STS.034 Final Project Proposal

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Project Type: Feature Article

Project Topic: Volunteer Computing

I propose to write a feature article on volunteer computing. The target publication is *Scientific American* and the target readers are those who are already equipped with some basic knowledge in science.

As scientific research dives into deeper subjects, more computational power is demanded. Super-computers, due to their great technological complexity and the high cost that comes along, are often not feasible for small research groups. Distributed computing was invented to solve the problem. Volunteer computing, as a special kind of distributed computing, breaks a big computational task down to multiple sub-problems and distributes them to computational resources donated by volunteers, who are ordinary people not necessarily doing science related jobs.

This final project is motivated by the fact that, although volunteer computing is really a “science for the general public”, it is not known to the majority of the public. Even those who participate in some projects may not know how things behind their desktop clients are functioning. The reason is, all such volunteer computing clients are designed more or less like a black box. What users need to do is to simply click on a button called “Start” and later on another button called “Stop”. Admittedly, this makes it much easier for people to get their hands on a project. But it also cuts volunteers off from the real science and thus fails to be attractive enough. Moreover, it leads to people's concern about any side effects of this black box on their computer systems.

In the first half my feature article, I will shed light onto this black box and tell my readers how volunteer computing actually works. To begin with, I will look back into the history and trace the development of distributed computing, especially the idea of volunteer computing by the end of last century. I will then turn to some of the most important volunteer computing projects that are currently online, including Folding@Home and SETI@Home. Using these projects as examples, I will show my readers what is happening behind their clients, as well as how computational resources across the world are being coordinated. Discussions will be made on some of people's concerns.

I will devote the second half of my feature article on how changes can be made to attract more volunteers and bring them closer to science. This includes applying more user-friendly softwares, more information to participants on the real science, as well as more efficient incentives such as linking volunteer computing with social networks and so on.

To complete this project, research is required in several directions. First of all, I will do some reading on the principles of distributed computing. Possible resources include relevant articles (academic papers, lecture notes, feature articles, etc.), online introduction of BOINC (Berkeley Open Infrastructure for Network Computing), MIT faculties and my course 6 friends. Secondly, I plan to conduct an interview/survey on volunteer computing participants (and potential participants) to collect view points of the general public. Lastly, I will interview some experts in the field of volunteer computing to get their opinions.

Finally, several resources that can be helpful:

[1] Nov, Anderson and Arazy, *Volunteer Computing: A Model of the Factors Determining Contribution to Community-based Scientific Research*

[2] Maire, *Introduction to Volunteer Computing and BOINC*

[3] Wikipedia site for volunteer computing: <https://en.wikipedia.org/wiki/Volunteer_computing>

[4] BOINC website: <https://boinc.berkeley.edu/>

[5] Folding@Home website: <https://folding.stanford.edu/>

[6] SETI@Home website: <http://setiathome.ssl.berkeley.edu/>

[7] LHC@Homewebsite:<http://lhcathome.web.cern.ch/>