PUBLIC SAFETY IN TIMES OF DISASTER THROUGH GPS TECHNOLOGY

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Introduction:

GPS technology and Disaster Management

Disaster management is a complex and interesting domain. The needs of disaster situations are very different from those found in normal life and the domain presents unique constraints which are both interesting and challenging to work with. In this project we use the constraints of the disaster management area to guide an exploration of the possibilities for GPS technologies to help out when disaster strikes. In particular we examine the possibility of using GPS technology in order to assist those attempting to deal with a disaster to better do the tasks that the situation thrust upon them. Smart phones are a relatively new class of devices which have been created by the confluence of GPS technology fitted on it. They are small hand held telephones with colorful screens, multiple sensor technologies, and multiple networks capable of exchanging data. In the following two sections we will examine disaster management and GPS technology in turn in order to understand how this new class of devices could be used to safe people when disaster strikes.

Technological Impact: Lack of Connectivity

The first thing to note about the disaster is that it knocks out most of the communications systems that state and local authorities and first responders rely upon to communicate with each other. These systems included not only the plain old telephone systems (POTS) but also the cell towers. While some cell towers lasted for some time on battery backups, in New Orleans, where there was considerable flooding because of the levee breach, the towers eventually lost all power. Because the battery backup systems and generator systems ran out of power, the cell network died and could not be restored until the flooding was dealt with.

Although many might think that the loss of cell towers implies that cell phones would be of little use in these areas, the emergence of phones with wireless internet connections and the development of the ad hoc networking systems, as well as the ability to quickly deploy battery-based mesh networking equipment, will allow smart phones to have considerable utility in future disasters. It has been suggested that peer to peer networks comprised of cell phones could be used to allow (possibly limited) communication in such an event. Thus our expectation is that the communication issues can be addressed by these new technologies, and in particular through the use of a combination of wireless networks found on modern smart phones and use of built-in GPS system in smart phone.
Objectives:
Natural Disasters have threatened mankind since history started. Due to geographic location and environment change, there are many vulnerable countries to natural disasters. The country also lacks effective disaster preparedness system to confront natural disasters. In addition, a tourist may face difficulties in finding safe area or shelter place prior to the occurrence of natural disaster. For this reason, we have proposed a disaster management system and evacuation system for people using Google Map (GM). The system is implemented on android mobile phone because of the burgeoning growth of smart phones in world. Android device with our application installed on it.

- User can send SMS at a time to send notification for help with in his contact list. By sending the current position obtained by GPS and including shortest path of shelter or safe zone on the map of the application, if he is online.
- If the user is not having network access in his region he can go for offline mode, in that user can get the nearest safer zones and current position in the map, so that he can navigate to nearest shelter or safer zone.
- User can do emergency calls also like 108 etc. in absence of network.

Methodology:
Our application gets the current position of victim through the GPS. When victim is in disaster zone. It will send a notification along with the path information to the member who can help a needy person. Notification contains text message and path information to reach the disaster zone to help victims.

There are various options such as safe zone, current location and shortest path to safe zone through GPS is available in the application

When the victim opens the application and clicks on ‘Safe zone’ in the application and it generate a popup window that show availability of food and health center resources.

In the below diagram we are checking the user is online or offline, if he is offline a popup Message is generated to enable mobile data if data pack or network access is not available, at that time offline Google map is generated, it shows only the safe zone or shelter zone nearest to the user and availability of food and healthcare at the centers, shortest path is not available if it is offline.

To find the shortest path for safer or shelter zone is implemented using Dijktra’s algorithm.

Software requirement specification include smart phones with GPS installed on android platform From version 2.5 to 6.0.
Figur1: DMA Architecture of Disaster Application using GPS.

Results:

The proposed Public safety in times of Disaster through GPS technology for mobile phone will provide effective communication facilities to get fast relief for victims when natural disasters or manmade disturbances (like strikes) occur.

Our Application helps a victim to find a safe area for his survival by establishing a link between victim and his friends, family or relief agency within very less time.

Suppose the user is in need of urgent medical help. This needs to be communicated as soon as possible with the dedicated helpline numbers. Such numbers are made available at the time of disaster. Emergency Call allows the user to quickly place a call without wasting time in searching the contacts list and dialing some number. SOS feature is used for Emergency Call.

Conclusions:

The primary objective of the research was to build an Android application abiding by information and communication requirements envisaged by discussions with the disaster management teams. The interview conducted with an official involved in rescue and relief.
activities of disaster management helped gather useful information. The functionality proposed for the mobile application addresses the elicited requirements. Each function has a feature in the application dedicated to it. Also utmost care has been given to make the application as user-friendly as possible. Textual detail has been kept minimal on the screen but still each feature has been explained well. The application involves various data sources to make weather data and predictions available. Many Android apps exist for disaster management but Rescue App combines various features into one.

**Scope for Future work:**

Incorporation of GPS in mobile phones places an emergency location capability in the hands of everyday users. Today's widespread placement of GPS location systems in passenger cars provides another leap in developing a comprehensive safety net.

Provide position information for mapping of disaster regions where little or no mapping information is available. GPS modernization translates to more lives saved and faster recovery for victims of global Tragedies. Using mesh networking information can be shared even in offline mode.