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RESEARCH ARTICLE

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# DISASTER MANAGEMENT USING MANET WITH SMART PHONES

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**ABSTRACT**

Nowadays smart phone plays a vital in our lives. Smart phone provides so many services like chatting, data sharing, calling etc. All these services are cost effective. We can make use of all these services at free of cost by using Mobile adhoc network technology. This technology helps us at a case of post disaster by providing services to the disaster victims through rescue teams. In this paper, we have transferred the data and made calls from one mobile to the other within a range of adhoc network.

**Keywords:** adhoc, disaster, smart phone, sharing, calling, rescue team.



## INTRODUCTION

Since the starting of wireless technologies[1], the concept of using Mobile Ad-hoc Networks [2][3] is becoming very popular. MANET is self organizing, self directing and self configurable. In MANET, all nodes move freely without pressure of any network topology. Moreover, a node is free to come and join and leave the MANET without any prior information. This behavior causes the breakup and automation of topology. It does not depend on any fixed infrastructure. The routing is a challenging task in MANET. In the past few years, we have observed a continuous growth in the field of mobile communications due to the sudden increase of less cost, lot of availability of wireless devices. However, present device applications are independently focused on networking. A Mobile Adhoc Network is collection of independent or autonomous mobile devices such as laptops, smart phones etc that can directly communicate with each other by wireless links. It is very useful in the absence of fixed infrastructure network. Whenever two nodes want to communicate with each other they can directly communicate each other without any access point. This is the main advantage of adhoc network. Some of the MANET characteristics are distributed operation and dynamic topology. This paper gives an idea of the strong applications of ad hoc networks like post disaster management and discusses the technologies like Bluetooth and Wi-Fi works on the smart phones. More over how the files are shared and calling is happened in smart phones without any cost. Wi-Fi has more features and speed capability rather than Bluetooth technology.

## RELATED WORK

A Network is defined as the group of systems or organizations used to share their information collectively for their business purpose.

In Computer terminology the definition for networks is similar as a group of computers logically connected for the sharing of information or services .A network can be characterized as wired or wireless. Wired networks are connected with dedicated wires (optical fiber). Wireless networks are connected with infrared or radio waves. Again wireless categorized into infrastructure and adhoc. Infrastructure network require access points. Adhoc network does not require any access point. Adhoc networks are static (no mobility) and dynamic (mobility). The Figure1 shows the Adhoc network and Infrastructure network.

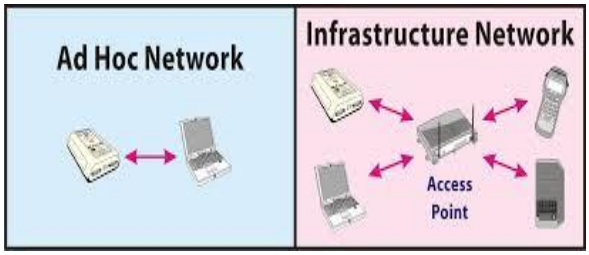


Fig 1: Adhoc and Infrastructure networks.

**MANET:** A mobile adhoc network is a collection of independent mobile nodes that can communicate via radio waves. Each node can directly communicate with other nodes within the transmission range. Each device in a MANET is free to move independently in any direction, and therefore change its links to other devices frequently resulting in dynamic topology. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route. The main goal of mobile ad hoc networking is to extend mobility into the realm of autonomous, mobile, wireless domains, where a set of nodes which may be combined routers and hosts--they form the network routing infrastructure in an ad-hoc fashion. MANET is more dangerous than wired network due to mobile nodes.

**Applications:**

i. Disaster Management
ii. Military operations
iii. Virtual class rooms
iv. Personal Area Network

**Disaster Management**: "Disaster Management"[4] is a process to save the people from the effect of Disaster. If any Disaster occurs at that case the telecommunication system gets destroyed. The communication is highly difficult. At this case next best alternative is MANET.MANET provides temporary communication. We can manage post disaster situation by creating temporary adhoc network. Simply Rescue teams connected to the adhoc network and provide the services to the disaster victims. In this way information exchange did between Rescue teams and disaster victims. The Figure 2 and 3 shows the recent disaster (Hud-Hud Cyclone) happened in vizag, A.P.


Figure 2 (Above) and 3 (Below): Disaster (Hud-Hud) in Andhra Pradesh.

**Technologies:** Bluetooth technology [5] also supports the information exchange but the problem is the range of Bluetooth is 10meters in real time. If we take the adhoc technology, the range of adhoc is 30 meters. We can exchange information by using adhoc in two ways through laptops and smart phones. In case of laptops we can exchange information in laptops through the adhoc [6]. Problems associated with laptops are laptops are too costly as compared with smart phones and time consuming is more whenever data is transfer in network. Carrying laptops is difficult. In case of smart phones we can easily carry the mobiles than the laptops. Smart phone provides more services like Wi-Fi calling [7], messaging [8].

**Experimental Setup:** We can transfer the data through the android mobile phones in two approaches.

1. MANET Manger application,
2. Serval Mesh application.

1. **MANET Manager application**:

In the mobile phones we have successfully sent them to the one mobile to other mobile. For this transmission purpose we have to use MANET Manger application.

**MANET Manager Application Design**:

In this we have used the two android mobile phones in which one is Samsung ace duos model number GT-s6802 with android version 2.3.6 Ginger bread. Another one is Samsung Galaxy y young GT-s5360.

**Process:**

First of all we have to root the mobile phones. After completion of the process we will get the super user privileges. Start the Adhoc option and send the message to another one. Broadcasting is possible in MANET Manager application. The Figure4 and 5 tells the connection and broad casting.

Problems associated to MANET Manager:

- The android mobile phones should be rooted.
- We cannot do file sharing and calling in MANET Manager.
- Multi-Hop communication problem arises.

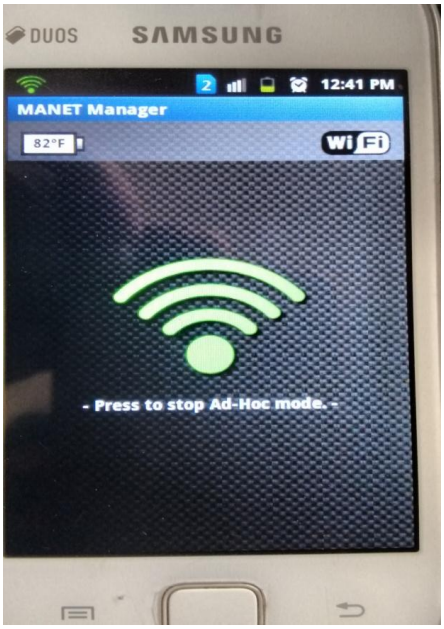


Fig 4: Adhoc connection

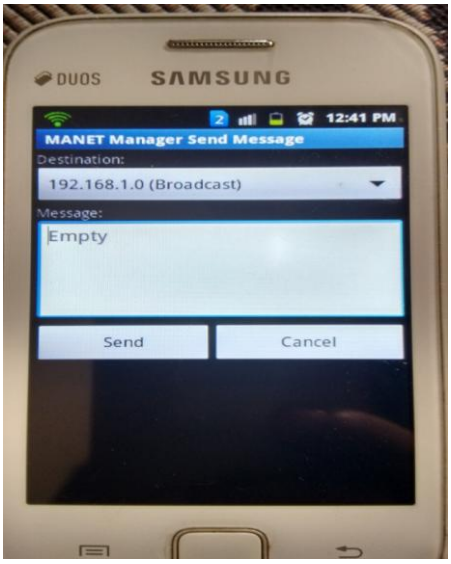


Fig 5: Broadcasting

2. **Serval Mesh application**:

In these mobile phones we have successfully sent data and made the calls to the one mobile to other mobile by using Serval Mesh application.

**Serval Mesh Application Design**:

In this Serval Mesh Application we have used the two smart phones of android operating system. One is Asus zenphone5 with android version 4.3 Kitkat. Another one is Lenovo a6000 with android version 4.4 Kitkat. This Serval Mesh Application is developed based on the android

package api 20. It may not be supported for the lower version. Because there are lots of packages are added in the higher version 20.

**Process:**

In the first mobile we have to open the Serval mesh app click on connect then select the portable Wi-Fi hotspot and the other side open the application click on connect then select the Wi-Fi. Whenever we connect Wi-Fi automatically first mobile reference will appear in the second one. After the connection establishment we can easily transmit the data and make the phone calls without any cost. The below Figures 6, 7,8,9,10,11 tells the connection establishment, calling, file sharing.


Figure6: Connection establishment at source

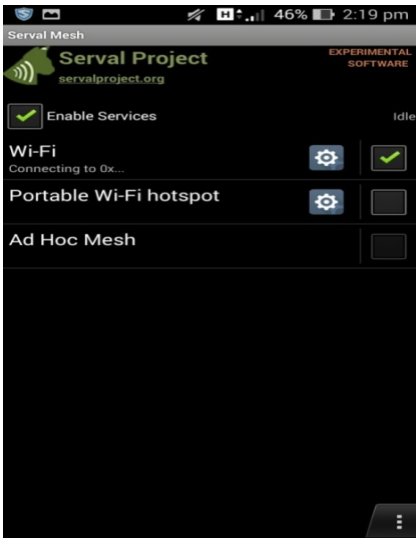


Figure7: Connection establishment at destination

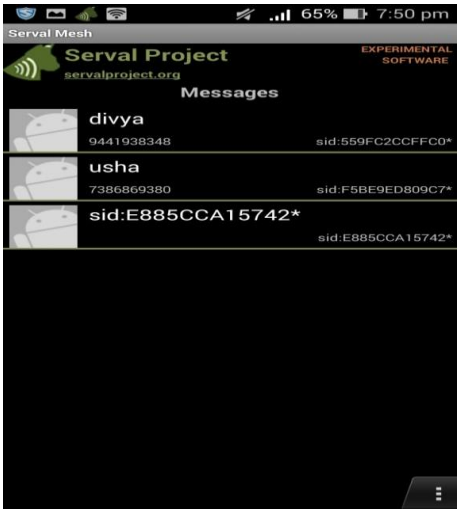


Fig 8: Call list at source side

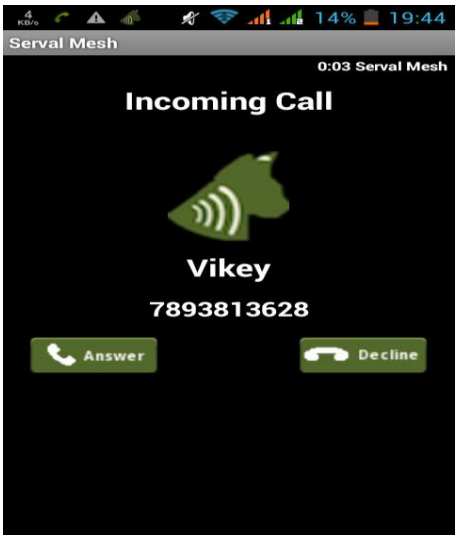


Fig 9: Incoming call at Destination side

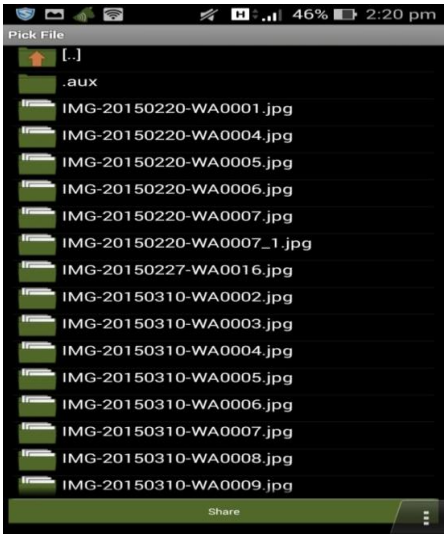


Fig 10: File Sharing at Source

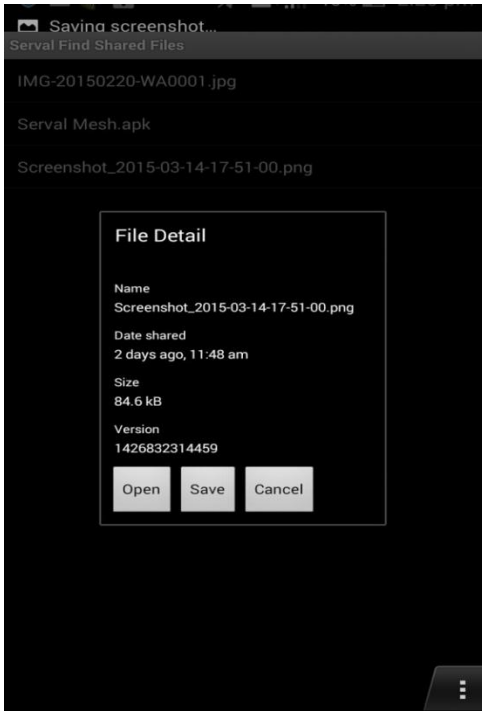


Fig 11: File Receiving at Destination side

**CONCLUSION AND FUTURE SCOPE:**

Finally we conclude that we are creating a Mobile adhoc network through the smart phones which will helpful at the post disaster cases. We are providing the services to the disaster victims through the rescue teams. So the MANET is flexible and reliable communication system at the post disaster. In future, we are going to plan to do the multi hop communication by using routing protocols like OLSR, AODV.

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