

# A trust mechanism to enhance Quality of service of Wireless Adhoc Networks

Gurpreet Singh  
CSE  
Lovely Professional  
University

Ravinder Singh  
CSE  
Lovely Professional  
University

Amritpal Singh  
CSE  
Lovely Professional  
University

## **Abstract:**

*Low cost and high efficiency is always in demand along with the concept of wireless technology and in addition to these powerful wireless transceivers are also preferred in mobile applications In this system we enhanced the route selection protocol this will include the concept of distance as well as an additional property of security. The main work which is done is working with routing protocol in which the trust mechanism is done in which the complexity of routing protocol for selecting the route on getting an malicious node in route it will get alternate the route with selecting the next hop on behalf of trust mechanism and proposed the calculation of trust of node in network is done and then an approach to find alternate route can be given in present work even we collaborated the energy efficiency in present work.*

## **I. Introduction to Wireless Networks**

Wireless technology has become a very emerging era in the past years. The wireless communication had become a very important part of our life. Wireless technology makes us able to get rid of the wires. The wireless technology makes us able to transfer data by using air as an interface for communication. The wireless communication provides us with the ability to move from one place to another while sending the data. There are different types of the wireless networks available around us. The wireless networks can be categorized by the type of their architecture .The two broad categories of the wireless networks are:-

- I. Infrastructure Wireless Networks: -These are the networks which require a fixed wired architecture. These networks are able to provide communication to the mobile nodes but they require the fixed network at the backend. The main example of Infrastructure network is :-
  - GSM: -Global system for mobile communication is a voice-oriented network. The GSM provides the facility to send voice data over the air interface. To access the services of the GSM the user must have a SIM (Subscriber identity module) and a mobile device. The user can be reached by using a 10 digit mobile number. The fixed architecture of GSM network consists of the following subsystems:
  - BTS:-It is known as a base transceiver System .The base transceiver system provides the coverage area to the mobile station. If a mobile remains in the coverage area of the BTS only then it can make or receive a call.

- BSC:-It stands for base station controller .As the name suggests the BSC controls a number of base stations .A number of BTS stations can be controlled by a single BSC. The BSC requests the MSC to provide a channel allocation for communication of the mobile device. The BTS and BSC are in a group known as BSS (Base Station Subsystem).
- MSC:-Mobile Switching Centre is the heart of the GSM architecture. 2 The main functionality of the MSC is to provide mobility to the users. The MSC is also responsible of assigning a channel for communication .The MSC consists of the main subparts which are briefly explained below:-
- HLR:- Home location register stores the information about the users which are registered with the MSC.
- VLR:- The visitor location register stores the information about the users which are visiting the MSC but they are actually registered with some another MSC.
- AUC:- It is the authentication register which stores the information about the devices used to access the services of the GSM.

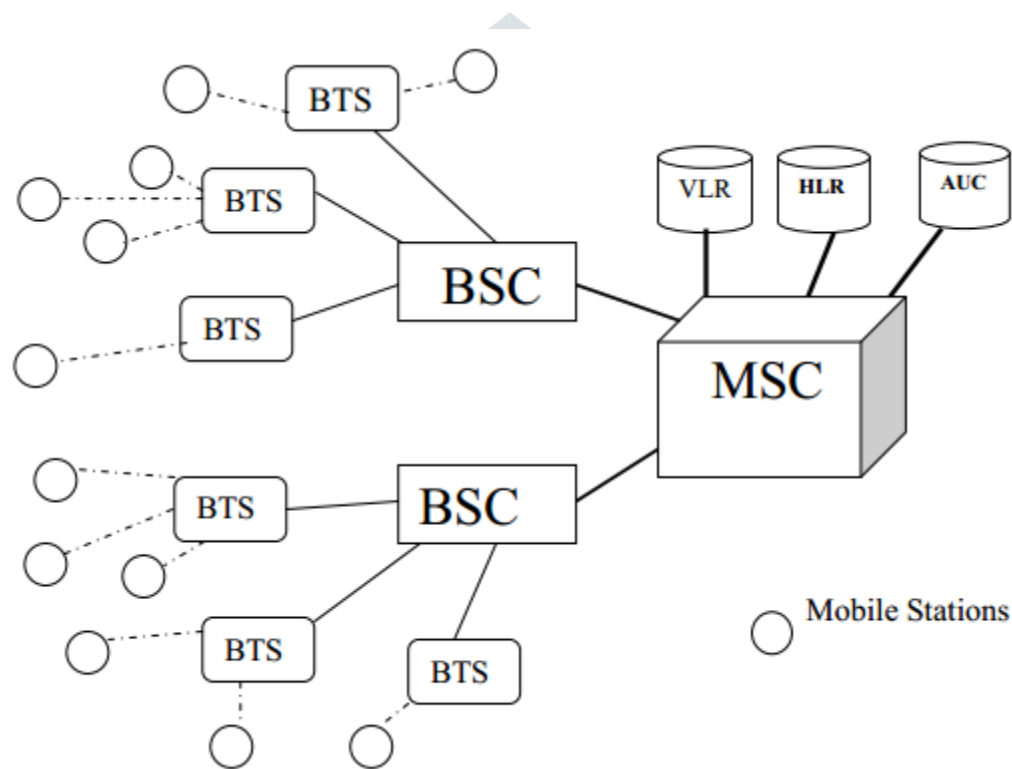


Figure 1.1 GSM Architecture

II. Infrastructure less Wireless Smart Networks: -The infrastructure less networks are the networks which don't required any fixed infrastructure for providing communication services. These types of networks do not need to have a centralized controlling system. The following networks comes under this section:

- MANET: - It stands for the mobile ad hoc network. In mobile ad hoc networks the nodes can communicate with each other by constructing a temporary network for communication. This temporary network can provide communication between the nodes in the area where it is not possible construct an infrastructure network.
- VANET:-Vehicular ad hoc network is a smart network which is build by using the vehicle transportation facility to transfer data from source to the destination. In such networks transmission and receiving units are installed on the cars or the other vehicles. With the help of VANET accidents between the vehicles can ve avoided. The vehicles can communicate with each other by using the transmitters and receiver on the vehicles. Such technology can help to save life and can make the transportation system very safe.

- PAN: -Personal Area network is a type of network in which a temporary network is build which can be used for personal communication at home. We can connect the computer with a printer without using a wire this can be done by using PAN. The auto lighting system in homes is also an example of such networks. Very small devices are used to activate the circuit at home which in turn will switch on or off the home lights and other appliances of home. Piconet and Scatternet also fall under the category of the Personal Area Network.
- SENSOR NETWORKS: -Small sensing devices are used to sense the environment changes and then the devices communicate with each other to collect data from the neighboring nodes. Data thus collected can be used to derive a result. The sensor networks are widely used these days. The main application area of such networks is: - Fire detection in forest, Temperature sensing devices in nuclear reactors. The sensors networks are also widely used in the battlefield to detect the movements of the enemy. The sensor networks are also widely used in the medical field as the patients can wear small sensing devices which can monitor their heart rate etc.

## II. Characteristics of Wireless networks

Wireless networks were designed to work in isolation where they don't need to depend on any infrastructure network to provide communication between source and destination. There can be many intermediate nodes in between source and the destination nodes. The intermediate nodes are simply called hops. If the network which we are using to communicate is using more than one intermediate node then we can call such kind of network as a multihop network. The nodes in the network are not bounded to remain in the network during the communication .When intermediate nodes move from one place to another then it might not be possible to get a path for communication. As all the devices are mobile they are having limited range to communicate with the neighboring nodes whenever there is a movement of the nodes the nodes need to reroute the data by using any available node for communication. The process of re routing data after the movement of intermediate nodes is not always possible. Due to these problems mobile ad-hoc networks are less robust as compared to infrastructure networks .As the mobility of nodes increases the performance of mobile ad hoc network drops. All the nodes have some communication interface the nodes of mobile ad hoc networks use antennas to communicate with the neighboring nodes .The antennas can be unidirectional or omnidirectional .The nodes can increase the transmission and receiving power of their antennas but increased the power of the antennas can cause a issue of interference in the communication of the other nearby nodes. The nodes of mobile ad-hoc networks have scarce resources available. So there is a limitation on the use of the available resources

## III. Issues of Ad hoc networks

- Mobile nodes: There is no restriction on the movement of nodes which are present in the network .The mobile nature of the nodes leads to several path breakages which eventually degrade the performance of the nodes.
- Limited bandwidth on the links: The nodes o mobile ad-hoc networks are having less bandwidth availability as compared to the fixed infrastructure networks. Due to the small bandwidth the Wireless links will not be able to perform better than the fixed infrastructure networks. The limited band width is not the only issue in mobile ad-hoc networks. There are several other issues which come into play when we need to increase the bandwidth of ad hoc networks. As the wireless networks are emerging day by day the expectations of the users are also increasing and they need similar services as they are getting on the infrastructure networks .Providing the similar services on the infrastructure less network is not a easy task.

- Limited energy: The nodes of mobile ad-hoc networks are mobile .So they might not have a power source available with them all the times. So they need to operate on the batteries or other resources of energy such as sunlight. But the amount of energy generated by batteries is still limited so we can't fully utilize the nodes capabilities for long time. So there will be always a tradeoff between the performance and battery consumption
- Lack of security: The nodes of the mobile networks are very much prone to the security breaches .As we have limited resources available for the processing of data so we cannot use very heavy algorithms for providing security to the data. There is also a lack of physical security of the mobile devices used in the mobile ad hoc networks. [1][2]

#### IV. Routing Protocols

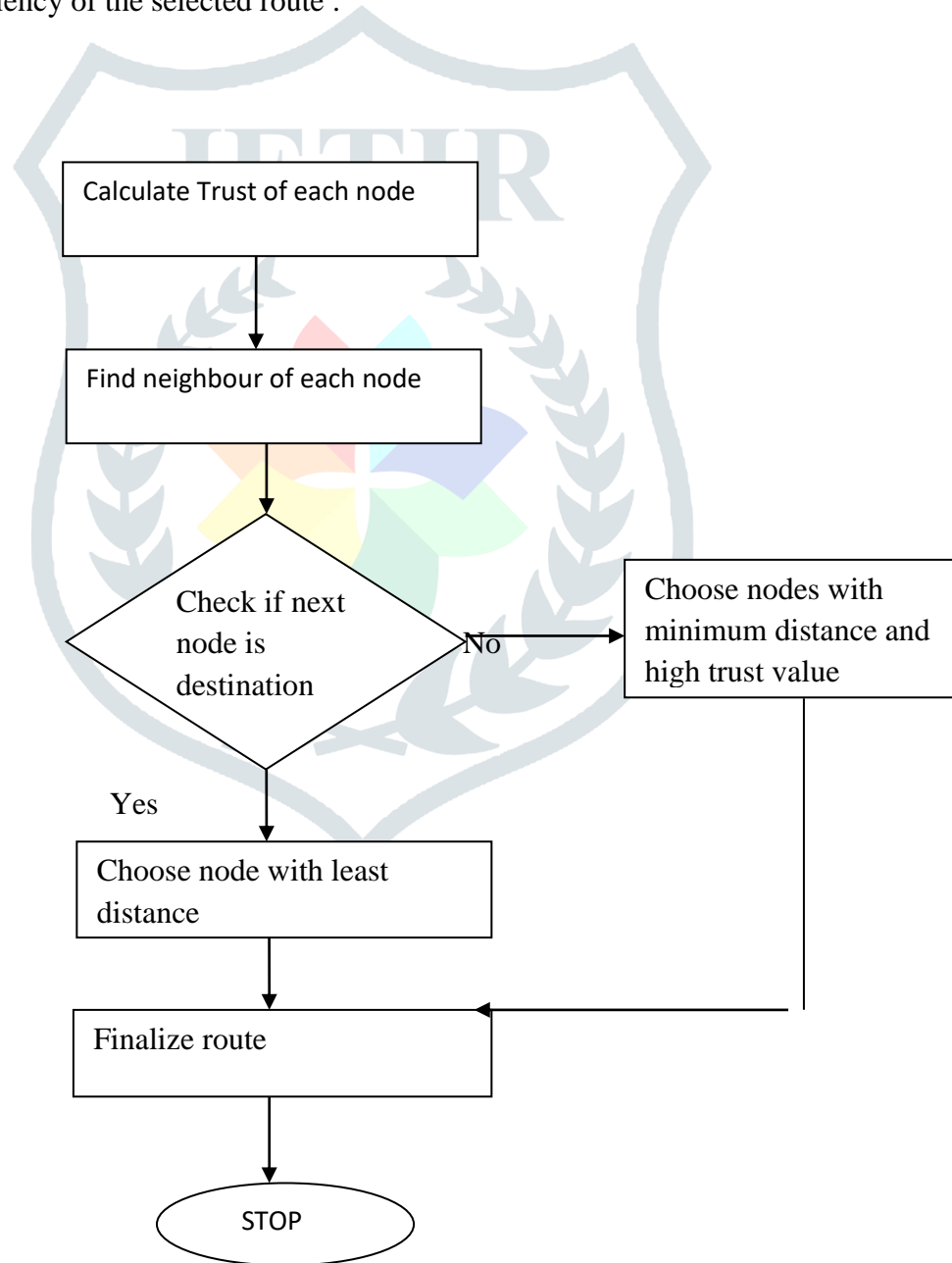
The protocols are the set of rules which are to be followed when we want to get some task performed the routing protocols are the set of rules which are to be followed by the nodes which want to communicate with each other. All the nodes have to follow the rules which are described inside the protocol. All the nodes of the ad-hoc network can have three type of roles which are source, destination, intermediate node. The responsibilities of the nodes are different in every role. The node can act as a source as well as an intermediate node at same time. Similarly a destination node can also work as an intermediate node at the same time.

#### V. Methodology

Routing is the process of selection of best path from all the available paths. When we have a source node and the destination node, the data is to be transmitted between them. The routing is done from the source to the destination for data transmission. A new technique for routing is presented and the methodology of the presented technique is described below:

1. First of all an initial network parameters will be set up like area of the network, number of nodes to be introduced in the network. A network will be initialized in the first step.
2. Then the neighboring nodes of each node will be calculated. This will be done on the basis of distance of each node from each other node. The neighbor nodes will be selected having minimum distance from the node.
3. As routing in the presented technique is done on the basis of trust values so the next step will be calculation of trust value of group of nodes in the network. There are two categories of trust in case of routing and that are direct trust and indirect trust. When the trust value of individual nodes is calculated it is called direct trust and in this case it is node to node trust. Now talking about indirect trust, it is the trust value found with respect to all the nodes present between the particular range of that node. In the presented technique indirect trust values of the nodes is calculated.
4. As in the presented technique the trust value and the energy of nodes is considered for routing. The trust value is found in the former step, so the latter step will be calculation of energy of each node and it is done in this step.

5. The computation of path is done in this step. The route will be selected in this step on the basis of trust dependency and the energy value of each node. The presented scheme selects the path for routing on the basis of trust and energy so it is what is done in this step. The trust and the energy calculated in the earlier steps will be evaluated in this step for calculating route.
6. The next step will be checking whether any malicious node is present in the selected path or not.
7. In the presented scheme if there is presence of malicious node in the selected path then an alternate path will be found in which no malicious node will be present and trust value may be lesser than the earlier selected path. So, in this step the path will be updated if the earlier one had any malicious node.
8. And finally the network parameters will be calculated which will tell the network's performance and will define the efficiency of the selected route .



Flowchart

## VII. Conclusion and future Scope

The proposed scheme in which the process of routing not only includes the value of trust of the nodes but also the energy value of the nodes is an efficient technique of routing. In order to check the trust of the node , choose the node with minimum distance from source node and high trust value of node to be calculated . This mechanism helps in improve security. Based on short distance parameter the energy consumption of nodes is also reduced .Now days different types of attacks are performed on adhoc networks, like active or passive attacks. In future better mechanism needs to be developed in order to improve security of network

## VIII. References

- [1] Seema and Reema Goyal, "A Survey on Deployment Methods in Wireless Sensor Networks," *International Journal of Advanced Research in Computer Science and Software Engineering*, pp. 540-543, 2013.
- [2] Amith Khandakar, "Step by Step Procedural Comparison of DSR, AODV and DSDV Routing protocol, Mobile Ad hoc network is network where nodes communicate without any central administration or network infrastructure," *International Conference on Computer* , pp. 30-34, 2011.
- [3] Vibha Yadav, "Localization S Cheme For Three Dimensional Wireless Sensor Networks Using Gpsenabled Mobile Sensor Nodes," *International Journal of Next-Generation Networks (IJNGN)*, pp. 60-72, 2009.
- [4] Rajesh Sharma, "The Dynamic Source Routing protocol (DSR) is a simple and efficient routing protocol designed specifically for use in multi-hop wireless ad hoc networks of mobile nodes," *International Journal of engineering*, pp. 20-25, 2009.
- [5] Amit N. Thakare, "Performance Analysis of AODV & DSR Routing Protocol in Mobile Ad hoc Networks," *International Journal of Engineering Science and Innovative Technology (IJESIT)* , pp. 259-265, 2013.
- [6] Rajeshwar Singh, "Performance Evaluation of DSR and DSDV Routing Protocols for Wireless Ad Hoc Networks," *Int. J. Advanced Networking and Applications*, pp. 732-737, 2011.
- [7] Pallavi Sahu and Sunil R. Gupta, "Deployment Techniques in Wireless Sensor Networks in this paper, we study coverage with connectivity properties in large wireless sensor networks (WSN)," *International Journal of Soft Computing and Engineering (IJSCE)*, pp. 525-526, 2012.
- [8] D. B. Jagannadha Rao, "A Study on Dynamic Source Routing Protocol for Wireless Ad Hoc Networks," *IJARCCCE*, pp. 522-529, 2012.