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A Novel Approach for Recovery of Disaster using Biometric in Case of Emergency Communication in MANET

[I]Navya J, [II]Phaneendra H D
[I]PG Student, Dept. of Computer Science, The National Institute of Engineering, Mysuru,India
[II]Professor, Dept. of Computer Science, The National Institute of Engineering, Mysuru,India

Abstract
MANET stands for Mobile Ad-hoc Networks. As the name suggests, nodes are mobile in nature and can move from one network to another network. There is no fixed infrastructure and is dynamic in nature. The communication in MANET plays an important role in natural calamities like disaster, military etc. Even though it's dynamic in nature security issues is the major concern. This paper proposes a model to fulfill the objective of providing emergency communication infrastructure to establish communication between trapped victims and rescue volunteers. A control station is used to provide an accurate information system for mobility, organization and coordination of rescue team. Fingerprint authentication is used for providing security.

Keywords
MANET, Disaster area, Control station, Access point, fingerprint authentication.

I INTRODUCTION

MANETs are self-organized, self-configured and self-controlled without any reliance on centralized infrastructure. It can be set up anywhere and anytime.
In Mobile Ad-hoc Networks, each node is not known to each other i.e., sender, receiver and intermediate nodes. The nodes are protected from outsiders. All the packets are similar to each other and is difficult to distinguish among them.
Natural calamities like flood, tsunami etc. occurs in the world. When these calamities occur, communication for victim is required in that disaster area. Rescue operation fails when there a breakage of link and communication system. It is also difficult toreconfigure the communication system and victims suffer.
An additional device such as satellite phone is required and user must be aware of operation of these devices[3].Several hybrid architecture has been proposed before integrating cellular communication system and MANET. These have many limitations which made them impractical while providing communication between nodes in disaster area and hosts in outside world. Access point(AP) are dropped in the disaster area. Victimreceives this AP and communicate. Some papers have proposed a routing protocol based on hybrid cellular communication architecture. A routing scheme is provided which efficiently uses energy resources for communication. The major challenge in this is to provide security. This paper uses fingerprint authentication for providing security.

II. Related Work

A. Existing System

In paper[1], a hybrid architecture is proposed to provide communication in disaster areas consisting of a reactive routing protocol which transmits a message in the disaster area. The drawback is that security is not provided.
In paper[2], two models has been proposed namely., two tier and multi-tier architecture. In two tier architecture, time complexity is more whereas in multi-tier transmission is done through satellite which requires high frequency resulting in end-to-end delay of packets and packet loss.
In paper[3], the author uses mobile stations to transmit information. The limitation is that availability of mobile station is very less. As they are heavy, if they are dropped by air it may get crashed when it touches the earth.
In paper[4], there is no guarantee that the communication system is available and it also has problems with power resources of nodes.
In paper[5], the limitation is that it uses Bluetooth technology which limits the size of MANET. It is assumed that patches will be formed over a non-over lapping network but it is impossible to have mobile nodes with non-over lapping groups.

III. Proposed Methodology

This paper presents a method for emergency communication to rescue the victims in disaster area. It consists of control station, access points, authentication and mobile nodes.
System Architecture is as follows:
It consists of three modules namely Control station, Access point and user. Control Station is used to provide an accurate information system for mobility, organization and rescue teams. It is also responsible for adding user profile, registering access points and registering users.

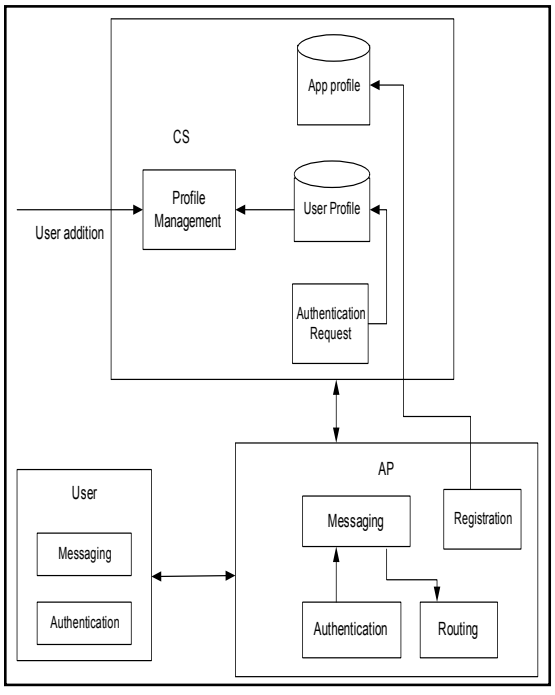

Fig. 1: System Architecture

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Access points are used to establish the communication link with control station either directly or via other access points. They transmit the data of mobile nodes towards control station or outside world using concept of minimum hop distance. Mobile nodes or devices are connected through Wi-Fi interface to each other and they can also connect directly to access points.
User module communicates with the access point by sending messages and registers itself with the Access point. Authentication is done during registration process to find out whether users are authorized or not.
Pseudo Code:
Algorithm : routePackettoGW
Input : srcnode
allbeacon← wait for AP beacon
AP← choose the shortest distance AP from allbeacons
forwardPacket (srcnode→ AP)
curr= AP
while curr !=GW
nextnode← get Next shortest distance AP to GW
forwardPacket (curr→nextnode)
curr← nextnode
end
The input here is the source node. All the beacon(signal) wait for the access point. This access point chooses the shortest distance to reach the destination. Before the access point chooses the shortest distance it first checks for the authentication of authorized users. If any user is not authorized then it ignores that user. The source node forwards the packet to the access points. While forwarding the packets if the gateway gets that packet then route is done else the access points in turn forwards the packets to its neighboring nodes till the shortest route is discovered.

IV. Performance Evaluation And Simulation Results

This paper consists of 50 nodes as default which includes both mobile nodes as well as access points. The sink node is the gateway. The simulation is done in java. It shows a comparison of existing and proposed system which has fingerprint as security. The parameters used here are energy consumption and packet delivery ratio.

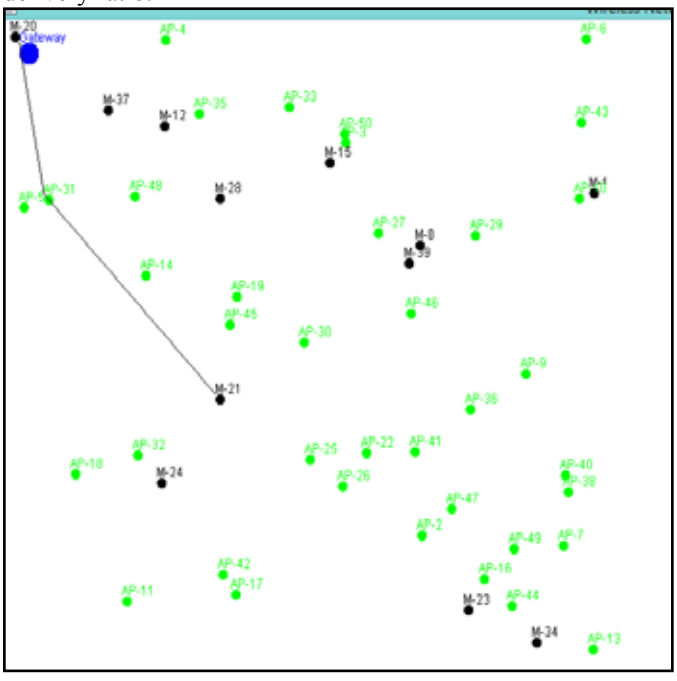

Fig 2: route from mobile node-21 to gateway

mobile nodes(M)

access point(AP)

gateway (GW)

access point down

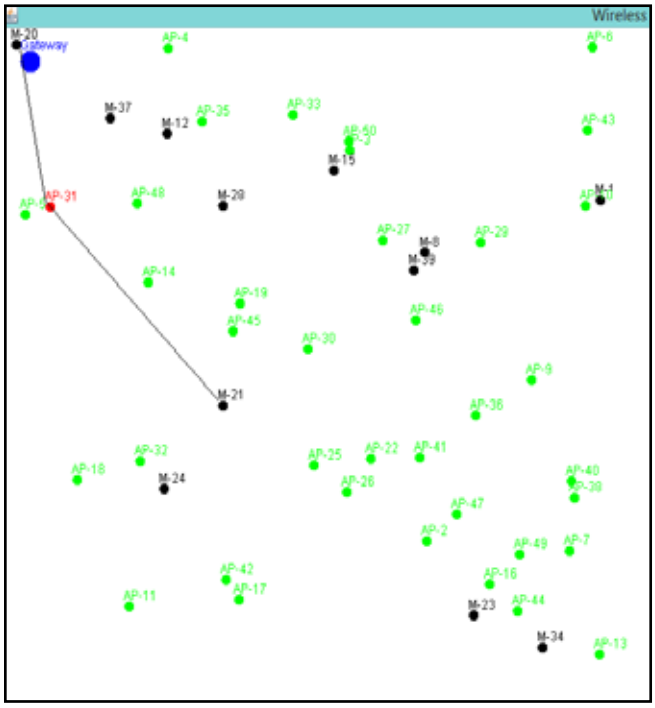

Fig. 3: AP down

In the above figure, the access point 31 is down hence it chooses the other path to reach the target as shown in fig 4.

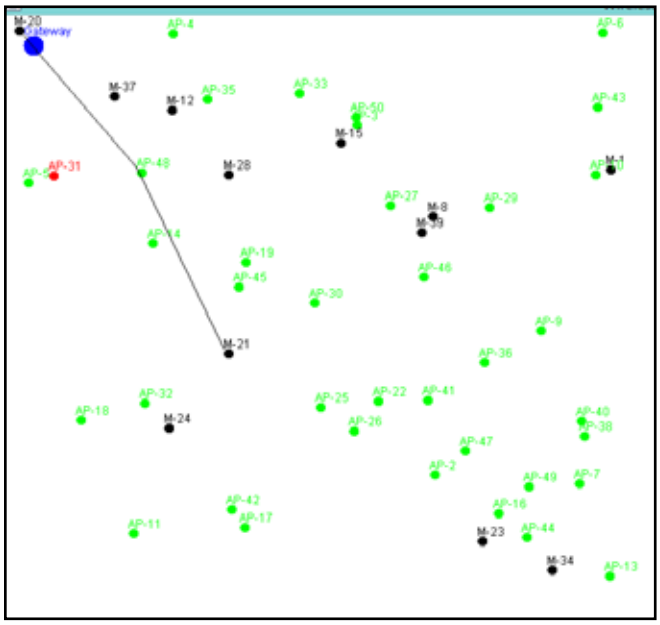

Fig. 4: Alternate path to target

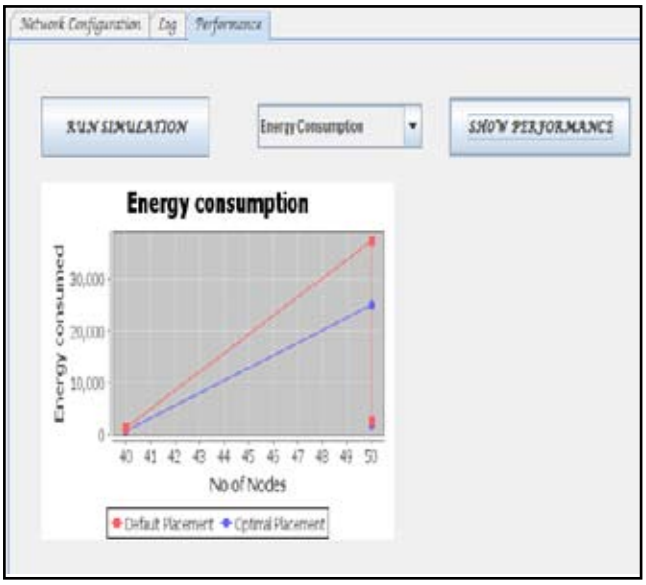

Fig 5: Energy consumption of proposed system is less compared to existing system.

Proposed system
Existing system

Fig. 6: Packet delivery ratio is high in proposed system compared to existing system.

V. Conclusion

This paper presents a hybrid architecture model with fingerprint as security. In this, each user gets registered to access points and then are used in communication with the trapped victims so that they can rescue the victims. In existing system there was no security provides which is overcome in proposed system. This system gives access only to the authorized users and unauthorized users cannot access the network.

VI. Acknowledgements

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