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Dynamic Search Technique Used for Improving Passive Source Routing Protocol in Manet

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Abstract: Mobile Adhoc Network are dynamically configurable and organized network, without any existing infrastructure. It is an integration of numerous wireless nodes. To communicate between the nodes efficiently, A routing protocol builds the route efficiently between the nodes within a network. The routing algorithm should dynamic discover a route; effectively maintain the route with minimum overhead and bandwidth.. Our work proposes a novel Passive Source Routing protocol that has a very small communication overhead. The proposed work enhances light-weight passive source routing protocol for MANETs, To enhance the PSR, we use Dynamic search algorithms namely DSF, DSRW and Knowledge Based -DS to discover the route. In such method, every node of the wireless network contains a neighbor table. Such table contains each node and its neighbors with distance between them. Therefore, each node has a full topology of the wireless network which is useful to discover the route. Periodic information exchange is used to update such table. The solution of routing are analysed in MANET and performance are evaluate using NS-2 simulator with various network paramters.

Key words: MANET · NS-2 · Routing protocols · Flooding · RW. PSR · DSDV · AODV · OLSR · DSR

INTRODUCTION

Wireless network contains various mobile devices and nodes communicated in a self configured network (MANET). These devices and nodes connect each other dynamically without any structure. Communications in wireless network in MANET is an integration of mobile devices connected in topological structure dynamically. The devices in MANET are connected dynamically without any fixed infrastructure or using the existing structure.

The structure is dynamically configured and organized with mobile devices; these devices connected are moved dynamically in any direction. The relationship between nodes and devices are frequently changed, based on the movement. Mobile network is own configured and own organized system, it can move in various direction. Because of their movement the links can be change often. Nodes will be the end points of data transmission and routers of that network if the end points are not vary directly with each other.

To discover the topology information and capture of data to the destination in a node is important for a decentralized network. The proper routing implementation depends on the application`s nature. MANET is an adhoc wireless network which is usually used for network reputability. It requires proper traffic route link in a network environment. Today many wireless device with Wifi and RFID technology has made a challenging area in research. Many research papers have written based on mobility of routing and routing protocol in a network space for mobile applications.

Fig. 1: Mobile Ad-hoc Network

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The MANET mobile network is dynamic and automatic which can support any infrastructure of the existing and future mobile network and network users, which gives scope to multi-level hoping in a network for various needs ands and emergency operations.

The challenging area of research in this field includes, security of network, communication access and control, support to all real time applications, end point to end point data forward and back ward. In adhoc network, there is no need for centralization control, fixed network and access point control communications. Adhoc network can be setup very easily and quickly when every needed. Wireless mobile network is an individual group of users, who communicate with various group of users with an individual nodes at a slow and reasonable links.

In a mobile network, there is an unpredictable and rapid change occurs in a node over time. In such a case, all the nodes of the mobile network should be active and related to dynamic route creation and end node delivery of message.In our paper; we discover a passive dynamic routing protocol to transmit data movement in a mobile network. Information should periodically exchange and topology updating has will be done automatically with neighboring nodes.

This updation and exchange of information between nodes allows to posses full information of path nodes in a network, which allows the nodes to identify and support forward IP and routing, this allows use to reduce overheads in routing. Our results shows that proposed method has less overheads compared to the others of DSR, DSDV and OLSR, but also show that data transportation facility may be similar or better compared with other.

Routing Protocols: Routing protocols plays a virtual role in communicating messages between networks to each other. Routing is a mechanism to transfer message from one host to another in a network. Routing protocols are used for mobile management and design scalability for exchanging the information.When data communication or exchange of information occurs frequently, there should be accurate host information of node and node location.

The routing protocols should efficiently discovery a route within a network, the discovered routine should have less overheads, maintain the routine bandwidth efficiently and accurately. The developed routine protocol should prepare infrastructure and dynamic topology.

Mobile network is dynamic, it does not have fixed infrastructure, so we cannot use traditional wired protocols in ad-hoc network. In such case, we have stable routing which can be changed dynamically in a network topology structure and perform quick and accurate communication of packets in a MANET.

The need of routing protocols is essential, when a packet needs to be handed over nodes in a network, there like an interaction formulation between nodes in a network. This interaction formulatesupdates and exchange of node information between them.

Pro-active Protocols: It is also called table driven routing, which uses table updated protocol and routing protocol for communication of packets between nodes in a network. These type of protocol used high bandwidth and power consumption to maintain the table and topological structure. This type of process continues in the pro-active protocols. OLSR and DSDV are passive protocols.

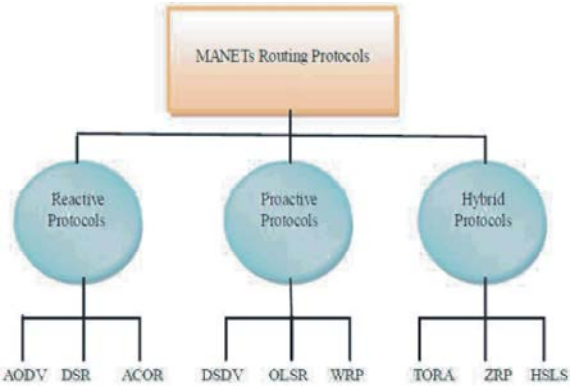

Fig. 2: Routing Protocols in MANETs

Reactive or On-demand Protocols: On demand Reactive protocol takes a different approach of routing protocols. This protocol discovers the route when ever required. If a destination node has to be notified from the source node, Table routing is checked and a route is discovered to send packets from source to destination.. Re-active routing can create the route dynamically and maintain fewer overheads in communication of packets. The most re-active protocol is AODV and DSR When a node has to communicate with the neighbor node, source node does not know the route, so there is a need for route for communication, reactive protocols will create a route dynamically from source to destination.

Hybrid Protocols: These protocols are high speed protocols they are passive and produce fewer overheads in message control, compared to other re-active protocols. The basic characteristics are when both passive and reactive protocols are integrated and forms routing hybrid protocol. The typical hybrid protocol is TORA and ZRP.

Related Work: Zehua Wang [1], proposed PSR to maintain network topology by using spanning tree. It uses BFS for updation of nodes.

C. E. Perkins *et al*. [2], developed a DSDV passive protocol routing for distance sequence measurment between neighbouring nodes in a mobile network.

T. Clausen *et al*. [3] developed Optimized Link State Routing Protocol (OLSR) for maintaining the route information of nodes in a wireless network.

D. B. Johnson *et al*. [14] proposed the Dynamic Source Routing Protocol (DSR) for Mobile Ad Hoc Networks, this protocol will dynamic create a route of destination after receiving data from the upper layer nodes.

C. E. Perkins *et al*., [5], initiated Ad hoc On-Demand Distance Vector (AODV) Routing which create a routing topology on demand based on distance vector information.

J. Behrens *et al*, [6] framed a Distributed, Scalable Routing based on Link-State Vectors, it is developed to reduce the overhead in data forward and routing a updation.

Murthy *et al*, [7] proposed An Efficient Routing Protocol for Wireless Networks, which was developed to initiate LS routing port in a mobile network; it supports loop-free routing.

Methodology: We propose a routing method which improves the performance of adhoc mobile network. Our method will extend passive routing protocol for data transmission in a mobile network and reduces the overheads, It also increase end to end data transmission reliability between nodes.

The main objective is to study existing methods, check the performance and throughput of each in MANET. NS-2 simulator is used to check for better results in wireless networks.

Our method dynamically provides table information to the neighbouring nodes over the entire network. It is done by broadcasting the neighbouring information iteratively, based on the information of the recent node traced knowledge and its topology structure. Like wise the knowledge of information of topology is distributed to the existing neighbouring nodes and in the next stage of iteration.

Due to certain fails of the neighbouring nodes, a function is executed to eliminate the related information from topology database for maintaining the node failure or lost.

Our proposed plan illustrates the same communication overhead alike DV protocols. We have used update differntial method to decrease overheads in routing.

Update Table: In our work, passive nature of update process is repeatedly distributed to all the nodes in a network. At the initialize state, starting node only knows the information of it, later By exchanging the information of the table to the adjacent nodes, dynamic node topology is maintained. Then these adjacent nodes exchange the information table to the neighbors of it, this process of exchange communication until an end node is communicated with the source node. This process of exchange, receives a set of dynamic route message from the neighbors.

To our notice, there may erase multiple nodes situated at a transmission range from source node, due to the failure in periodic updation which are not received to the neighbors node which occurs channel bad conditions. This failure or lost is handled by neighbour table update method. Neigbhour table update method is initiated from source, source node has the update information of the neighbour, each adjacent node should update its table. Then the neighbouring node should broadcast the information to its adjacent neighbours so on until end node is pointed.

In our implementation, the occurrence of information of update table may be duplicated; this duplication of update table is only single updated at a time interval quickly. Which will not increase in communication overhead? because of only one route message is updated or sent per interval.

Table I: Neighbour Table

		Node's Position		Neighbor's Position		
Node ID	Neighbor ID	X	Y	X	Y	Distance
0	10	1063	41	1065	8	49
6	7	392	39	579	187	20
7	6	579	187	392	39	20
9	11	1392	282	1362	226	58
9	12	1385	195	1362	138	58
10	0	1065	8	1063	41	49
11	9	1362	226	1392	282	58

Information removal in Lost Neighbors: Whenever a neighboring node is detached from a network, each neighboring nodes eliminates the data of the lost node. The process is given below.

- If no packet data or update route table is not performed in a time interval
- If data communication has failed to such nodes
  The operation is performed number of times

Update Differential Mechanism: This unit mechanism, will update only shorter message of differential information in routing messages between the neighboring nodes. The differential short message is only updated at a time interval w.r.t the neighboring node table. The main theme of this module is to broadcast only short packets of differential information between the neighboring nodes.

Dynamic Route sighting with Dynamic Search Routing Method: Dynamic Source search algorithm is used in enhancing the Light Weight passive routing which reduced overheads and bandwidth.

Dynamic Source search algorithm is used in enhancing the Light Weight passive routing. In our work, we use three methods MBFS, flooding and RW to search the nodes effectively

Dynamic search algorithm is the challenging key for creating a routing in a MANET. Flooding, RW and MBFS is the typical search algorithm used aggressively for searching and creating a path from the source node to the point node. It uses query message broadcasting method for preparing a route and identifying each hop in a network.

Dynamic Search Algorithm: Dynamic search mechanism is the combination of Dynamic search and knowledge based search technique.

Dynamic Search Algorithm Operation: Dynamic Search is based on flooding, MBFS and RW. The search algorithm is divided into two phases for search optimally the route path. Each phase path is related to the count hop of a node via message query and threshold decision is queried from n.

Phases 1. When h _ n
In this phase Dynamic search uses flooding

1. Initialize the source
2. The source query the message to the neighbours based on probability transmission p
3. A link is created of degree d from source; send the degree source of neighbour to d_p after transmission.
4. if p =1, Dynamic source creates flooding.
   Else
   Search for MBFS with probability p transmission

Phase 2. If hop > n
1. Scan method RW
2. At scan, each node broadcast the message query to the neighboring nodes, check for its neighbours
3. Assign the nodes visited by Dynamic Search at hop ¼ based on cn, then process DS as RW with Cn
4. if DS ==RW
   Set the threshold of n
   Repeat DS as RW
   Search and scan the neighbour nodes using RW
5. Check for reduant message generate by RW
   Eliminate redundant message using update constraint

Knowledge-Based Dynamic Search

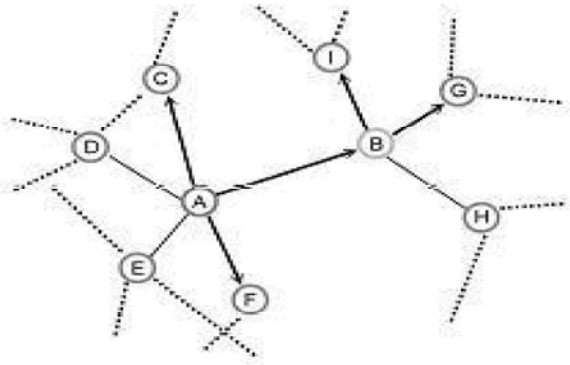

Fig. 3: Shows Routing Search using Dynamic Search

1. KBSA includes APS, biased RW, RI, local indices and IES
2. combined DS with reference to above
3. Check from the pass search target
4. KBS-DS – initialize the source node
5. Forward decision with the neighbour nodes based on decision
6. Check for the message broadcasted to neighbour nodes, based on table probability and updation
7. Generate query for creating a path. Shown in Figure 3.

Packet Transmission using Broadcasting: The method used for broadcast is ExOR, this is an advanced method used for broadcasting the packets to the neighboring nodes, the neighbor nodes acts a intermediate nodes of the subset of the route, which again broadcast the data effectively in data transmission to the end node.

Performance Metric Evaluation: The work performance is evaluation and studied using NS2. In this performance measure are evaluated using performance Metric, this metric is used to analyze the performance of the system.

The comparison of the proposed (PRO) is done with OLSR, DSR, DSDV and PSR. OLSR, DSR and DSDV routing protocols are unlike protocol of difference nature protocol used in MANET, they vary in mobility rate and density. The test results shows that proposed protocol has less overheads compared to the other protocols. Our proposed protocol provides information of routing at a low cost. It as provides better data transmission performance.

Table II: Setup for Simulation

Parameters of Simulation	Values of Simulation
Type of Channel	Wireless channel
Model of Propagation	Two-Ray Ground
Network Interface Type	Physical/Wireless Phy
Queue Interface Type	Queue/DropTail/PriQueue
Range of Transmission	255m
Dimensional Network	1600m * 760m
Capacity of Queue (in packet)	60
Protocol MAC	IEEE 802.11
Antenna- Type	Omni antenna
Time of Simulation	30

The measurement of routing performance of the existing with proposed (PRO) is checked for consistent, result are comparable with physical layer parameters based on approximately 255m transmission range and time of the channel is set to 30.

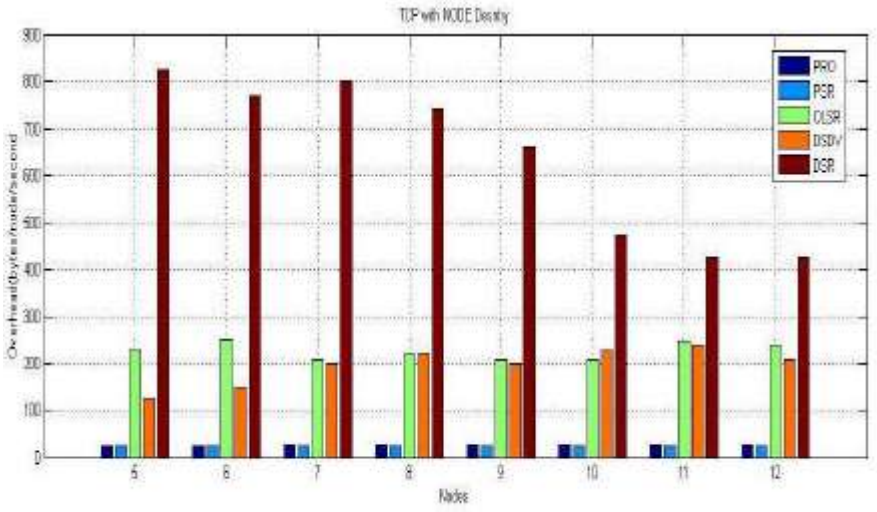

Fig. 4: Shows a comparison graph for routing overhead with various node densities, in which PRO means proposed work

The performance comparison is done with OLSR, PSR, DSDV and DSR. Selection of these protocols are done base on nature of the network. PSR, DSDV and OLSR are passive protocols. Our proposed techniques are the extension of these and also belong to this category. OLSR is a topology structure routing protocol which makes all the nodes available with the topological structure. DSDV is a distance estimation protocol which relates to the distance of neighboring nodes. PSR is a routing protocol which is used for estimation of the route between nodes, where each of the nodes uses spanning tree structure of network. DSR is a passive source routing protocol, nearly identical to our method which support source node routing.

Here graphs are represented based on the performance metric and also analyzed with our proposed method.

Figure 5. Graph comparison of various nodes densities vs end to end delay

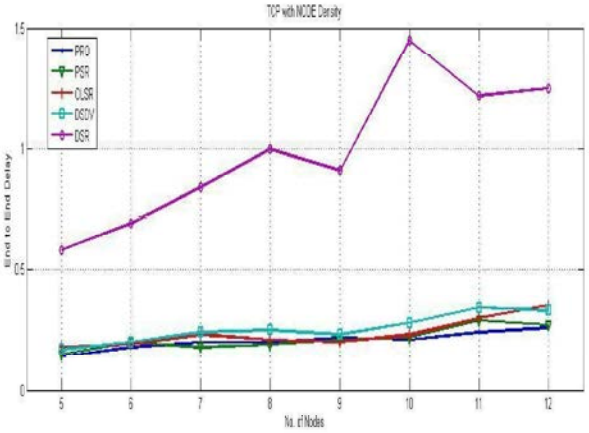

Fig. 5: End-to-end Delay Vs Node Density

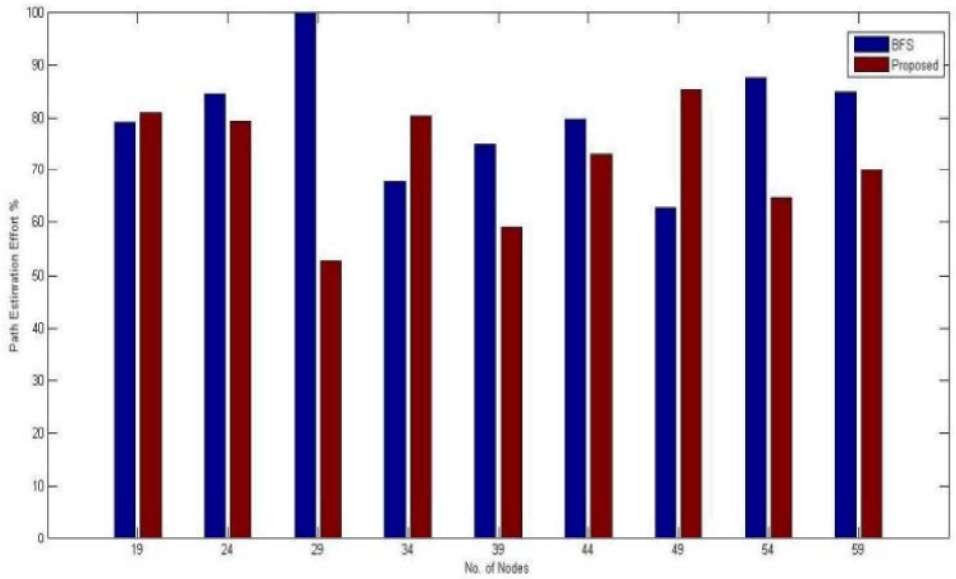

Fig. 6: Nodes Vs Effort Estimation Path

Figure 6. Graph comparison for estimation effort with PSR and proposed

CONCLUSION

Our work has motivated the necessity of data forward in a MANET. To process the work we use ExOR operation and an efficent passive protocol. The protocol should provide dynamic routing topology information better compared to DV's. It should have small overheads compared to other protocols.

To meet the above, we proposed a table routing protocol which uses Dynamic search routing with neighbouring nodes. Here broadcast and periodic update operation are done with exchange of information between the neighbouring nodes. The results show that the proposed method has fewer overheads compared to OLSR, DSR and DSDV by experiential study. It also shows the proposed is better than PSR. In practical study and test approach passive source packet routing give better results for data forwards with less overheads are met.

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