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RescueMe: Smartphone Based Self-Rescue System for Disaster Management

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Abstract: Recent ubiquitous earthquakes have been leading to mass destruction of electrical power and Cellular infrastructures, and deprive the innocent lives across the world. Due to the wide-area earthquake disaster, unavailable power and communication infrastructure, limited man-power and resources. With the increasing proliferation of powerful wireless devices, like smartphones, they can be assumed to be abundantly available among the disaster victims and can act as valuable resource to coordinate disaster rescue operation. In this paper, we propose a smartphone based self-rescue system, also referred to as Rescue Me, to assist the operations of disaster rescue and relief. The basic idea of RescueMe is that a set of smartphones carried by survivors trapped under the collapsed infrastructure forms into a one-hop network and send out distress signal to nearby rescue crews.

Keywords: Disaster management, Smartphone, natural disaster

I.INTRODUCTION

Unexpected natural disaster such as tornadoes, earthquakes, hurricanes, and tsunamis have been rising dramatically in recent years. In particular, earthquakes tremendously kill innocent lives and damage the environment around the globe, and epicenter of an earthquakes can occur anywhere and now no place would be safe from ubiquitous earthquakes. The traditional rescue systems and equipment are inefficient and time-consuming, leading to the golden hour missed.

On other hand, smartphone have become an essential electronic device that people always carry for communication and social connection , or place them where they can be easily and immediately accessed. So the disaster victim can easily access their smartphones. The proposed approach can reduce the scheduled vacancy of broadcasting distress signal and improve the discovery of probability with very little sacrifice of network lifetime. Due to the sudden earthquakes, the rescue terms or planners of disaster rescue and relief mainly suffer from the following issues. First, since the current disaster situation of sudden earthquakes may not be available, it is difficult to a plan or decision on the priority of rescue operation. Second, the impact area are admittedly wide, but the number of rescue terms and man power are very limited in reality. And the impacted areas become a black sport where WIFI and 4G- LTE services are not available and the affected area is cut off from the outside

According to these reasons and conditions, this paper is to develop a novel disaster self-rescue system incorporating increasingly popular smartphones in the disaster area.in this paper we propose a smartphone based self-rescue system to assist the operations of disaster rescue and relief. It also helpful for the people trapped under the collapsed infrastructure. The smartphones carried by survivors trapped under the collapsed infrastructure forms into a one-hop network and send distress signal to the nearby rescue crews to assist the rescue operation.

II.EXISTING SYSTEM

In previous work we used a smartphone-based post disaster management mechanism to in the disaster affected area using the concept of Wi-Fi tethering. Where smartphone in the affected areas may turn themselves into temporary Wi-Fi hotspot to provide internet connectivity and important communication abilities to nearby Wi-Fi enabled user device. As reported by Raj, Kant and Das(2014) a novel architecture called energy aware disaster recovery network using Wi-Fi tethering is proposed to create the desired network infrastructure using wireless devices. The research of Hossain, Ray and Sinha (2016) present a smartphone-assisted victim localization method in which smartphones belonging to trapped victims and other people in disaster affected areas can self-detect the occurrence of a disaster incident by monitoring the radio environment and self-switch to disaster mode to transmit emergency help message with their location coordinates to other smartphones nearby. To locate the neighboring smartphones, also operating the disaster mode, each smartphone run a rendezvous process. As Zamora, Suzuki and Kashihara (2017) noted, an application, also

referred to as SOSCast, is proposed to propagate SOS messages from trapped survivors through a direct communication between smartphones.

In the research of lu, Cao, and la porta (2016), by bridging the gap among different kind of wireless networks, a system called Teamphone is proposed to provide the smartphones the capabilities of communications in disaster recovery and the Teamphone consist of two components a message system and a self-rescue system .The message system integrates cellular networking, ad-hoc networking and opportunistic networking seamlessly, and enables communication among rescue workers. Hossain and Ray (2018) propose a smartphone and IOT devices-assisted emergency and recovery method in a post-disaster environment, where smartphone can utilize the IOT devices in the disaster affected areas to successfully relay the emergency message to other smartphones.

In summary, various kind of smartphone-based wireless communication technologies and hybrid network have been widely investigated for disaster rescue and relief. However, to the best of author's knowledge, the proposed research focusing on dynamically adjusting the schedule of sending out the distress signals according to the change of network topology is new.

III.DISADVANTAGE

When an earthquakes occurs, the rescue teams or planners of disaster rescue and relief mainly suffer from the following issues.

- First, since the current disaster situation of sudden earthquake may not be available, it is difficult to make a plan or decision on the priority of rescue operation in terms of the focused rescue areas, the distribution of rescue teams or the allocation of equipment.
- Second, the impact areas are admittedly wide, but the number of rescue teams and man-power are very limited in reality.
- Due to the collapse of power and communication infrastructure, the impacted area become a black spot where Wi-Fi and 4G-LTE services are not available and the affected area is cut off from the outside.

IV.PROPOSED SYSTEM

We present a smartphone-based self-rescue system, also referred to as RescueMe, to assist the operation of disaster rescue and relief in the disaster area. The basic idea of RescueMe is that a set of smartphones carried by survivors trapped under the collapsed infrastructure forms into a one-hop network and send out the distress signal to the nearby crews to assist the rescue operation. After detecting a seismic signal, the node can automatically enter into the self-rescue mode, or after disaster occurs, the trapped survivors can click a rescue app to enable the node to enter into the self-rescue mode.in the self-rescue mode, each node broadcasts a one-time hello message. The one hop network consist of cliques, in which the direct connection exist between every two node, and each node can communicate with every other node.in order to extend the battery lifetime through reducing energy consumption, the one in the one hop network wake up alternatively in a coordinated way and send out distress signal to discover nearby rescue crew

We develop a customized framework and implement the proposed scheme for experiment study .for performance comparison, we revisit an existing approach Teamphone, and modify it to work in the developed simulation framework.

ADVANTAGE

- The proposed approach can significantly reduce the scheduled vacancy of broadcasting distress signal.
- Improve the discovery probability with very little sacrifice of network lifetime.
- And indicate a potentially viable approach to expedite disaster rescue operation

MODULES

1. Smartphone based rescue interface
2. Network formation
3. Hello message transmission
4. Distance calculation

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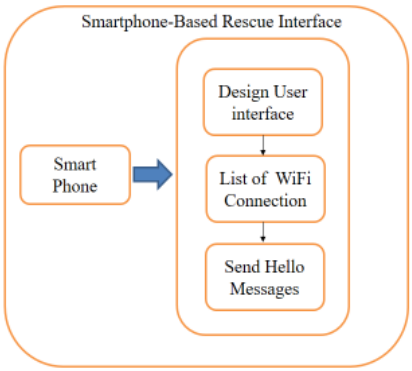
Module description

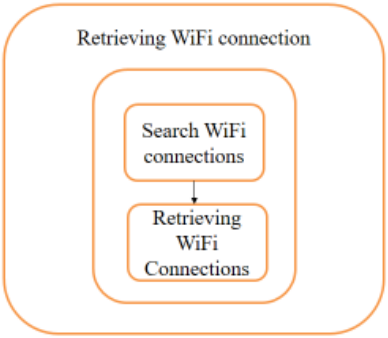
1. SMARTPHONE BASED RESCUE INTERFACE

In this module we design a user interface for the rescue system using android.by using this interface the survivors can easily chat with the neighboring persons and they can share the location they are trapped. This interface display the list of connected Wi-Fi connections.it have an interface to send the hello message.



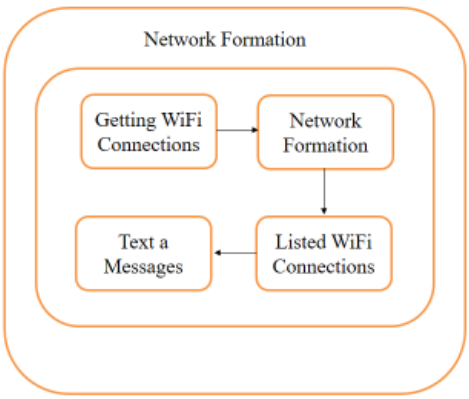
2. RETRIVING WIFI CONNECTIONS

This modules search for the Wi-Fi connection available in that nearby area, that is in the disaster area. It will retrieve all Wi-Fi connections in the disaster area.



3. NETWORK FORMATION

By retrieving the Wi-Fi connections it create a one hop network formation for discuss in the group. Here, the network is formed for the listed Wi-Fi connections and can text a messages between that connections.



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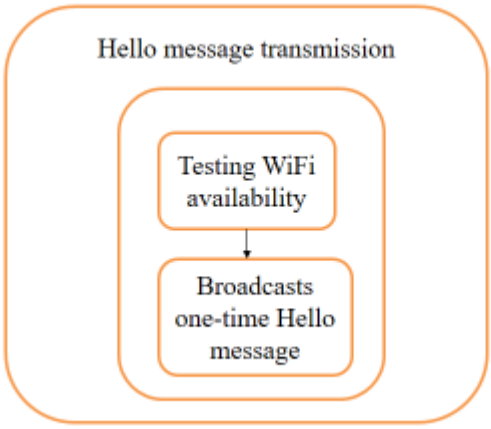
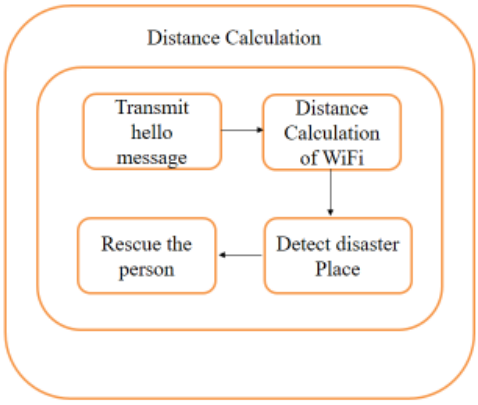
4. HELLO MESSAGE TRANSMITION

This module is for testing the Wi-Fi availability by leaving the hello messages.First, each node broadcasts a one-time Hello message piggybacked with its node id, overhears.



5. DISTANCE CALCULATION

After transmission of hello message, this module is used for distance calculation. It calculates the distance of the Wi-Fi connected in the disaster place. Then it will easier to rescue the person.



SYSTEM REQURMENTS

Software Used:

Language : Java, Android
Tool Kit : Android 2.3.3, Android SDK Manager.
IDE : Eclipse indigo.
Database : MySQL 5.0

Hardware Used:

Processor : Any Processor above 2 GHz
Ram : 1 GB
Hard Disk : 80 GB

V.CONCLUSION

In this paper, we proposed a smartphone based self-rescue system to assist the operation of disaster rescue and relief. The basic idea of RescueMe is that a set of smartphone carried by survivors trapped under the collapsed infrastructure forms into a one hop network and send out distress signal to the nearby crews to assist the rescue operation. We evaluate the proposed approach through extensive simulation experiment and compared its performance with the existing scheme Teamphone .the result showed that the proposed approach can significantly reduce the scheduled vacancy of broadcasting distress signal and improve the discovery probability with very little sacrifice of network lifetime.

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