Project: Sahana client solution on Openmoko™ mobiles

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I. Introduction:

Natural calamities do not come by giving any prior notice. Moreover, when they do, they create a havoc and destruction resulting in a huge loss of life and resources and disturbing the daily lives of people and sometimes affecting their lives in a significant way. Government agencies, NGOs and relief workers react immediately to such issues and start working for the relief and rehabilitation of people affected by such disasters like earthquake, floods, tsunami to same a few. With the advancement of technology, new tools and techniques are evolved to aid in such a process adding to the effective management and operations of relief works. My final year project addresses such an important need, where communication of information is a key in such emergency & life critical situations.

A. What is Sahana?

Sahana is a FOSS (Free and Open Source Software) Disaster Management System, www.sahana.lk, which grew in response to the 2004 Asian tsunami disaster that devastated many of the countries in Asia bordering the Indian Ocean.
To name a few instances, since the Tsunami, Sahana has been deployed for:

- Pakistan earthquake disaster in 2005.
- Philippines Guinsaugon landslide in 2006.
- Indonesian Yogjakarta earthquake in 2006.
- Recently in Myanmar, China, Bihar Floods India.

The main modules of the Sahana system are:

- Sahana Missing Person Registry
- Sahana Disaster Victim Registry
- Sahana Shelter Registry
- Sahana Request Management System
- Sahana Messaging System
- Sahana Situation Awareness

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II. Problem Context:

My solution comes into picture which extends the access to Sahana system and Disaster reporting needs using a compact handy device, cellphones, which has various PC like capabilities and a GPS receiver. All of which, make a perfect combination for a solution that could possibly be used to communicate in various forms.

Openmoko phones are based on Linux operating system in which input is based on the touch screen, has Wireless connectivity options like Wi-Fi, Bluetooth, GPRS, hardware like Internal GPS, additional memory card support for local data storage, which makes it an ideal choice to replace the normal laptop or PC up to an extent where it can be used for communication purpose by relief workers who are involved in disaster data reporting, management and relief work, who access information from the Sahana system and send data to it on a regular basis.

III. Problem Description

From the observations made by studying the past deployment efforts and relief work in situations of emergency, it has been found that:

- Field reporters key in data in paper forms which is later shuffled to relief camps where the Sahana system is setup for data entry.
- They need to carry a GPS device to note down exact locations of situations or victims.
- Sometimes, the relief workers need to be assigned to different tasks and be re-located to a different location to operate on tasks assigned to them. Communication flow in such cases is required immediately.
- Saving time & accurate data reporting is very crucial in such life critical operations. For e.g. a missing person was reported missing few days back, and was found today. But the information is updated only when the reporter reaches the camp and hands over the data for entry.
- Power is available in limited resources as sometimes; relief camps are setup with generators to provide electricity. So having a low power consuming alternative to Laptops/PCs is a good solution.

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IV. MAIN OBJECTIVES

- The primary objective of the project is to make use of touch interface based cellphones with Wi-Fi, GPS, and GPRS as an effective disaster reporting & communication tool which interacts with the Sahana main system, either real time or by synchronization when accessible with the device.
- The project aims at creating a "new application stack" over mobile devices which can be further expanded to provide all the features of the Sahana system, possible on a mobile device.
- Having a compact and handy mobile device as an assistive tool and as a replacement for PCs/Laptops at relief camps for use in data reporting and information access from the main Sahana system.

V. PROJECT SCOPE & DELIVERABLES

A. Core Functionality of the application

1. After building and planning the base application structure, the focus would to be to deliver one complete working module on to the mobile device. Starting with the Disaster Victim Registry.
2. Person should be able to do the following tasks:
    a. Add New Group/Individual.
    b. Edit a Group/Individual.
    c. Transfer the Group/Individuals.
    d. Generate Reports, which fit well on the small screen resolution and are useful.
3. Local data storage using the phone's memory.

B. Enhanced Functionality

1. Extending the application to have the following features of the "Situation Awareness module" of Sahana:
    a. Add a situation with its GPS Locations by selecting the pin point location on the map available, which would show the current location of the user using the in-built GPS receiver.
    b. View the Situation Map of the affected area/region and locate relief camps etc on the map, might be subject to connection availability for downloading of maps from Internet.

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2. Online Data synchronization with the main Sahana server using any one of the available transport mediums, i.e. GPRS, Wi-Fi or SMS, also depending on the type of Sahana network deployment.

C. Special Functionality

1. Support for localization of the user interface to other International languages, since the application is used across the world.
2. Current geographic location of user is sent to the main Sahana server using the GPS data.

D. Limitations

1. The duration of usage of such an application is dependent on the amount of battery backup provided by the phone subject to its usage and other parameters.
2. The GPS device might not receive signals from satellites in case the weather conditions are cloudy.
3. The amount of data that can be stored on the mobile devices will be dependent on the amount of memory installed and supported for application usage.
4. Since Sahana is a work in progress, code changes to the main system can occur on a daily basis. The system will have certain limitations in keeping in sync with the core code base changes.

VI. Project Benefits:

A. Tangible Benefits

- Provides two-way communication as a cellphone to stay in touch with other relief workers, and as a client connected to the Sahana server.
- Volunteers will save the need of carrying a GPS Receiver and a cell phone, thus providing convenience.
- Facilitating real time data reporting and data access to and from the Sahana server, subject to availability of network connectivity.
- Location based information can now be entered along with other information being reported using the in-built GPS receiver.
- Provision of Offline data storage, for saving all the information locally on the phone for later synchronization with the main Sahana server.

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- Cellphones can operate longer without the need of external power sources, compared to Laptops or PCs earlier used, and run on battery. Thus becoming an important accessory for field workers. Cellphone batteries are lighter to carry, than that of Laptop batteries too for longer usage.
- Using the device, in a remote area, information can be accessed and provided to any one who seeks for it. For e.g. a relative of a victim, wanting to know the exact status of the person could ask the field reporter who could use the phone to search through the database and provide him the information instantly.
- No moving parts, no hard disk etc, and a compact device makes it more reliable and shock resistant for rugged use.

B. Intangible Benefits

- Use of low power consumption devices in place of the higher power consuming alternatives, helps save power and thus helping to the environmental benefits.
- Such a solution can very well be expanded to have all the features of Sahana, thus extending its capabilities on another set of handhelds.
- Provides efficient and time saving alternatives of data reporting.
- Provides a convenient accessory to the field workers which they can use with comfort.
- Using an Open mobile platform, scope for community participation in the development is increased for more collaborative efforts by developers from both Sahana and the Openmoko community.
- Adds value to the range of applications available for Openmoko, not to mention adding value to the Openmoko brand image itself.

VII. Other information

- License: Same as Sahana. LGPL http://www.gnu.org/copyleft/lesser.html
- Project Timeline will be posted in due course.
- Project progress will be blogged on http://ajuonline.net

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