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A Survey:Secure and Energy Aware Stable Route Discovery and Forwarding in Manets

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***Abstract* - In mobile ad hoc networks, knowledge of neighbors is a requirement in a number of important tasks. The distributed techniques to perform secure neighbor discovery, suitable for highly mobile ad hoc environments, are described under discovery of neighbor by detecting malicious neighbors. On with address selection of stable path among the neighbors which not only describes the selection of correct position neighbors but also best link stability neighbors.The adversary or malicious and also link failures. The availability and the duration probability of a routing path that is subject to link failures caused by node mobility in terms of malicious activities.**

Keywords* - *Link Stability, Route Discovery,Forwarding in MANETS.

1. INTRODUCTION

A mobile ad hoc network is an autonomous collection of mobile devices (laptops, smart phones, sensors, etc.) which communicate with each other over wireless links and cooperate in a distributed manner in order to provide the network functionality. In this type of network, operating as a stand-alone network or with one or multiple points of attachment to cellular networks or the Internet, paves the way for numerous new and exciting applications. Application scenarios include, but are not limited to: emergency and rescue operations, conference or campus settings, car networks, personal networking, etc. Nodes are mobile, topology can be very dynamic.Nodes must be able to relay traffic oncommunicating nodes might be out of range.A MANET can be a standalone network or it can be connected to the external networks(Internet).

MANETS can be used for facilitating the collection of sensor data for data mining for a variety of applications such as air pollution monitoring.It should be noted that a key characteristic of such applications is that nearby sensor nodes monitoring an environmental feature typically register similar values. This kind ofdata redundancy due to thespatial correlation between the sensor observations inspires the techniques for in-network data aggregation and mining. The spatial correlation is measured between data sampled by different sensors, a wide class of specialized algorithms can be developed to develop more efficient spatial data mining algorithms as well as more efficient routing strategies. Researchers have developed performance models for MANET by applying queueing theory.

Mobile ad hoc networks (MANETs) can be defined as a collection of large number of mobile nodes that form temporary network without aid of any existing network infrastructure or central access point. Each node participating in the network acts both as host and a router and willing to forward to packets for other nodes. The characteristics of MANETs such as: dynamic topology, node mobility, provides large number of degree of freedom and self-organizing capability of that make it completely different from other network. The nature due to MANETs, to design and development of secure routing is challenging task for an open and distributed communication environments.

2.MANET APPLICATIONS

With the increase of portable devices as well as progress in wireless communication, ad hoc networking is gaining importance with the increasing number of widespread applications. Ad hoc networking can be applied anywhere where there is little or no communication infrastructure or the existing infrastructure is expensive or inconvenient to use. Ad hoc networking allows the devices to maintain connections to the network as well as easily adding and removing devices to and from the network. The set of applications for MANETs is diverse, ranging from large-scale, mobile, highly dynamic networks, to small, static networks that are constrained by power sources. Besides the legacy applications that move from traditional infrastructure environment into the ad hoc context, a great deal of new services can and will be generated for the new environment. It includes:

- Military Battlefield
- Sensor Networks
- Commercial Sector
- Medical Service
- Personal Area Network

3.NEIGHBOR'S VERIFICATION AND PATH QUALITY PROTOCOL (NVPQP)

To calculate the broadcast link probability. The scheme considers the information about the current routing status of specific nodes which called connectivity metric (link stability value). When a node send route request to its neighbors then each neighbor reply with its link probability metric value to the route requested node. Link probability metric value is calculated by taking probability of some metrics like signal strength, processing capability, distance etc.

STEP 1:
The process of prediction and evaluation of the link context information can be summarized as follows:
1. Each node calculates its link rate for a given set of neighbor nodes.
2. This process is based on the calculation of energy value or signal strength is the attribute describing the context of each node.
3. The calculated rates are periodically sent to the other nodes in the broadcasting area as part of the update of routing information.
4. Each node maintains a logical forwarding table of tuples describing the next logical hop and its associated signal strength rate for all known destinations.
5. Each node uses local prediction of routing path between updates of information.

To calculate the above parameter for path selection to define the network model first and then it will subsequently describe the process of calculation for each the parameters.

STEP 2:NEIGHBOR LOCATION INFORMATION STEPS
Source node at data packet generation
Get destination location from location service
Broadcast data packet
Set up timer for rebroadcasting packet to tr
Destination node at data packet reception
If the packet is received for the first time
Deliver data packet to application
Broadcast ack packet
All intermediate (non-destination) nodes at data packet reception
Update location service with data packet location information
If an ack has been received for the packet
Broadcast ack packet
Else if the node is in the forwarding area
If the node does not have a copy of the packet
Set up timer for rebroadcast to td
Else if custodian is in node forwarding area
Remove packet in node if it has one
At ack packet reception
Update location service with ack packet location information
If the node has a copy of the packet
Remove packet
When a data packet rebroadcasting timer expires
If the packet's TTL has expired (tTTL)
Remove packet
Else
Update location information in packet with location server data
Broadcast data packet
Set up timer for rebroadcasting the packet to tr

STEP 3: CONFIGURATION STEPS

To specify the necessary input parameters in the Config.in file as said above. For the simulation procedure, it have been
specific about certain parameters as mentioned below to enable hassle
free simulation

Terrain range – (800, 800)

Number of nodes – 20 (This is a scalable simulator. Hence number of
nodes can be increased at will.)

Routing protocol – NVPQP

These parameters were adhered to for the whole process of experimentation with the new protocol.

4.MODULES DESCRIPTION

The Module descriptions used are
- MANET FRAMEWORK SETUP
- PATH STABILITY VALUE BASED PREDICTION TECHNIQUE
- NVPQP ROUTING PROTOCOL
- PROTOCOL CONFIGURATION SETUP
- PERFORMANCE EVALUATION

4.1manet Framework Setup

To give structure for the routing process in an ad hoc network that includes setting up of node placement, node partition etc. Simulation framework is formulated by linking all layers and sub layers into a single process because it can't get results by running each and every layers. Framework includes topology design like grid based or random or uniform or user specification.

4.2 PATH STABILITY VALUE BASED PREDICTION TECHNIQUE

To propose an algorithm to predict the link lifetime in MANETs by the path stability value. The algorithm recursively computes the nodes mobility states, modeled as a nonlinear system, using periodically measured node current stability value as inputs. The technique states are then utilized to compute the estimates of the remaining link lifetime. A host or node willing to send a message to a recipient or any host in the multihop path to it uses a prediction technique to choose the best next hop or forwarding node for the message. The use of this technique is at strategic network locations to allow predictions of future network congestion. The premise is that intelligent agents can use such predictions to form context aware, cognitive processes for managing communication in mobile networks.

4.3 NVPQP ROUTING PROTOCOL

Neighbor's verification and path quality protocol (NVPQP) is proposed protocol. It is very evident that two major factors mobility and energy efficiency need to be considered to assure better network performance. Specially while assuring QoS in MANET environment nodes should not die due to power constraint or the links should not expire due to mobility in the middle of the transmission. So the target is to choose a more stable path considering

higher link stability and less cost along predicted higher life path. In this paper to combine the idea of link stability calculation based on mobility prediction and best path in terms of cost and lifetime along with QoS support. To achieve QoS path along with prolonging the network life time and to reduce packet loss it need to calculate three parameters for a path:

i. Path Stability
ii. Lifetime prediction and
iii. Ratio of QoS support and requirements

To calculate the above parameter for path selection to define the network model first and then it will subsequently describe the process of calculation for each the parameters.

4.4 Protocol Configuration Setup

It need to configure some attributes which is supported to execute the routing protocol like Number of nodes, Mobility, Mac protocol, Simulation time, Band width, Transmission range etc… by setting these kinds of attributes to execute out routing protocol with layers interaction. To setup the layer wise results in the configuration process.

The sequence of events at run time:

1. The main function in driver.pc is run. This is the C main function, where GloMoSim starts.
2. The main function calls parsec main () to start the Parsec simulation engine, initialize the simulation runtime variables and create the driver entity. The parsec main function is used when the user wants to write his own main and is found at PCC DIRECTORY/include/pc api.h (since the function is part of the Parsec runtime system, it is not possible to access the source for it).
3. When the simulation ends, parsec main () returns, and the rest of the main function is executed.

In GloMoSim, the driver entity (in ./main/driver.pc) reads the input file descriptor, establishes partitions, allocates memory for node information, calls appropriate functions depending on the read input values such as simulation time and node placement, and finally starts simulation by sending a StartSim message to the partitionEntityName instance of the GLOMOPartition entity type (defined in the glomo.pc file).

4.5 Performance Evaluation

It need to specify the necessary input parameters in the Config.in file as said above. For the simulation procedure, it have been specific about certain parameters as mentioned below to enable hassle free simulation

Terrain range – (500,500)

Number of nodes – 20 (This is a scalable simulator. Hence number of nodes can be increased at will.)

These parameters were adhered to for the whole process of experimentation with the new protocol.

The performance of the proposed algorithm is evaluated via glomosim simulator. Performance metrics are utilized in the simulations for performance comparison:

- **Packet arrival rate.** The ratio of the number of received data packets to the number of total data packets sent by the source.
- **Average end-to-end delay**. The average time elapsed for delivering a data packet within a successful transmission.
- **Communication overhead**. The average number of transmitted control bytes per second, including both the data packet header and the control packets.
- **Energy consumption.** The energy consumption for the entire network, including transmission energy consumption for both the data and control packets.

5.CONCLUSION

A fundamental issue arising in mobile ad hoc networks (MANETs) is the selection of the optimal path between any two nodes. Ensuring a data path to be valid for sufficiently longer period of time is a very difficult problem in MANET due to its highly dynamic nature. A method that has been advocated to improve routing efficiency is to select the most stable path so as to reduce the latency and the overhead due to route reconstruction.

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