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MOBILE DISASTER COMMUNICATION USING ZIGBEE

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Abstract -*Our main aim is Broadcasting emergency messages to nearby people is considered to provide more instant help than distant rescue units. The emergency communication service in order to improve communication range, victim localization and evacuation route planning. Since, the popularity of smart phones has been unprecedentedly increased. Thus increases the possibilities of successful receiving and recognizing SOS messages. The objective is to realize a one-way communication in case of an emergency between a source smartphone and a destination in absence of operational base stations inside an emergency region. To achieve this goal, our idea is to take advantage of wireless communication of smartphones to establish and broadcast and forward the message from the source to rescue unit. In this case, to re-establish communication between victims and outside world, sending the emergency messages through wireless technology. In our application, no assumption is made with regard to the existence of a complete path between two nodes wishing to communicate. Any possible node can opportunistically be used as a next hop, provided brings the message closer to the final destination. These features match the concept of opportunistic networking.*

1. INTRODUCTION

Communication networks such as cellular phone networks are quite likely to be severely damaged during a large-scale of disaster like (typhoon, mudslide and earthquake). As a result is people in the disastrous area was unable to call for help, making it difficult to locate them thereafter. Thus, it is crucial to establish a system of emergency communication in order to timely deliver SOS messages to rescue authorities. In ubiquitous computing, computers become a helpful but invisible force, assisting the user in meeting his or her needs without getting in the way. A smartphone can be seen as a ubiquitous computing platform.

Smartphone is a new generation mobile phone that offers increased computational and connectivity capabilities and is able to run complete operating systems that are used as a platform for application developers. Thus, a smartphone usually allows the user to install and run more advanced applications. The popularity of smartphones has been unprecedentedly increased. A smartphone is usually equipped with dedicated chips for logic processing (CPU), graphics processing (GPU) and communication components. In addition, smartphones are embedded with cameras and a wide variety of sensors and transducers. Last but not least, smartphones support various transmission technologies, including infrared, Bluetooth, WiFi and GPS. It is worth mentioning that the advanced and accurate input methods and operation systems such as IOS and Android support ubiquitous computing's vision well. We explore a potential application of smartphones in the case that natural disasters or other emergencies occur, which becomes frequent all around the world. A rescue system using the Android Technology is proposed. However, disaster soften come along with the destruction of the local telecommunication infrastructure causing severe problems for rescue team. In this case, to re-establish communication between victims and outside world, sending the emergency messages through wireless technology.

In our application, no assumption is made with regard to the existence of a complete path between two nodes wishing to communicate. Any possible node can opportunistically be used as a next hop, provided brings the message closer to the final destination. These features match the concept of opportunistic networking.

2. EXISTING SYSTEM

In this system, an emergency message dissemination system by taking advantage of epidemic routing algorithm, as well as Bluetooth and WiFi technologies present in modern smartphones. For the purpose of verifying our research, we have simulated the system with two tools: Epidemic Routing Simulator with graphical user interface, and a simulation script. We tested the influence of various parameters (disaster area, number of devices, range of devices, node movement speed, chance of anode to drop a connection, message priority) on the success rate of the

message delivery function. A successful message transmission out of the disaster area is the Node Density, WiFi Devices' Range, Message Priority and Probability of Node Leaving the Network.

Regarding the wireless technologies, the result shows that WiFi makes much greater contribution than Bluetooth on message dissemination. Furthermore, a trade-off should be made between success rate and average time/energy cost. The simulated results also provide a useful baseline for practical parameter setting in performance-cost optimization.

2.2 Disadvantages

- Short range communication up to 10 meters.
- Simulated results only can be done.
- Bluetooth and wifi networks works under cellular networks.

3. PROPOSED SYSTEM

We explore a potential application of smartphones in the case that natural disasters or other emergencies occur, which becomes frequent all around the world. A rescue system using the Android Technology is proposed. However, disasters often come along with the destruction of the local telecommunication infrastructure causing severe problems for rescue team. In this case, to re-establish communication between victims and outside world, sending the emergency messages through wireless networks would be favorable. In our application, no assumption is made with regard to the existence of a complete path between two nodes wishing to communicate.

Any possible node can opportunistically be used as a next hop, provided brings the message closer to the final destination. These features match the concept of opportunistic networking.

There are three roles for smartphones in the described. The message source could belong to victims trapped in a building/ruin or injured people in need of rescue. They are usually unable to move, therefore are static sources. The source smartphone can also belong to witnesses or reporters sending the real-time information out. Such node can be considered as dynamic sources. The final destination could be either an emergency center (police, red cross etc.) or a mobile user (the source's family or friend). From technical point of view, here we consider a nearby operational base station outside the disaster region as the destination. These are smartphones within the disaster region that participate in the message dissemination by virtue of their wireless capabilities.

3.1 Advantages

- Robust wireless mobile network
- Autonomous radio switching
- Retransmission can be done
- Privacy Protection

3.2 Block diagram

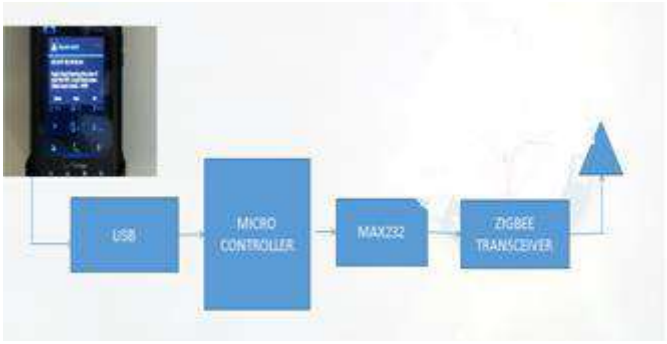

Fig-1 Transmitter Section

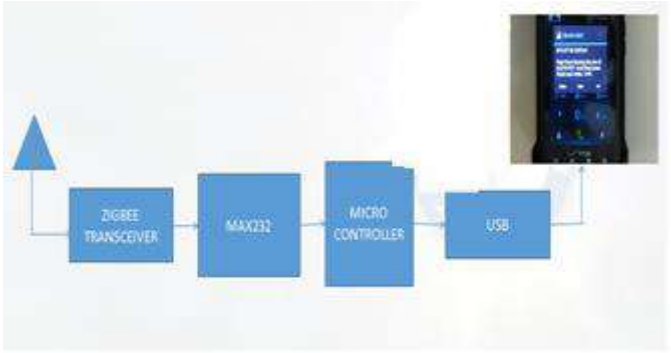

Fig-2 Receiver Section

3.3 Applications

The decentralized nature of wireless ad-hoc networks makes them suitable for a variety of applications where central nodes can't be relied on and may improve the scalability of networks compared to wireless managed networks, though theoretical and practical limits to the overall capacity of such networks have been identified. Minimal configuration and quick deployment make ad hoc networks suitable for emergency situations like natural disasters or military conflicts. Wireless ad-hoc networks classified by their applications:

3.3.1 Mobile ad hoc networks (MANETs)

A mobile ad hoc network (MANET) is a continuously self-configuring, self-organizing, infrastructure-less

network of mobile devices connected without wires. It is sometimes known as "on-the-fly" networks or "spontaneous networks".

3.3.2 Smartphone ad hoc networks (SPANs)

A SPAN leverages existing hardware (primarily Wi-Fi and Bluetooth) and software (protocols) in commercially available smartphones to create peer-to-peer networks without relying on cellular carrier networks, wireless access points, or traditional network infrastructure. SPANs differ from traditional hub and spoke networks, such as WiFi Direct, in that they support multi-hop relays and there is no notion of a group leader so peers can join and leave at will without destroying the network.

4. CONCLUSIONS

In this paper we explored the usage of smartphones as message disseminating nodes that do not depend on cellular infrastructures. Our application is useful during natural hazards, when base stations are destroyed, rendering the phone users unable to call or send a SMS to other users. Under such circumstance, we proposed a personal emergency message dissemination system by using wireless technology with 2.4 GHz frequency along with android application. We are able to broadcast messages around 30 to 40 meter. Our system is possible that somebody near the people in emergency can provide more instant help than distant rescue units. Thus, we broadcast the emergency message to nearby people.

Furthermore, a prediction or evacuation of a disaster often needs to broadcast the emergency message to people in a local area.

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