RECITAL ASSESSMENT OF A MAN-MADE ANT COLONY BASED ON THE MANET ROUTING PROCEDURE

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Abstract: AntNet utilizes "counterfeit subterranean insects" that would over and again travel through the organization and gather the data about the ongoing traffic conditions in the organization. This data would be utilized to coordinate the information parcels towards their objective. AntNet showed exceptionally encouraging outcomes and ended up being profoundly versatile in powerful organization conditions. The capacity of AntNet to adjust to dynamic conditions appears to make AntNet-like convention appropriate for the directing in MANET. In our work, a self-coordinating organization model is planned utilizing subterranean insect net directing, and this is a straightforward steering component. How about how neighborhood data is traded is rely upon the way of behaving of the hub. To adjust the component of directing calculations are planned base on dispersed steering that are Insect Net calculation utilizing Zone based steering plan. The calculations can be utilized to find most brief ways in the organization bounce by jump, and the following jump choice strategies are planned, and the calculations are extended to help nature of administration boundaries.

Keywords: AntNet, ZRP Performance Metrics, NS-2. **1 INTRODUCTION**

In today's fast growing Internet traffic conditions changes and failures occurs at some parts of the network from time-to-time, in an unpredictable manner. Therefore, there is a need for an algorithm to manage traffic flows and deliver packets from the source to the destination in a realistic time. An ideal routing algorithm should be node and link independent, and be able to deliver packets to their destination with the minimum amount of delay, regardless of the network size and the traffic load. The routing algorithms currently in use lack intelligence, and need human assistance and interpretation in order to adapt themselves to failures and changes. In recent years, agent based systems and reinforcement learning have attracted researchersinterest.
Many aspects of the collective activities of social insects are self-organized. Theories of self-organization(SO) in social insects show that complex behavior may emerge from interactions among individuals that exhibit simple behavior. This process is spontaneous; it is not directed or controlled by any individual. The resulting organization is wholly decentralized or distributed over all the individuals of
The colony. Recent research shows that SO is indeed a major component of a wide range of collective phenomena in social.
The Ant net algorithm is distributed throughout the network, you must choose the best path to take the packages to your destination and avoid congestion [9]. Most algorithms using data structures in the nodes (Routing Tables), these structures are both databases and local models of global state, the information such as store and update depends on the algorithm used.
Antnet is a software agent that is.Application based routing algorithm. Practically ants deposit some kind of chemical substance that is pheromone which marks the path that they used and on their way back they choose the path with the maximum pheromones which becomes the optimal path. Ants are nothing but software agents which are used in antnet update the probabilistic distance vector routing table entries and to collect traffic information. The existing Antnet Algorithm deals with only feedback provided to the system by the software agents and are the round trip time from source to destination. Then the distance vector table is updated using this feedback signals. As in the real life scenario chemical substance deposited by the ants evaporates over time in the same way routing table entries based on link usage statistics also evaporates with time. The comparethe performances of packetsdelivery ratio and average end-to- end delay are

superior to the traditional routing protocol and ant-colony based routing algorithm as per our research modified AntNetscheme.

The rest of the paper begins with performance analysis of zone based routing approach for single hop and double hop. The rest of this paper is organized as follows. In Section II and III provides an overview routing protocol is introduced. Section V, VI and VII shows the Simulation parameters, performance metrics and simulation model. Performance summary is demonstrated in Section VIII. Finally Section IX concludes the paper.

2 ANTHOCNET &ANTNET

ANTHOCNET is combination of reactive route establishment & proactive route maintenance which makes it a hybrid multipath routing algorithm. In ANTHOCNET the paths are set according to the pheromone tables which indicate their respective quality. After the route setup, data packets are routed randomly over the different paths following these pheromone tables. ANTNET is a table-driven (proactive) Ant Colony Optimization Routing Algorithm (ACRA)for

Packet switched networks. In this routing algorithm, a forward ant is launched from the source node at regular intervals of time. A forward ant at each intermediate node selects the next hop using the information stored in the routing table of the node. The next node is select with a probability proportional to the goodness of that node which is measured by the amount of pheromone deposited on the link to the node.

Position Based Routing Algorithm

In Position Based Routing Algorithm it is assume that a node is aware of its position, the position of its neighbors, and the position of the destination. The position of nodes in a network can be estimate by the instruments like GPS receivers which motivated researchers to propose position based routing algorithm. Such as GPSR [12] and DIR

LOCANT: location based ant colony routing algorithm

LOCANT is a location based ant colony optimization routing algorithm which use location information to improve efficiency. LOCANT is reactive in nature that's why the route is searched for only when there is a collection of data packets that are to be sent from a source node to a destination node. LOCANT is able to find optimum routes when a given network contains nodes of different transmission ranges. The next phase in our algorithm is concept ofzones.

Delivery of data packets after defining route to the destination it is very important to deliver the data packets at the right time. Delivery of data packets too early may result in the loss of the packet or may follow a longer route which increases the traffic in the network. On the other hand, sending late increases the delay. The appropriate time for sending data packets is determined as follows: For each of the six zones from the sender to the destination D, the sender calculates the average and standard deviation of the delays reported by backward ants using the hop count. So each backward ant carries the length of the path passed from the destination to its current hop. Whenever a backward ant is received by the sender, we update the average and standard deviation of packet delays for the corresponding zone using the delay reported by this ant. To reduce the effect of old backward ants, we define a fixed size window for each zone that contains recently received backward ants from that zone. The average and standard deviation of delays will be calculated only for the backward ants in the window. When a new backward ant is received, we put it in the window of the corresponding zone discarding the oldest ant when the window size has been attained. Therefore, selecting an appropriate window size is important. If the window size is too small, the average delay calculated from the window. Information would be too far from the real average. If the window size is very big, existence of very old ants would affect the result for a longtime.

3 ZONE ROUTING PROTOCOL

Zone Routing Protocol or ZRP was the first hybrid routing protocol with both a proactive and a reactive routing component. ZRP was first introduced by Haas in 1997. ZRP is proposed to reduce the control overhead of proactive routing protocols and decrease the latency caused by routing discover in reactive routing protocols. ZRP defines a zone around each node consisting of its k-neighborhood In ZRP, the distance and a node, all nodes within hop distance from node belongs to the routing zone of node. ZRP is formed by two sub-protocols, a proactive routing protocol: Intra-zone Routing Protocol (IARP), is used inside routing zones and a reactive routing protocol:Inter-zone Routing Protocol (IERP), is used between routing zones, respectively. A route to a destination within the local zone can be established from the proactively cached routing table of the source by IARP, therefore, if the source and destination is in the same zone, the packet can be delivered immediately. Most of the existing proactive routing algorithms can be used as the IARP forZRP.

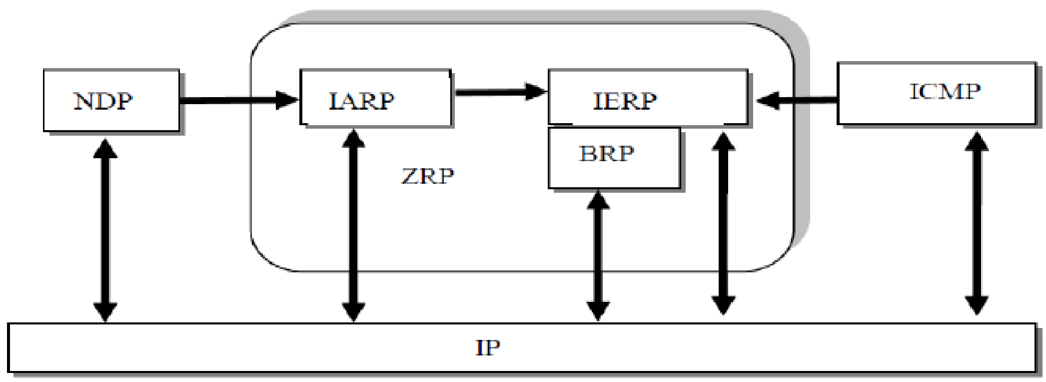

Figure - Complete block diagram of ZRP

In a mobile ad-hoc network, it can be assumed that most of the communication takes place between nodes close to each other. The Zone Routing Protocol (ZRP) described in takes advantage of this fact and divides the entire network into overlapping zones of variable size. It uses proactive protocols for finding zone neighbors (instantly sending hello messages) as well as reactive protocols for routing purposes between different zones. Each node may define its own zone size, whereby the zone size is defined as number of hops to the zone perimeter. For instance, the zone size may depend on signal strength, available power, reliability of different nodes etc. While ZRP is not a very distinct protocol, it provides a framework for other protocols. First of all, a node needs to discover its neighborhood in order to be able to build a zone and determine the perimeternodes.

INTRAZONE ROUTING PROTOCOL

Intrazone Routing Protocol is an important part of ZRP routing protocol. It is not a specific routing protocol but is a family of limited-depth, link state, proactive routing. It establishes a route for nodes locate in the same zone. IARP efficiently guides route queries outward through border casting and relaying queries blindly from neighbor to neighbor. IARP helps to enhance the quality of real time applications and proper route maintenance. It supports unidirectional links as long as the link source and link destination lie within a same routing zone. It maintains the local routing information proactively based on periodic exchange of neighbor discovery messages. All nodes are referred by unique IP addresses. Although temporary loopsmayformduringthetimeofnewlinkestablishment in the routing zone, it provides support as a loop free routing protocol [14].

INTERZONE ROUTING PROTOCOL

ZRP uses Interzone routing protocol to communicate with the nodes in different zones. It follows reactive approach to find out new routes. Instead of sending queries to other nodes using traditional flooding, IERP uses BRP which improves the efficiency. For unidirectional links, IERP provides the local support based on the routing information of IARP [15]. Interzone routing protocol helps to discover the global route and facilitates all the services to maintain the routes based on local connectivity of Intrazone routing protocol.

4 RELATEDWORKS

AntNet is a hybrid algorithm, containing both reactive and proactive elements. The algorithm is reactive in the sense that it only gathers routing information about destinations that are involved in communication sessions. It is proactive in the sense that it tries to maintain and improve information about existing paths while the communication session is going on (unlike purely reactive algorithms, which do not search for routing information until the currently known routes are no longer valid). Routing information is stored in pheromone tables that are similar to the ones used in other ACO routing algorithms[1-3]. Forwarding of control and data packets is done in a stochastic way, using these tables. Link failures are dealt with using specific reactive mechanisms, such as local route repair and the use of warning messages. Below, we describe the general working of the AntNet routing algorithm. In AntHocNet, routing information is organized in pheromone tables, similar to the ones used in other ACO routing algorithms such as the earlier described AntNet[9- 14]

Antnet Routing Algorithm is an agent based routing algorithm that is influenced from the real ant's behaviour. In Antnet ants explores the network to find the optimal paths from the randomly selected source destination pairs. Moreover, while exploring the network ants update the probabilistic routing tables and construct a statistical model of the nodes local traffic. Ants make use of these tables to communicate with each other. The algorithm uses two types of ants namely, forward ants and backward ants to collect network statistics and to update the routing table.

In each node there are two types of queues, low priority and high priority. The data packets and the forward ants use low priority queues, whereas the backward ants use the high priority queues. Later forward ants do also use the high priorityqueues.

1. Forward Ants who gather information about the state of the network,and
2. Backward Ants who use the collected information to adapt the routing tables of routers on theirpath.

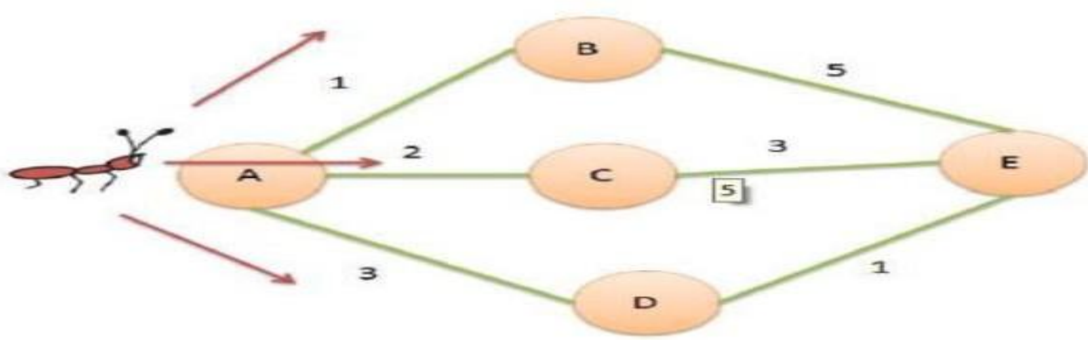

Figure Real Ants Choose Path

An AntNet router contains a special routing table where each destination is associated to all interfaces and each interface has a certain probability. This probability indicates whether or not it is interesting to follow that link in the current circumstances. The router also contains a statistical model to store the mean and variance values of the trip times to all destinations in the routing table. These are used as reference values [5-8]. On a regular time base, every router sends a Forward Ant with random destination over the network. The task of the Forward Ants is collecting information about the state of the network. In each router they pass, the elapsed time since the start is stored on an internal stack together with the identifier of the router. Then the next hop is determined. Normally this is based on the probabilities in the routing table. There is however a small chance (exploration probability) that the next hop is randomly chosen. This is necessary to constantly explore the network and to be able to react fast to network changes like link failures or congestion.

To overcome the problem of congestion by using change some energy parameters and change mobility of Ant- Colony Optimization. In the improved version, of ACO, this Ant-Colony Optimization can find more than one optimal outgoing interfaces are identified as compared to only one path, which are supposed to provide higher throughput and will be able to explore new and better paths even if the network topologies gets changed very frequently. This will distribute the traffic of overloaded link to other preferred links. Hence the throughput of the network will be improved and the problem of stagnation will be rectified [16-19].

This is necessary to constantly explore the network and to be able to react fast to network changes like link failures or congestion. the overall performances using Zone based hybrid routing approach for ant colony optimization means ant hoc network, the simulation done for wireless ad hoc network. This shows that results are able to adapt well to the fast changes in the highly dynamic environment caused by high node mobility the overall performance parameters values indicates in graphical method.

5 SIMULATIONPARAMETERS

Simulation Parameters is given below:

PARAMETERS	VALUE
Simulator	NS-2
Routing protocol	Ant-ZRP
Number of Nodes	40
Area	800mX 800m
Packet size	512byte
Simulation time	100 to 500s
Pause time	10.0
Traffic type	CBR
Mac protocol	Mac/802.11
Speed	10 m/s

6 PERFORMANCEMETRICES

Author report performance metrics for the protocols:

- **Packet Delivery Ratio -** It is calculated by dividing the number of packet received by destination through the number packet originated from source.

PDF = (Pr/Ps)

where Pr is total Packet received and Ps is the total Packet sent.

- **Average Delay-** It is defined as the time taken for a data packet to be transmitted across an MANET from source todestination.

D = (Tr –Ts)

where Tr is receive Time and Ts is sent Time.

- **Normalized Load-** It can also be defined as the ratio of routed packets to data transmissions in a single simulation. It is the routing overload per unit data delivered successfully to the destination node
- **Throughput** -It is the average number of messages successfully delivered per unittime.

7 SIMULATIONMODEL

Each of the experiments, we specify how the different applied scenarios were derived from it. We consider a network of 40 nodes that move in a rectangular area of 800m × 800m. It is an open area. Limit node mobility or signal propagation. Node movements are defined according to the RWP mobility model. Under this model, each node starts from a randomly chosen initial position in the area, and independently chooses a random speed between a given maximum speed, and a random destination. Then, it moves at the chosen speed towards the chosen destination in a straight line. Upon arrival, it remains static for a fixed pause time,

ISSN : 2347-7180
Vol-08 Issue-14 No. 03: March 2021

after which it chooses a speed to destination. We use a maximum speed of respectively 10 and 40m/s, and a pause time of 1.0s. Each experiment has duration of 100s, and is repeated 4 times, using different random instances of the same scenario. Data traffic is generated by constant bit rate (CBR) sessions: 5 data sessions are run between randomly chosen source and destination nodes. By observing the performance of the network under mobility we can test the stability of design in real time scenario with varying Maximum Speed. Data rate of 2Mbps is used [6,9].

8 SIMULATION RESULTSANALYSIS

In this section present the simulation results demonstrating the effectiveness of our algorithm. the proposed method has been implemented in NS 2. And the experimental performance analysis is presented. These overall performance metrics show with variation simulation time.

Figure- PDF with varying simulationtime

Figure- NRL with varying simulationtime

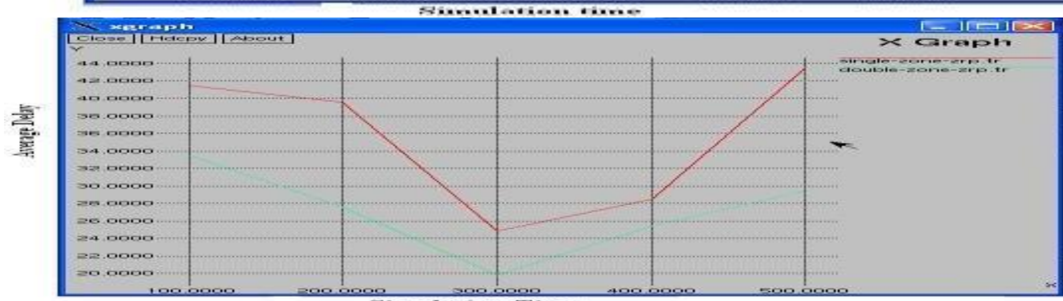

Figure- Average End to End Delay varying simulation time

Figure- Average Throughput varying simulation time

In this first set of experiments, the variation of no of nodes in the RWP mobility model, from using as intermediate values of each parameters disc. Varying the simulation parameters like as simulation time with RWP mobility model affects the node mobility directly in an obvious way: the higher the speed, the higher the mobility. Higher mobility leads to more frequent changes in the network environment, and therefore to more difficult scenarios. The results of the experiments are shown in figure, where we report (a) the delivery ratio, (b) the average end-to-end delay (c), Average Throughput and (d), the overhead ratio in number of packets. The results for delivery ratio reflect the increasing level of difficulty of the scenarios: for all algorithms the delivery ratio decreases with increasing node speeds. The best results are obtained by double zone hierarchical routing approach in wireless environment using ant hoc network, by change the parameters that even at the highest speeds are able to deliver average packets of almost 85 percent. This shows that results are able to adapt well to the fast changes in the highly dynamic environment caused by high node mobility the overall performance parameters values indicates in graphical method.

9 CONCLUSION

In this part presentAnt based directing organization. Subterranean insect frameworks are self getting sorted out frameworks which have large numbers of the attributes of frameworks. Here, we portray the actions that assess the exhibition of the different steering calculations in the examinations.

Our work contains two parts: one is theoretical study and other is empirical study. In theoretical part of study it is clear to us that due to the random mobility of node, routing becomes a complex issue. Till now many routing protocols are used in MANET. Each routing protocol has unique features. Based on network environments. Proactive routing protocols are best suited in small networks. In large and dense network, proactive routing protocols cannot perform well. Proactive routing protocols are table driven. Maintaining thousands of routing tables properly in large network degrades the efficiency. So for large and dense networks reactive routing approach plays a major role. Reactive routing protocols use destination sequence number and feasible distance to ensure a loop free routing. Hybrid routing protocols use reactive and proactive approach in routing operations. Course support procedure is utilized because of the nonstop our goal for this attempts to foster a viable Insect state advancement method to boost or limit different execution boundaries like burden, Deferral and got packetpercentage.

In future, the proposed staggered subterranean insect province advancement calculation. Numerous Insect Settlement Streamlining can find more than one ideal active points of interaction are distinguished when contrasted with just a single way, which should give higher throughput and will actually want to investigate new and better ways regardless of whether the organization geographies gets changed regularly.

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