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Performance Enhancement Using Naodv Algorithm In Manet

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ABSTRACT: Mobile Ad hoc Networks (MANET) is typically characterized by high mobility and frequent link failures. As a result, normal routing algorithms route creation have to make frequent route discoveries resulting in decreased throughput, high end to- end delay and packet losses so as to improve them, we propose routing algorithms for increasing performance. Here we develop the new routing algorithm with the help of nanotechnology, The ad hoc on-demand distance vector (AODV) integrated with nanotechnology which make use of nanomachines and infosation to improve the performance. The Nanotechnology consists of nanomachines, they are assumed to sense the environment and gather some environmental information to deliver infostations. The Info stations collect the information coming from nanomachines, infostations are assumed to make decision for an appropriate action in routing through AODV routing tables and it also act as a buffer in storing the data packets. NAODV performs in routing protocol increasing the throughput, routing protocol performance and then to reduce the delay, and reduce the packet delay of this network. Using the TN (Transmitter Nano) and RN (Receiver Nano) sending and receiving data process on these network. Nano–Aodv (NAODV) process to be mainly focused on the better throughput performance compare with Aodv routing protocol.

KEYWORDS: Performance, MANET, Nanotechnology, NAODV

I. INTRODUCTION

An ad-hoc network is a multi-hop wireless network where all nodes cooperatively maintain network connectivity without a centralized infrastructure. If these nodes change their positions dynamically, it is called a mobile ad-hoc network (MANET). Since the network topology changes frequently, efficient adaptive routing protocols such as AODV, DSR are used. As the network is wireless, security and performance becomes the major issue in Mobile Ad hoc Networks. Some of the attacks such as modification, fabrication, impersonation and denial of service attacks are due to misbehavior of malicious nodes, which disrupts the transmission are rectified by secure AODV routing protocol (SAODV). Simulation results show that our proposed routing algorithm provides a better performance than existing works. The simulation results show the improvement of the network performance, in terms of overhead and end to end delay to the AODV routing protocol by using nano-AODV routing protocol(NAODV)which can improve the performance of the MANET. Therefore MANETs are integrated with nano technology so called Nano-AODV are used in the improvement of the performance. Nanotechnology involves nano machines and infostations for the process. Nanomachines operates at a speed of 10^-9/sec, thus increases the performance level .

Nanomachines for MANETS:
A nanomachine, also called a nanite, is a mechanical or electromechanical device whose dimensions are measured in nanometers (millionths of a millimeter, or units of 10^-9 meter). The mobile ad hoc networks (MANET), is a nature of nanomachine collision rate is governed by some mobility models such as random mobility and then random waypoint. The movement, are assumed to their network. The mobility of nanomachines is collision on the data processing on network. Using the nanotechnology, Performance is increased at a rate of 10^-9 /sec therefore collision speed and transmission of data are enhanced. On evaluating the speed of the existing technology, Nanotechnology performs faster without loss of data

packets and delay of throughput. Using the nano technology performance is calculated for the collision speed and transmission of every nano network topology. This nano technologies performance evaluate the existing speed and performance calculated are efficient on this method. The microscopic size of nanomachines translates into high operational speed. This is a result of the natural tendency of all machines and systems to work faster as their size decreases Nanomachines could be programmed to replicate themselves, or to work to build larger machines or to construct nano chips. Specialized nanomachines called nano robots might be designed not only to diagnose, but to improve the network performance. The nanomachines used here senses the environment, gather the information and deliver them to the infostation. The infostation takes decision for an appropriate action and it also act as a gateway and also as a buffer. As the structure of MANET is large the probability of meeting point of the nanomachine and the infostaions are considerably less and so several secondary nanomachines are placed which act as relay nodes.

II. LITERATURE REVIEW

We have identified several pieces of key literature in the field of MANET routing protocols which highlight existing protocols as well as the current thinking within the field and the directions researchers are moving in the future. An effective MANET routing protocol must be equipped to deal with the dynamic and unpredictable topology changes associated with mobile nodes, whilst also being aware of the limited wireless bandwidth and device power considerations which may lead to reductions in transmission range or throughput. This is expanded upon by who propose that in addition to these core requirements; MANET routing protocols should also be decentralized, self-healing and self-organising and able to exploit multi-hopping and load balancing, these requirements ensure MANET routing protocols ability to operate autonomously.

2.1 Early MANET routing protocols

The literature deals with the protocol performance,
which compares the Destination Sequenced Distance Vector (DSDV) protocol and the reactive Dynamic Source Routing (DSR) protocol these protocols were developed in 1994 and were amongst the earliest MANET routing protocols identified using the pevious survey papers.

A. Destination Sequenced Distance Vector (DSDV)

The DSDV protocol which are proactive in nature was designed based on the Bellman-Ford algorithm to calculate the shortest distance to the destination. Each DSDV node has routing table which stores;destinations, hop addresses and the number of hops and then the sequence numbers; the updates of the routing tables are being send periodically with only 1packet containing the new information. DSDV compensates the mobility pattern by using sequence numbers and routing table updates, if a route update has a very high sequence number then its is received and it will replace the existing route resulting in reducing the chance of routing loops, when a greater topology change occur a full routing table will be dumped, this adds significant overhead to the network in dynamic pattern.

B. Dynamic Source Routing (DSR)

The DSR Protocol are found to be reactive in nature. It was developed by operation of the DSR protocol, where the protocol is broken into two stages; route discovery phase and route maintenance phase, these phases are initiated only on necessity of packets when it needs routing. Route discovery phase floods the network with route requests when a suitable route is not available .DSR uses a source routing strategy to generate a complete route, this will then be stored temporarily in nodes route cache. DSR addresses mobility issues using packet acknowledgements; failure to receive an acknowledgement causes packets to be buffered and the route error messages are sent to all upstream nodes.Route error messages initiates the route maintenance phase which removes incorrect routes from the route cache and undertakes a new route discovery phase. It restricts the band width taken by control packets in ad hoc wireless networks by neglecting the periodic table-updates required in the table-driven method. The major difference between this and the other on-demand routing protocols is that it is beacon-less.

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C. Mobility Models

The mobility model which is designed to describe the movement pattern of mobile users, and how their location, velocity and acceleration change over time. Since mobility patterns may play a significant role in determining the protocol performance, it is desirable for mobility models to emulate the movement pattern of targeted real life applications in a reasonable way. Various researchers proposed different kinds of mobility models, attempting to capture various characteristics of mobility and represent mobility in a somewhat 'realistic' fashion. Much of the current research has focused on the so-called synthetic mobility models that are not trace-driven. A mobility model should attempt to mimic the movements of real mobile nodes. Changes in speed and direction must occur and they must occur in reasonable time slots. For example, we would not want mobile nodes to travel in straight lines at constant speeds throughout the course of the entire simulation because real mobile nodes would not travel in such a restricted manner. Mobility pattern of the Mobile Ad Hoc Network, in many previous studies, was assumed to be Random Waypoint because of its relatively simple implementation and analysis. However, in the future, MANETs are expected to be deployed in various different scenarios and applications having complex node mobility and connectivity dynamics. For example, in a MANET on a battlefield, the movement of the soldiers will be influenced by the commander. In a city-wide MANET, the node movement is restricted by obstacles or maps. mobility models uses networks of varying sizes up to 100 nodes; this increases the accuracy and reliability of the data and shows network performance under different situations, the study showed that DSR produced greater network throughput than DSDV in all tests and it give an accurate representation of the network performance; collection of other metrics such as packet delivery ratio or end-to-end delay should be considered as these are important for the performance

2.2 SECOND GENERATION MANET ROUTING PROTOCOL-AODV

Researchers learned many lessons from early MANET protocols such as DSR and DSDV, these lead to proposals for new protocols to improve performance,one of the most significant contributions to MANET routing was the Ad-hoc On-demand Distance Vector (AODV) protocol which was designed by as an improvement upon previous work on the DSDV protocol with highly dynamic DSDVs.

A. Ad hoc On-Demand Distance Vector (AODV)

AODV utilises sequence numbers and routing algorithm using on-demand route requests (RREQ); the same process as the DSR protocol. AODV is different to DSR in that it uses distance vector routing; this requires every node in the route to maintain a temporary routing table for the duration of the communication. AODV has improved upon the DSR route request process using an expanding ring topology mechanism based upon incrementing time-to-live (TTL) to prevent excessive RREQ flooding . Nodes within an active route record the senders address, sequence numbers and source destination IP address within their routing tables, this information is used by route reply (RREP) to construct reverse paths . AODV deals with node mobility using sequence numbers to identify and discard outdated routes, this is combined with route error (RERR) messages which are sent when broken links are detected, RERR packets travel upstream to the source informing nodes to delete the broken links and trigger new route discovery if alternative routes are not available . References discusses the core principles of the protocol but provide no real insight into possible directions the protocol could take in the future, the network simulation collects data on a number of important metrics; dropped packets, transmission and receiving throughput (UDP and TCP), delay, send time vs. delay, jitter and round trip time. These metrics are all important for quality of service considerations and useful indicators of network performance, however the simulations are run only using AODV protocol so no direct comparison between alternative protocols can be made, the simulation topology also uses a uniform random waypoint mobility model of 16 nodes which as discussed previously is not an ideal testing environment.

B. Expanding upon AODV-Multicasting

The number of multicast routing protocols for ad hoc networks has been proposed based on the routing structure; they can broadly be classified into two categories: tree-based protocols and mesh-based protocols. In tree-based protocols, there

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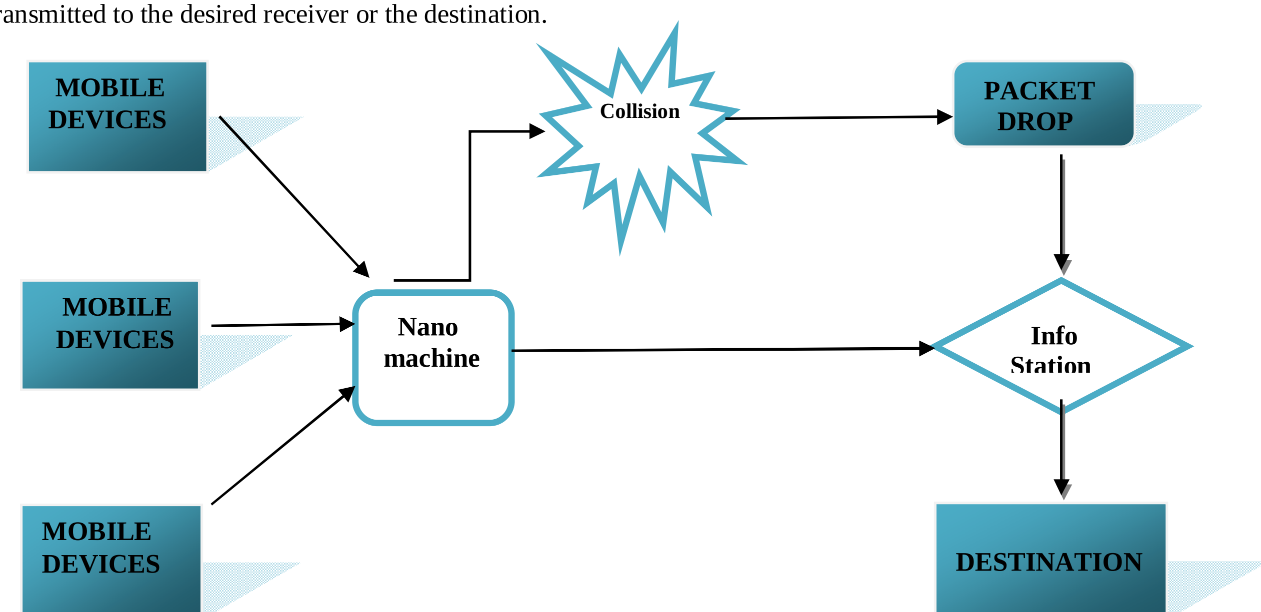
exists a single path between any sender-receiver pair. Tree-based protocols have the advantage of high multicast efficiency (which is defined as the ratio of the total number of data packets received by all receivers to the total number of data packets transmitted or retransmitted by senders or intermediate nodes). However, tree-based protocols are not robust against frequent topology changes and the packet delivery ratio (which is defined as the ratio of the number of data packets delivered to all receivers to the number of data packets supposed to be received by all receivers) drops at high mobility. Mesh-based protocols provide redundant routes for maintaining connectivity to group members. The low packet delivery ratio problem caused by link failures is alleviated due to redundant routes. Mesh-based protocols are robust to node mobility. However, redundant routes cause low multicast efficiency. Performance evaluation MAODV have performed a wide range of simulations to test the performance of the MAODV protocol however a key limitation of their work is that they only used random waypoint mobility model in testing, This mobility model alone has several limitations. The simulations also failed to collect a number of important performance metrics such as network throughput and didn't perform any performance comparisons with other multicast protocols available such as Lightweight Adaptive Multicast (LAM) .

III. SYSTEM ORGANISATION

The architecture shows the transmission of messages from the source to the destination. The informations are transmitted as packets through the nodes .Each node receive the packet and establish a route for transmitting the data through the shortest path. Nanomachines are placed between the nodes to perform the task. The nanomachine sense the data and send them to the infostation, Before receiving the information from the nanomachine, the nanomachine and infostation has to collide and then adhere to each other. since the system volume containing the MANET is very large the probability of meeting point of the nanomachine and the infosation are less. Therefore intermediary nanomachines can be used as relay nodes that help in the communication between the nanomachine and the infostation. Infostations are used in taking the major decision of sending the data packets to the desired location. The infostations accepts the data from the nanomachines and check for the receiving node, after finding the node infostation sends the data to the receiver. Thus the packet data are transmitted to the desired receiver or the destination.



Representation of N-AODV System Architecture

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3.1 Node Creation and Topology Design

This module is developed for node creation and more than 10 nodes are placed within particular distance. Wireless relay nodes are placed at intermediate area. Each node knows its location relative to the sink. The access point has to receive transmitted packets then send acknowledge to transmitter. Consider a Source node that does not have a route to the destination. When it has data packets to be sent to that destination, it initiates a Route Request packet. This Route Request is flooded throughout the network. Each node, upon receiving a Route Request packet, re broadcasts the packet to its neighbors if it has not forwarded already or if the node is not the destination node, provided the packets time to live (TTL) counter has not exceeded. Each Route Request carries a sequence number generated by the source node and the path it has traversed. A node, upon receiving a Route Request packet, checks the sequence number on the packet before forwarding it. The packet is forwarded only if it is not a duplicate Route Request. The further development is to Topology design all node placed at particular distance without using any cables. Wireless equipment based transmission and reception of packet data are done. Nodes are wireless which calculate the sending and receiving packets. The sink is at the center of the circular sensing area.

3.2 Collision and Information from Infostation

The data packets for network flow and the ACK packets corresponding to uplink TCP flow are the two types of packets buffered at the same queue. The access point to communicate with the packets sends and receives from the queue. At the same time when two processes are on a track then a collision is attacked. A specific instance of interference, where two or more nodes transmit a packet at the same time and within the same signal space (at the same frequency and/or encoding) such that these packets instead fails to do so, and loses one or more of the packets then retransmission of a received message (whether modified or unchanged) over one or more MANET interfaces of the node is done. Creation of a new message (rather than a received an forwarded message) for transmission over one or more MANET interfaces of the node is also performed. Typically, a node will generate messages based on a message schedule (periodic or otherwise) or as a response to changes in circumstances. Infostation which offer geographically intermittent coverage at high speeds, are one such an example. Indeed, through the use of the Infostation networking paradigm, the capacity of a mobile network can be increased at the expense of delay. We propose further to extend the infostation concept by integrating with the Ad hoc networking Technology. If they have any problem or any collision on the network immediately to information send on the infostation. It collects the collision speed and then the performance and transmission range of the network.

3.3 Nanomachine Performance

Using the nanotechnology, Performance is increased at a rate of 10^-9 /sec therefore collision speed and transmission of data are enhanced. On evaluating the speed of the existing technology, Nanotechnology performs faster without loss of data packets and delay of throughput. Using the nano technology performance is calculated for the collision speed and transmission of every nano network topology. This nano technologies performance evaluate the existing speed and performance calculated are efficient on this method. The microscopic size of nanomachines translates into high operational speed. This is a result of the natural tendency of all machines and systems to work faster as their size decreases. Nanomachines could be programmed to replicate themselves, or to work synergistically to build larger machines or to construct nano chips. Specialized nanomachines called nano robots might be designed not only to diagnose, but to improve the network performance.

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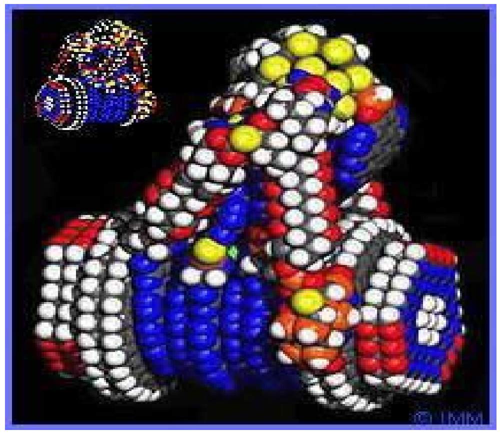

Representation of a nanomachine. The colored balls represent individual atoms that comprise the machine

IV. NANO-AODV

Nanotechnology provides favorable development in miniaturization and fabrication of nanomachines with simple sensing, computation, communication and action capabilities. In literature, three different ways are proposed for the development of nanomachines namely, bottom-up, top-down, and biohybrid approaches. In bottom-up approach, the molecules or atoms are assembled to form nanomachines. In top-down approach the design of nanomachines is realized by downsizing current microelectronic devices. In biohybrid approach, biological entities can either be genetically modified to develop nanomachines or used as the building blocks of nano machines.ss
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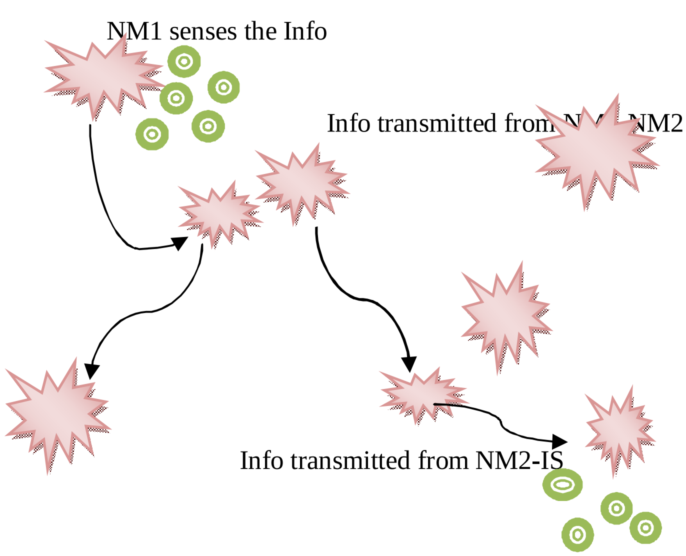

Representation of Nanomachine communication

The nanomachines sense the environment, gather the information and deliver them to the infostation. The infostation takes decision for an appropriate action and it also act as a gateway. As the structure of MANET is large the probability of meeting point of the nanomachine and the infostaions are considerably less and so several secondary nanomachines are placed which act as relay nodes.

4.1 Nano-AODV Algorithm

The nanotechnology uses nanomachines and infostations for the process. In this process when an user starts the communication through a mobile device data are transmitted through nodes to reach the desired destination in a specific time. Wireless relay nodes are placed at intermediate area. Each node knows its location relative to the sink. The access point has to receive transmitted packets then send acknowledgement to the transmitter. Consider a Source node that does not have a route to the destination. When it has data packets to be sent to that destination, it initiates a Route Request packet. This Route Request is flooded throughout the network. Each node, upon receiving a Route Request packet, re broadcasts the packet to its neighbors if it has not forwarded already or if the node is not the destination node, provided the packets time to live (TTL) counter has not exceeded. Each Route Request carries a sequence number generated by the source node and the path it has traversed. A node, upon receiving a Route Request packet, checks the sequence number on the packet before forwarding it. The packet is forwarded only if it is not a duplicate Route Request. The nanomachines are placed in between the nodes of the Ad hoc network which helps in transmitting the data to the destination at a shorter duration and it may also reduce the loss of packets along the path. The mobile ad hoc networks (MANET), is a nature of nanomachine collision rate is governed by some mobility models such as random mobility and then random waypoint. The movement are assumed to their network. The mobility of nanomachines is collision on the data processing on networkNanomachine 1 is assumed to be the source of the information that is to be communicated to the infostation. Nanomachine 1 transmits the information to every nanomachine, i.e., relay node, with which it collides and adheres. The nanomachines that acquire the information follow the same strategy and this clearly increases the probability of information delivery. Note that this communication strategy is clearly similar to the spreading of epidemic disease. As the nanomachines work at a high speed the data are exchanged between the nodes faster which results in reduced collision, packet loss and lesser throughput delay. This nano technologies performance to evaluate the existing speed and performance calculate and efficient one of this method. The microscopic size of nanomachines translates into high operational speed. This is a result of the natural tendency of all machines and systems to work faster as their size decreases. Nanomachines could be programmed to replicate themselves, or to work synergistically to build larger machines or to construct nano chips. Specialized nanomachines called nano robots might be designed not only to diagnose, but to improve the network performance.

V. CONCLUSION

The approach we have proposed uses improved performance mechanisms to introduce in the proposed techniques so that it satisfies the main performance requirement and guarantees the discovery of a correct and improved performance route. The performance mechanisms that the protocol uses are the nano-AODV algorithm which improves the speed at a rate of 10^-9 per second. The performance of the protocol was tested in simulation and their communication costs were measured using the NS-2 simulator, which was suitable for the present purpose. The evaluation metrics used in this study were overhead, end to end delay and packet loss. Our proposed protocol show better performance by using the nanotechnology with an in build nano-AODV algorithm in it.

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