that we have developed that combines data quality enhancement services with online social networks and trust metrics to improve the reliability of the data. The system calculates trust metrics for contributed data based on a combination of individual (and inferred) ratings of other contributors, ratings of data, background and expertise of contributors, quality of past data contributed etc.

Given these measures of trust, the system filters and visualizes search results so that decisions made by scientists and policy makers are based on the most trustworthy of data. The approach also supports user-centric views of trust – enabling the results to be optimized for individual users in an online network. In addition, the system can also be used to motivate contributors by rewarding and recognizing those who are the most reliable and trust-worthy.

The proposed framework and set of services is described and evaluated using the Coral Watch project [1] as a case study.

[1] <http://www.coralwatch.org/>