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Networking Smartphones for Disaster Recovery Using Teamphone

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Abstract: In this paper, we examine how to use networks with smartphones for providing communications in disaster recovery. By lessening the communication gap among different kinds of wireless networks, we have designed and implemented a system called TeamPhone, which provides Android phones the capabilities on communications in disaster helper. TeamPhone consists of two components: a messaging system between rescue worker and the victim and a self-rescue system. The messaging system between rescue worker and victim integrates cellular networking, ad-hoc networking, and opportunistic networking seamlessly, and enables proper communication. The self-rescue system finds different communication network ways for trapped survivors. Such a group of Android phones can cooperatively get a notification and send out emergency messages in an energy-efficient manner with their location and position information so as to help rescue operations. We have implemented TeamPhone as a prototype application on the Android platform and deployed it on all types of smartphones from Samsung to Redmi and others. Results demonstrate that TeamPhone can properly enhance communication requirements and increase the pace of disaster recovery. We are creating three applications with a centralized cloud for communication. First for the admin who will monitor victim and rescue worker on Google map and other two for rescue worker and disaster victim.

Keywords: Smartphone, Routing, Disaster Recover, Wifi, Bluetooth, ADHOC, GSM, and GPS.

I. INTRODUCTION

Today mobile and mobile based applications have become an integral part of our day to day life. With the revolution in mobile computing, many great features were added to the field and the mobiles got smaller, faster and better as the decade passed. It gave rise to the introduction of new mobile-based operating systems where the programmers were presented with an open source operating system named "ANDROID".

With the introduction of android, the programmers were free to program freely and with the much-awaited programming language as the programmers did not have to learn anything new. The android was a handsome mixture of java and mobile computing.

Thus a model integration of ANDROID platform with a desktop application can be utilized for disaster management applications and disaster management which can be of many types varying from natural disaster, accident, fire, theft. So we are thinking of in cooperating various constraints in our application like.

Injuries due to accidents are among the leading causes of hospitalization in elderly persons, often resulting in a rapid decline in functionality and death. The fast and unique response can improve the victim's outcome, but this is often lacking when the injured person lives alone and the nature of the injury is so bad to call for help.

The lack of efficient disaster management system that will help in times of need. One common scenario during disasters is that the activity of rescue and relief is not well-coordinated. This increases a need for a well-coordinated disaster management system that can be coordinated by a central entity such as administrator using the cloud. Since the use of Android smartphones has attracted millions of people, the disaster management system was implemented as a smartphone application using Google's Android operating system. The disaster management system uses Google maps to monitor both victim and rescue worker. It finds out the rescue worker which is nearest to the victim and sends him an alert to help the victim.

II. LITERATURE SURVEY

Considering worldwide systems for emergency reporting regardless of their communication method where it's wired or wireless, majorly we studied some unique parameters of the systems which will help us to define the strong objectives about our proposed systems. Below listed generation wise systems gives us the fair idea about the survey we had done.

A. Closed-Circuit Television (CCTV)

Closed-circuit television (CCTV) is the use of cameras and its wired or wireless network to transmit a signal to its DVR. It can be deployed as a point to point or point to multipoint links between camera and monitor. These are mainly used in surveillance areas where they are needed from shops to airports etc. In mechanical and production plants, these video cameras are used to monitor and take decisions accordingly while at one room only. Some places like the heavy heat generated while molding metal or another area where worker can't sustain that environment that time such CCTV are more useful and most suited one. Depends upon the requirement these CCTV operate continuously or time being to a monitor. Now a day we have advanced Digital Video Recorders (DVRs), which records 24 hours for many years. It can continuously run and record it in some storage like disk or tape. Also, these CCTV supports IP based monitoring and centralized network-based storage such as cloud.

Advantage and disadvantage:

1>it can work and may be placed anywhere

2>DVR should always be on.

B. Smoke Detectors

Smoke detector systems are Emergency detection system in case of fire which generates smoke first. Such detectors are widely used in areas where there are big facilities like factories and hotels. These systems report the issue to some kind of audible alarm to alert public around it. Older smoke detectors were using the physical process of ionization whereas latest technology enables us to use the photoelectric diode sense the smoke in the air and send an alarm after it. In large areas like factories, it runs mainly on the power supply and not on batteries.

Advantage and disadvantage:

1>It can detect fire easily and accurately

2>It can do it only once not repeatedly.

C. Natural Disaster Monitor App (Developed by Dominic925)

This smartphone-based app gives you real-time updates on any global natural calamities like earthquake, tsunami, cyclone, floods, and volcano eruptions on the backdrop of a Google earth map. The app makes use of the alerts published by the Global Disaster Alert and Coordination System (GDACS). The app shows icons on the map with colours- green, orange, and red etc. each indicating the severity of the natural calamity. On clicking the respective icons, the list shows date and time, region, disaster type and other related details of the calamity.

Advantage and disadvantage:

1>It shows disasters on Google maps.

2>It cannot help and coordinate and help victims.

D. Tsunami Alert (Developed Palta Software)

This application is capable and built to help people living along the coastal lines across Pacific and the Indian Ocean, who witnessed the large-scale devastation by the 2004 Tsunami. The main feature of the application is that a user will get real-time updates from US government owned NOAA in every five minutes. It will also give details about the area affected, the location of the earthquake and also provide with tips on how to react to it. In Tsunami Alert app, the user will have the option to select 5 main regions- one US and Canada, Pacific, Hawaii, Indian Ocean and the Caribbean Sea.

Advantage and disadvantage:
1>It gives perfect Tsunami alert
2>It cannot help and coordinate and help victims.

E. Help Me

Another very important mobile app which deals with disaster environment is called HelpMe. It introduces a new approach to building the ad-hoc network using Wi-Fi to enable Android-based smartphones to communicate during disaster time. It works without the help of any GSM operator, and smartly forwards the message on the hop-to-hop basis. It has centralized HelpMe server to keep a log of all happening about an emergency, once service is restored. This information from a cell phone in knowing whereabouts of the missing person.

Advantage and disadvantage:
1>It helps using the AdHoc network.
2>It cannot use any other network.

III. PROPOSED SYSTEM

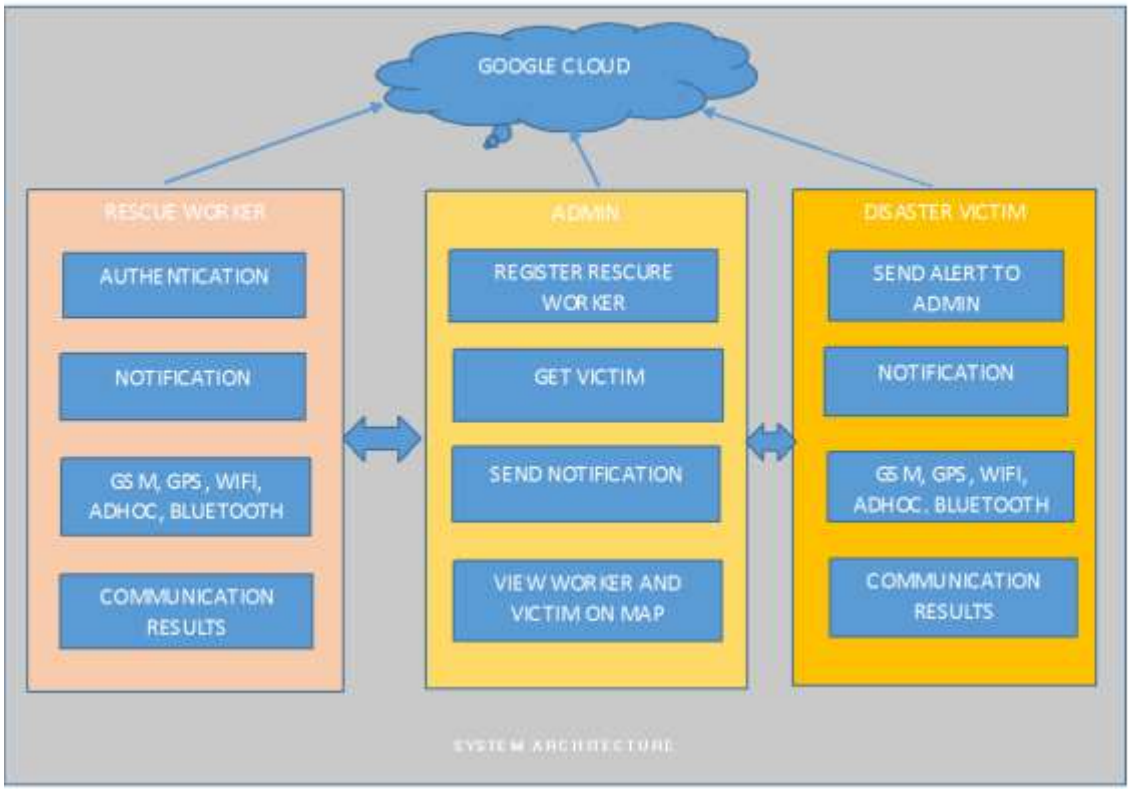

Fig. 1 System Architecture

Our project can be distributed into three modules:

Survivor

Registration:

In this module a survivor will send name and location to admin using smartphone;

Beeper:

In this module, if all communication network fails a beeper will be on.

GPS:

In this module, if GPS is on the correct latitude and longitude will be given to admin.

Rescue worker:

In this module, the admin will find the nearest rescue worker and notify him the location of the survivor for help

AES:

In this module, the data on the cloud will be secured using AES (Advanced Encryption Standard) algorithm.

Rescue Worker

Registration:

In this module a rescue worker will register to admin for helping the survivors;

GPS:

In this module, if GPS is on the correct latitude and longitude will be given to admin.

Map:

In this module, the rescue worker can see the survivor on his map and get the correct distance from him and survivor.

Notifications:

In this module, the admin will send notifications to rescue worker for further help.

AES:

In this module, the data on the cloud will be secured using AES (Advanced Encryption Standard) algorithm.

Desktop:

Authentication:

In this module, the administrator will authenticate himself using the cloud.

Survivor Monitoring:

In this module, the admin will continue monitor survivor whereabouts on his map.

Rescue Worker Monitoring:

In this module, the admin will continue monitor rescue worker and see if he is really near the survivor on the map.

Notifications:

In this module, the admin will find the nearest rescue worker and send him to the survivor by sending notifications about the location of survivor and alert the survivor that help is coming.

AES:

In this module, AES algorithm will be used to handle encryption and decryption of data from the cloud.

IV. SYSTEM ANALYSIS

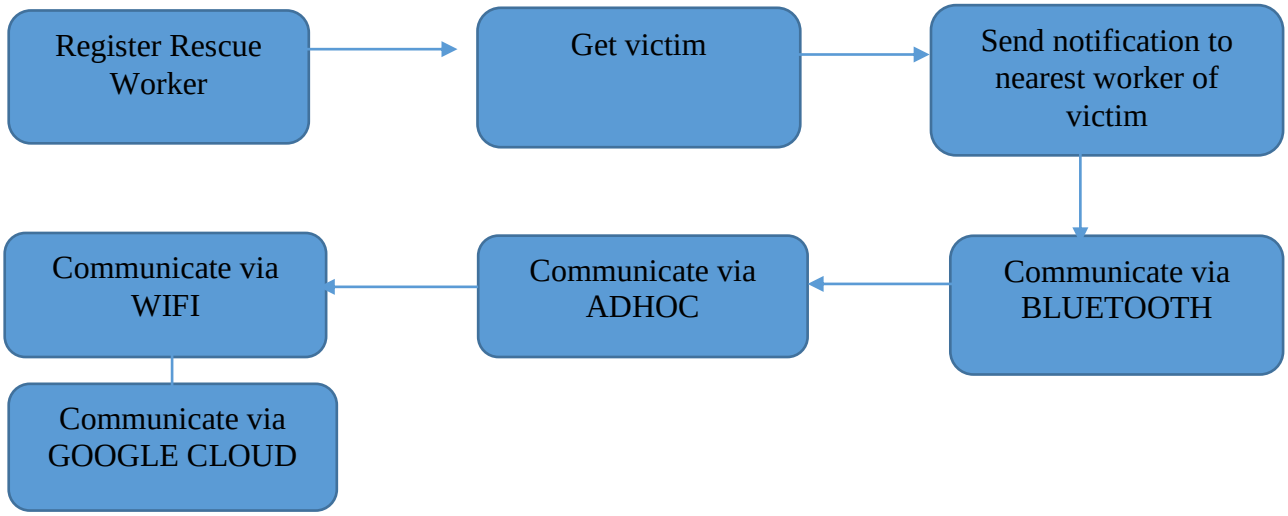

Fig. 1 System Analysis

CONCLUSION

In this paper, we propose TeamPhone, which is designed to network smartphones in disaster recovery. TeamPhone includes two components: the messaging system that provides data communications for rescue workers, and the self-rescue system that groups the smartphones of trapped survivors together, energy-efficiently discovers nearby messaging nodes and sends out emergency messages including location and position information. TeamPhone is implemented as a prototype application on the Android platform using the WiFi interface and cellular interface to provide several ways of communications. TeamPhone has been deployed and evaluated on the off-the-shelf smartphones.

The evaluation results demonstrate that TeamPhone can accomplish various message transmissions with affordable power consumption and delay, and greatly reduce the energy consumption of sending out emergency messages by grouping and wake-up schedule.

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