AN INFLATE SLIGHT PROACTIVE SOURCE ROUTING PROTOCOL USING DFID- DIJKSTRA'S ALGORITHM FOR MANET

Justin Sophia. I
Assistant professor, Department of Computer Science, Loyola College, Chennai 600034
Dr. N. Rama
Associate Professor, Post Graduate and Research Department of Computer Science, Presidency College, Chennai 600005

Abstract: A mobile ad hoc network (MANET) is a baseless wireless communication network with a collection of mobile nodes; these nodes may not lie within the direct transmission range of each other but depend on the intermediate nodes for data transmission. The availability of a path depends on the number of links and the reliability of each link forming the path. Many routing metrics in terms of number of links have been proposed, such as the shortest path routing. Shortest path routing selects a path having minimum cost to forward the data to the destination node. Shortest path routing algorithm selection depends on direct traffic form source to destination, maximizing the network performance and minimizing the cost. Performance of the network can be enhanced through Dijkstra but it also depends upon the functionality of the routing protocol and the parameters that are selected for the shortest path routing. Therefore opportunistic data forwarding has not been widely utilized in mobile ad hoc networks (MANETs). In this research the PSR working is modified by Depth-first iterative-deepening combined with Dijkstra's algorithm to maintain the information of the entire network topology. DFID-Dijkstra's algorithm spanning tree is constructed to maintain the network topology information. Instead of periodically updating this information, the updating is made only when modification occur, in network topology through the nodes. This makes the neighbor node discovery process simple and reduces the routing overhead, therefore the energy is saved as much as possible. Hence enhanced lightweight proactive routing feature with strong source routing capability of DFID and dijistra is combined for an efficient route establishment between a pair of nodes so that messages may be delivered in a timely manner through a shortest path. Route construction should be done with a minimum of cost, overhead and bandwidth consumption.

Keywords: MANET, Dijkstra, DFID, PSR.

Introduction: MANET [1] is a speculative technology used in various applications. The network layer received a deal in the research on MANETs. The two main operation performed by the MANET in this layer is Data forwarding and Routing. Data forwarding is the operations of taking the packets from one link and delivered on another link.This research work proposed an improved light weight proactive source routing (PSR) protocol in MANETs to enhance the opportunistic data forwarding process. Basically, the nodes in PSR maintains a breadth-first search spanning tree of the network, but in this research the PSR working procedure is slightly modified by implementing Depth-first iterative-deepening[5](DFID-Dijkstra's algorithm) combined with the best first heuristic search[6] to maintain the information of the entire network topology. [7]the DFID-Dijkstra's algorithm spanning tree is constructed to maintain the network topology information. Instead of periodically updating this information, the updation is made only when modification occur, in network topology through the nodes. This makes the neighbor node discovery process simple and reduces the routing overhead, therefore the energy is saved as much as possible.

Related works: This section describes some related research such as neighbor node discovery, energy consumptions, routing overhead reduction and route discovery which is most relevant to the proposed paper.

Walikar Gyanappa A and Biradar Rajashekar C(2015), "Energy aware multicast routing in mobile ad-hoc networks using NS-2", introduced an Energy Aware Multicast routing Protocols which increase the energy consumption while discovering the neighbor node ,maximized end-to-end connectivity and reduced the fault in node /link level effectively.

Xin Ming Zhang et al (2013) proposed a novel protocol known as neighbor coverage-based probabilistic rebroadcast protocol that removes the broadcast storm problem by reducing routing overhead in MANETs. A novel mechanism Rebroadcast delay is introduced to obtain the neighbor coverage knowledge that determines the rebroadcast order. The node density adaptation is defined by the connectivity factor. These connectivity factor and the neighbor coverage knowledge is combined to reduce the number of retransmission, this the way used by the author to reduce the routing overhead.

Proposed Methodology: The proposed work introduced a source routing protocol which is proactive in nature this makes the ODF available for MANETs. Traditionally the nearby nodes periodically exchange this information to obtain an updated network topology this leads to the routing overhead. This problem is reduced in this work by improving PSR that maintains DFID-Dijkstra's algorithm spanning tree of whole network is constructed.

Dijkstra's Algorithm with Depth-First Iterative-Deepening (DFID): The DFID is similar to the breadth-first search it uses less memory on every iteration. This search finds the solution starting from initial stage and performs the depth-first search for goal node selection. In each iteration the node in the previous search is discarded. The search is repeated until it reaches the goal. All nodes are expanded by DFID at a given depth before expanding any nodes at a greater depth. O (d) is the space used by this search algorithm. The demerits of DFID is it process the wasted computation prior to obtain the goal so it's combined with one of the powerful Heuristic Search Dijkstra's Algorithm.

Dijkstra's algorithm is applied for finding the shortest path in a graph. It starts to work by setting the source vertex distance to zero and other nodes to infinity. Based on the visited vertices and a queue this algorithm provides the shortest path. In the proposed work this algorithm produce the shortest path to reach the destination and based on this information and the DFID, the spanning tree is constructed. This combined work algorithm is given below.

N_0:Starting Node
D_l: cut off depth
V: vertices
R: source
limit ← 0
While limit <$D_l$do
DFS depth
(N_0,limit)
Search start to find a goal
Return the goal state
limit ← limit + 1
else
return fail
d[s]=0
for each $v_i \in V(s)$

$$d[v_i] \leftarrow \infty$$

R← ρ
T←v
If T≠ ρ
min←MIN(T,d)
min←MIN(T,d)

R←RU $\{u\}$
For each v
∈nearby[min]
If d[v]>d[min]+n(min,v)
d[v] ←d[min]+n(min,v)
return d

Experimental result: The study of the work is performed using computer simulation with Network Simulator 2 version 2.34 (ns-2). The comparison is performed between the DFID_PSR with dijikstra PSR with various parameters. Our tests show that the overhead of improved PSR is only a fraction of that of the existing one. Nevertheless, as it provides global routing information at such a small cost, improved PSR offers similar or even better data delivery performance. The performance evaluation is described in constant bit rate, nodes and speed respectively.

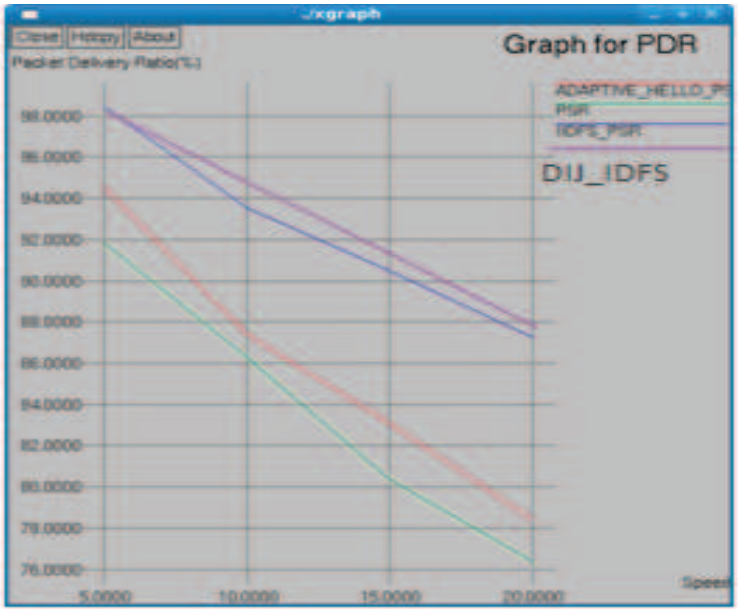

Figure 1: Packet Delivery Ratio Versus Varying Speed

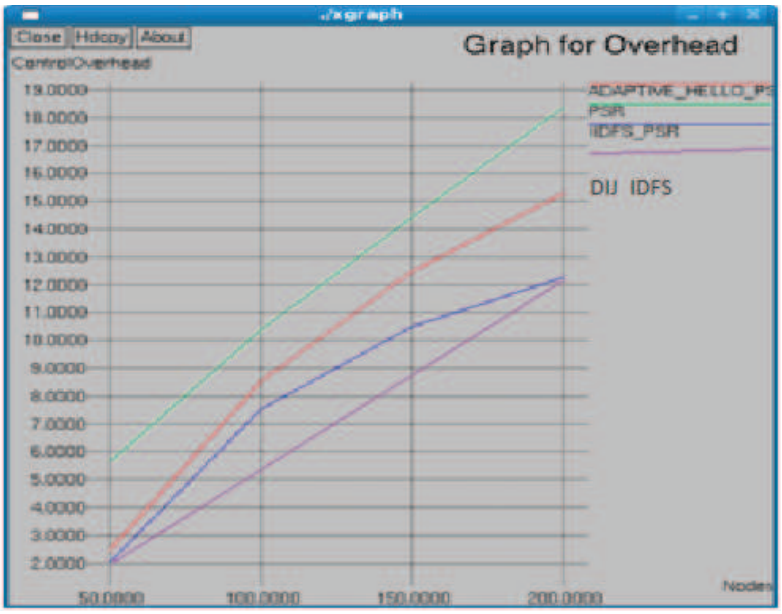

Figure 2: Overhead versus Varying Nodes

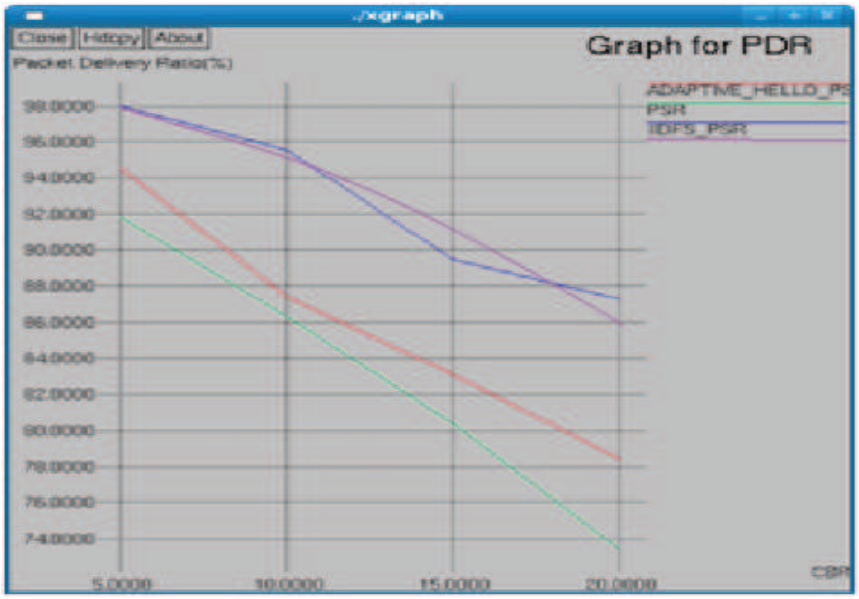

Figure 3: Packet Delivery Ratio versus Constant Bit Rate

Conclusion: In this research the PSR working procedure is slightly modified by implementing Depth-first iterative-deepening (DFID) combined with Dijkstra's Algorithm to maintain the information of the entire network topology. DFID is similar to the breadth-first search it uses less memory on every iteration and Dijkstra's algorithm is applied for finding the shortest path with the combined result of this both is used for constructing the spanning tree, finally updation is done in the routing tables is based on the adaptive Hello Messaging technique with DFID

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