Creating an Academic Community to build Humanitarian FOSS: A Progress Report

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ABSTRACT

This paper describes The Humanitarian FOSS Project, a National Science Foundation funded effort to help revitalize undergraduate computing education by getting students and faculty involved in building open source software that benefits the community.

Keywords

Open source, FOSS, Humanitarian, HFOSS, H-FOSS, Academic, Collaborations.

INTRODUCTION

For the past two years, students at three New England Liberal Arts colleges have been actively participating in the Humanitarian FOSS (Free and Open Source Software) Project. As its name suggests, the H-FOSS project builds open source software that benefits the community, whether it be by contributing to international humanitarian FOSS efforts, such as Sahana, or by developing FOSS solutions that benefit local or regional non-profits organizations.

By involving students in this project we are hoping to stimulate interest in the computer science major by "get[ting] involved in the open source movement." [Patterson, 2006]. As ACM President David Patterson has noted, the open source movement is growing rapidly and has become an important component of the software industry. Yet it has received relatively little attention as an object of study in undergraduate computing curricula. Many schools use open source software in their labs, but few schools teach about open source methodology in their classrooms.

A second motivation for involving students in H-FOSS is to "help our neighbors" [Patterson,2005]. Our goal is to raise the social awareness of students while allowing our institutions to contribute to the larger community. In a manner similar to *pro bono* work in law, student involvement with H-FOSS projects allows them to employ their skills to help others. As Patterson suggests, perhaps contributing to our communities in this way will help generate more interest in, and counteract misperceptions of, academic computer science as a field of study.

As described in [Morelli, et al. 2007], the H-FOSS Project attempts to harness the availability and enthusiasm of the undergraduate computing community and focus it, with financial, technical, and marketing support from the corporate community, on fulfilling the software needs of humanitarian and social service organizations. The project is supported by a two year grant from the Directorate for Computing and Information Science & Engineering (CISE) of The National Science Foundation (NSF) under its Pathways to Revitalized Undergraduate Computing Education program (CPATH).

THE HUMANITARIAN FOSS PROJECT

The co-sponsoring organizations include Trinity College (Computer Science Department, Office of Community Service and Civic Engagement, the TrInfo Cafe Technology Outreach Program), Connecticut College (Computer Science Department, Holleran Center for Community Action and Public Policy, Office of Volunteers for Community Service), Wesleyan University (Computer Science Department, Office of Community Service and Volunteerism), and Accenture Corporation.

Goals and Objectives

The primary goal of the Humanitarian FOSS Project is to build a collaborative community of educational institutions, computing organizations, and social service agencies engaged in the development of socially useful, open-source software. While humanitarian open-source software development serves as the unifying theme of the project, we believe that the primary impact on computing education will result from the successful building of this diverse community.

The problems with undergraduate computing education–sagging enrollments, out-of-date curricula, changing demographics, rapidly evolving technologies–can best be addressed by getting students excited about the technology they are learning about and getting them to see that designing and building good software is a way to contribute to society. The H-FOSS project provides challenging opportunities by which students can build their knowledge of the open source community and the contemporary software development process. Of course, study of computer science entails so much more than software development. Our hope is that by getting students interested in the kinds of contributions they can make through the H-FOSS Project, they will want to continue with the formal study of computer science and all that it entails.

Our project addresses the following specific objectives:

- *Introducing new concepts and methodologies.* Working with a community of educators to experiment with various ways of introducing the open-source software model into the undergraduate curriculum
- *Attracting a new demographic.* Will building socially beneficial software help attract more women to computing majors?
- *Debunking the computing-is-coding misconception.* To emphasize that computing is all about problem-solving and working with people our projects involve the entire software development process, from requirements gathering, use case analysis, object-oriented design, implementation, testing, and end-user support.
- *Bringing Together Town and Gown*. In addition to getting IT corporations to help fund our activities, we seek to place students within community settings and to get them interacting with IT and computing experts from the corporate domain.
- *Contributing to Society*. Through summer internship programs and other activities, the project will develop a model to create meaningful opportunities for students, faculty, and computing professionals to collaborate on projects that benefit the community.
- *Portability and Sustainability.* Develop free and open web-based resources to help other colleges and community groups get involved, including a repository of software tools and support materials and a clearinghouse that will help match up social service agencies seeking support with corporations and colleges seeking to participate in the program.

Courses and Activities

In addition to the three initial schools, Trinity College, Wesleyan University, and Connecticut College, we are in the process of building collaborative efforts with faculty and students from other institutions, including Bowdoin College, University of Hartford, Drexel University, Brooklyn College, and George Washington University. Student participation has been facilitated through the offering of new courses, independent research projects, and summer and academic year internships.

The HFOSS Project has so far conducted several teaching experiments in the classroom:

- Fall 2006 – The Sahana project was incorporated into an independent study course using video-conferencing (VC), between Trinity College, Connecticut College and Wesleyan University. In addition to "for-credit" students (two from each school), there were four volunteer students involved in the project.

- Spring 2007 – A formal credit course "Open Source Humanitarian Software Development" offered via VC to 25 Trinity, Conn College and Wesleyan students, led to the development of eight student projects, some of which were eventually deployed in the community.
- Summer 2007 – With financial support from the Aid Matrix Foundation, a summer humanitarian open-source software development institute was held at Trinity College, with five Trinity and Conn College students. Working with IT experts from the respective projects, students re-factored the Sahana Volunteer Management module [Volunteer Management Module] and developed a prototype touch-screen interface module for OpenMRS [OpenMRS].
- Fall 2007 – An independent study VC course with six students and four faculty from Trinity, Wesleyan and Connecticut College continued work on the Sahana Volunteer Management module and OpenMRS module. This resulted in the inclusion of the redesigned volunteer management module in Sahana 0.6.2, released Dec 26th 2007 (to mark the anniversary of the 2004 boxing day Tsunami) and the release of the Touch-screen toolkit [Touchscreen Toolkit]. The group also developed online materials to support a workshop on HFOSS [SIGCSE 2008].
- Spring 2008 – In addition to an introductory VC course "Open Source Software for Humanity" offered at Trinity College, two new H-FOSS activities will be initiated: an independent study course at Bowdoin College will develop a volunteer management application for the Ronald McDonald House in Brunswick Maine, and a software engineering course at University of Hartford, will develop an office management application for the Literacy Volunteers of Greater Hartford.
- Fall 2008 – Wesleyan University will offer an upper-level Software Development course, teaching software design (from conceptual issues such as design patterns through more applied techniques such as source-code management systems) with a focus on contributing significantly to an existing humanitarian open-source project.

Further details of HFOSS project activities are provided in [Ellis, et al. 2007a, Morelli, et al. 2007 Ellis, et al, 2007b].or through the project's web portal [hfoss.org].

Ongoing Projects

As a result of courses and other educational activities, a diverse set of ongoing projects has now been initiated, several of which have gone on to be deployed and actively used in the community and others of which have spawned new applications. Community-based projects are underway in Hartford Connecticut, Brunswick Maine, and Washington D.C. All projects are supported by academic teams of faculty and students from the participating universities. The following list is a sample of active projects as of January 2008 [hfoss.org].

- *Sahana Disaster Management System Volunteer Management Module*(Trinity College, Wesleyan University, Connecticut College) - The Volunteer Management (VM) module for Sahana supports the registration of relief volunteers and their assignment to projects. A prototype of the module was field tested in June 2006 at Strong Angel III. It was completely re-factored in summer of 2007 by student interns and is currently part of the Sahana version 0.6.2 release.
- *Volunteer Management Credentialing System* (Trinity College, George Washington University) - A volunteer credentialing system (VCS) is being designed for the Sahana VM module in collaboration with Prof. Frank Fiedrich of the Institute for Crisis, Disaster and Risk Management (ICDRM) at George Washington University. The VCS will enable volunteer organizations to verify and document a volunteer's professional credentials.
- *Touch screen Toolkit/API* (Trinity College) - The toolkit provides a software package to simplify use of web-based systems with a touch-screen input device. Initially designed to allow clinicians to use Open Medical Record System (OpenMRS) with a touch screen, it is currently being converted into a standalone FOSS package.
- *Captcha Verification Plug-in* (Wesleyan University) - Built as an 3rd party PHP code snippet for human user verification (Captcha) into online forms by a student from Wesleyan University.
- *EMS Scheduling System* (Trinity College) - Software designed specifically for Darien, Connecticut Emergency Medical Services to schedule and monitor the shifts of the volunteer supervisors.
- *Volunteer Scheduling System* (Bowdoin College) - A standalone version of the Sahana VM module for use by the Ronald McDonald House of Brunswick, Maine will be developed during Spring 2008.

- *AppTrac Application Management* (University of Hartford, Trinity College) - Built as part of a student project in the Spring 2008 Software Engineering Course at the University of Hartford, App-Trac will allow Literacy Volunteers of Greater Hartford (LVGH) to monitor usage of literacy software applications in order to better evaluate students learning needs and streamline report writing.
- *Portable Open Surveying Information Tool (POSIT)* (Trinity College) - A portable application built on Google's Android mobile phone framework, used for data gathering in the field from logging damage following a disaster to a botanist logging plant density. Prototype development scheduled for Spring'08.

As the list above shows, many of the projects have current or potential applications in the crisis management domain. In addition to the projects listed above an on-line directory of H-FOSS projects is being built by the Humanitarian-ICT community and Trinity College. [Humanitarian-FOSS Section of UNDP IOSN; Humanitarian ICT Community; H-FOSS Directory]

FUTURE PLANS

In addition to current activities and projects several other initiatives are planned for 2008-2009 including but not limited to:

- SIGCSE 2008 Workshop: A workshop on "Teaching and Building Humanitarian Open Source Software" will be held in March in Portland, OR at the SIGCSE conference [SIGCSE 08].
- Summer Open Source Institute: The 2008 summer humanitarian open-source development institute at Trinity College will be expanded to provide ten summer internship opportunities to students from Trinity, Wesleyan, Conn College as well as other schools.
- Code-a-Thon for Humanity: Modeled after college spring break projects organized by Habitat for Humanity, a rapid software building activity will be held during the 2007 spring break during which students will develop a small-scale open source application for a local non-profit organization.
- Humanitarian Open-Source Workshop: A spring 2009 curriculum workshop will give faculty, IT experts, and others an opportunity to share their knowledge and experiences with open-source software development and how it can best be incorporated into undergraduate computing curricula.

The Humanitarian FOSS Project is in its infancy and the concept itself is yet to be widely promoted. However the interest shown among those who have heard about it suggests strong potential for the project to achieve its objectives. More information is available at www.hfoss.org.

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