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An Adaption Of Congestion Aware Routing In Manet Using Modified Branch And Bound With Dsr Protocol

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Abstract

Mobile adhoc network is a decentralized wireless system that does not rely on a pre-existing infrastructure. In adhoc the system can be setup at anytime and anywhere. Each node in a MANET act as a router and communicate packets with each other from source to destination. Mobile Adhoc network is a self configured network and nodes move randomly when the network changes frequently due to its infrastructure less network. Routing plays a vital role to select paths in a network. The routing decides the packets route between devices in a MANET. The proposed methodology Modify DSR with Modify Branch and Bound i.e., MDSR with MBB with congestion aware routing focus in rising the energy utilize level, forwarding the packet, Route discovery and avoiding collision when sending packets from an origin to end. The efficiency of the energy level is improved in MANET with the proposed methodology (MDSR with MBB). The metrics were used to calculate the efficiency in a network system such as Lifetime of a network, Energy utilization of a node, End to end delay of packet , Delivery ratio of Packet in a network ,Throughput and Routing overhead.

Keywords: *MANET, Reactive Routing Protocol, surroundings Repair Method*

1. Introduction

A MANET consists of mobile devices and defined as an autonomous system to form a arbitrary network. Each device in a MANET moves in any direction independently, and changes its link to other devices frequently in a wireless device. The major confront in MANET is each device maintains the information continuously, in order to properly acquire the route traffic. Such type of networks operates by them or connected to an internet. It may contain single or multiple different transceivers between nodes in a MANET. The communication in manet is highly depend on nodes cooperation. A self organized manet has major objectives such as Reliability, availability and scalability. The nodes are autonomous and capable to move independently. Each node act as a host and communicate with different nodes has a wireless interface. The collection of independent nodes can communicate through radio waves. Since nodes are in radio range the nodes directly communicate so they can route their packets with the aid of intermediate nodes.

The reactive routing approaches maintain a route between all pair of nodes when routes were discovering when the node need to transmit the data packets between a network therefore the discovery of route occurs with routing information table maintain by dynamic network Hence the approach of Data transmission by avoiding congestion in a network can be implemented with modified DSR Branch and bound technique integrated by congestion aware mechanism

1.1. Route Discovery

A demand routing protocols and it is known as Incremental search Method .Every node maintain a list of its neighbor nodes and contain direct message link with a source node. In accumulation source node also maintains the records of its neighbor discovery in its neighbor list. Whenever a basis node wants to send a packet to target, it has a route to target in its direction-finding table and progress the data transfer to that particular node through this route. If source node could not find suitable route to target then the basis node send route discovery packet. Each node accept a route finding packet to a target node in its direction-finding table and neighbor node. If a node finds a route to target node then it sends a way of verification packet to destination so that it reply a route confirmation packet to basis It is to ensure that the route is valid or not. Route discovery has major advantage that all node in network apart from the

destination node know the possible routes through routing tables. Route overhead is reduced in route discovery process and increase the bandwidth efficiency in Reactive Routing Protocol (RRP).

1.2. Route Maintenance

Reactive Routing protocol is known as Surroundings Repair Method (SRM). It is used for detection of link breaks and repair of accessible route. Each node keeps record of next hop for each destination entry in routing tables. In a Reactive routing protocol the source node is unable to forward data packets to target due to its link break to destination it initiates routing table that use as their next hop. Route maintenance has many advantage if a route is repaired successfully the overhead occur in sending a direction invalid packet back to the source node and new path search by source node is saved. The overall bandwidth efficiency is improved in route Maintenance of using surroundings Repair Method (SRM) in RRP method..

2. Dynamic Source Routing Protocol(DSR)

DSR Protocol is a easy and well-organized protocol. The dynamic source routing protocol specifically deliberate for multi-hop adhoc network of movable nodes. The nodes Cooperate to forward packets and allow message over manifold hops when it is not directly within wireless broadcast range. In a network the node move to join or leave the network, such a basis of change is determined and all route is automatically maintained by DSR protocol.

It has three acknowledge mechanism that data can flow over the association from one node to the next hop:

1.The link layer acknowledgement standard is IEEE 802.11 is provided by MAC layer protocol.

2. A Passive acknowledgement is used to forward a packet and confirm the reach ability of the link.

3. The Network acknowledgement sends an clear acknowledgement request to next-hop node.

In DSR the route maintain between nodes to converse and reduce the transparency of route maintenance and discovery overhead by route caching.

3. Branch and Bound Algorithm(B&B)

Branch and Bound algorithm explore the complete space result which are usually NP-hard, for a given problem to find a optimal solution. In Branch and Bound, Branching create new nodes divide into a set of smaller subset and find upper and lower bound of each node. since clear enumeration is unfeasible due to growing number of possible solutions, the use of bound to be optimized with the assessment of the present solution which enables to search the solution space completely.

3.1. Branching Approach

Branching requires two ways to do branching

1. Branching with the smallest bound:

It search all the nodes and find the smallest node and set as next branching node. So it has less sub problems and save a estimation time.

2. Newly created node with smallest Bound:

The node with energy saving mechanism have been used by selecting the lower bound level in the sub branch of the network Therefore the node can utilize minimum storage level in the network. .

4. Proposed Methodology

4.1. A congestion control with modified DSR and Branch and Bound Technique

Dynamic source routing is an on Demand routing protocol use Multi-hop wireless adhoc network. Branch and bound algorithm is integrated with DSR protocol to get an optimal route when transfer data packets from basis to target. In MDSR protocol it initially deploy all nodes and send "hello" message to all neighbor node. When destination node receive route demand packet from the source node through the repeal path of route request packet. Destination node sends a route respond with alternate route path information from basis to destination. The Modify Branch and bound algorithm with MDSR, propose a back jumping method to reduce the traffic problem. Therefore it is used to find upper bound energy value of the node to travel the route path to find an optimal path.

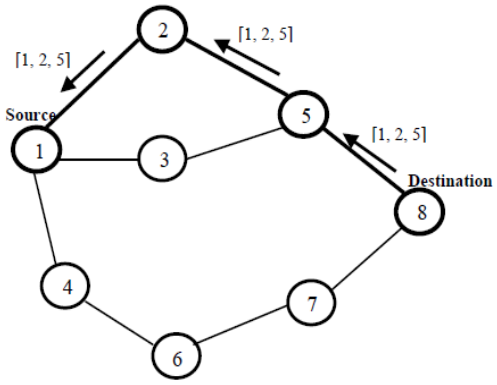

Fig 1: Route demand in DSR

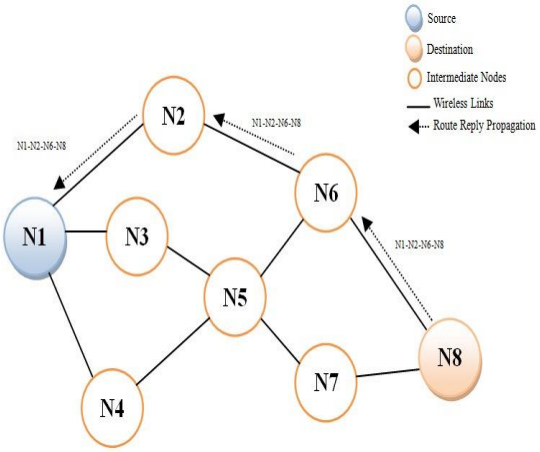

Fig 2: Route respond in DSR

4.2. Algorithm Steps

Step 1: Congestion of nodes were calculated based on level of congestion in intermediate nodes, active routes can be determined by classified by live nodes to interact between nodes in a network .The information packet send by Source node to destination with the help of broadcasting a sample packet in a network by RREQ. The request packet has been received by target and inverse the path for the basis to transmit the data to destination .The RREP receive a packet with congestion level to the Route reply PACKET to the basis of transmission flow with similar task of finding the congestion in a route path until it attain the source node. The node in a Source receives multiple RREP with different Congestion available between a travelling path of the network. The approach of Congestion aware and choosing an optimized path with modified branch and bound technique are controlled by calculating a congestion level average and lower maximum congestion to incorporating the intermediate nodes .The approach consider the lower buffer ratio to send the data packet to avoid collision in a network with expected RREP in a

network Initially, the current node broadcast packets to its neighbor node and set the minimum distance value. When the packets received from the source to destination, the source intimate the destination to count the data packets. Then the destination will evaluate the data packets acknowledged from the data count.

Current node = = src(basis)
A= source node(src)
B= destination node(dst)
Finding distance value
To find the distance between source and destination

Algorithm:
Src!= dst
(A2= source node A2 value
A1= source node A1 value
B2= source node B2 value
B1= source node B1 value)
srcd = sqrt((A2-A1)+(B2-B1)^2)
(A22= source node A22 value
A11= source node A11 value
B22= source node B22 value
B11= source node B11 value)
dstd = sqrt((A22-A11)+(B22-B11)^2)
Find a routing path
if srcd<F and dstd<S // S – minimum congestion level distance value,
F – path finding For set a fitness value.
Find the active routes
Forward the route request packet from source to destination node
Then send route reply packet towards source using inverse path to reach destination node
Then send rout reply packet send back to destination to source node
End if
Initialize the congestion level value
max = S // S – maximum congestion level assessment for node
// S1 – Least congestion level assessment for node
For C < T // C – Current node, T – Total no of nodes
if e (a) <S // e (a) – Congestion level value of the node
Find maximum and minimum congestion level value
if e (a) <S and e (a1) <S1
S=e (a) S1=e (a1) // e (a1) – Congestion level assessment of the node at=a // a – highest congestion level value of the node, at – accumulate the highest congestion level assessment of the node at1=a1 // a1 – lowest Congestion level assessment of the node, at1 – store the lowest Congestion level value of the node
Then forward the route request packet to routing path node
Find routing path occur condition
For C1 < T1 // C1 – Current node Congestion level value,
T1 – Total no of nodes Congestion level value
Then store the latest value in array
End Loop
F = 0 // F – Flag value for node count checking
it=1 // it – interval time increase
If a=at And F=0 and a1=at1
// a – Current node of highest Congestion level value,
at – past node of highest Congestion level value,
a1 – Current node of lowest Congestion level value,
at1 – Past node of lowest Congestion level value.
Then break the path
Else if

Find the minimal average buffer ratio path to send the packets.
Then forward the route reply packet (RREP) from destination to source choose the path
End if
End if

5. Performance Study - Simulation Parameters

The various performance measures has been analyzed and proposed work is discussed. The simulation tool NS2 is an object-oriented and provide significant support for simulation of TCP over wireless network.

Pause Time (Sec)	ROUTING OVERHEAD (No of Routing packets / Sec)	NETWORK LIFETIME (Lifetime / Sec)	ENERGY CONSUMPTION (Energy / Sec)	END TO END DELAY (Delay/Sec)	PDR (Pdr/sec)	THROUGHPUT (Kb/sec)
0	10.0	9.25	10.0	10.0	9.25	9.25
5	9.33291	9.84271	9.35291	9.36921	9.86482	9.93419
10	9.31542	9.86301	9.33612	9.34871	9.88342	9.95512
15	9.23721	9.93231	9.24521	9.25191	9.94521	9.99452
20	9.13742	10.102	9.15511	9.15211	10.1932	10.2011

S.NO	Property	Value
1	Simulation Tool	NS2
2	MAC Protocol	IEEE 802.11
3	Routing Protocol	DSR
4	Coverage area	1000 x 1000 m
5	Number of nodes	60
6	Simulation Time	1000s
7	Traffic Type	UDP – CBR
8	Pause Time	50, 100, 150…
9	Transmission range	200 m

Table 2 A Modified Branch and bound Dynamic Source Routing Protocol with Congestion Aware

5.1. Evaluation of Performance in Manet with MBBDSR incorporated with Congestion Aware technique

The performance metric has been evaluated and compared with the existing algorithm. Pause time is a motionless while the transmission continues. The time varies between 50 to 200 sec in the simulation environment. The simulation is carried out using MDSR protocol with MBB algorithm with congestion aware technique The data transmission

across the node performance is calculated for varied time intervals and various performance metrics is used for energy utilize in MANET.

A. Routing overhead

The node exchange the routing information and use the same bandwidth and numeral of routing packets required for communication in a system.

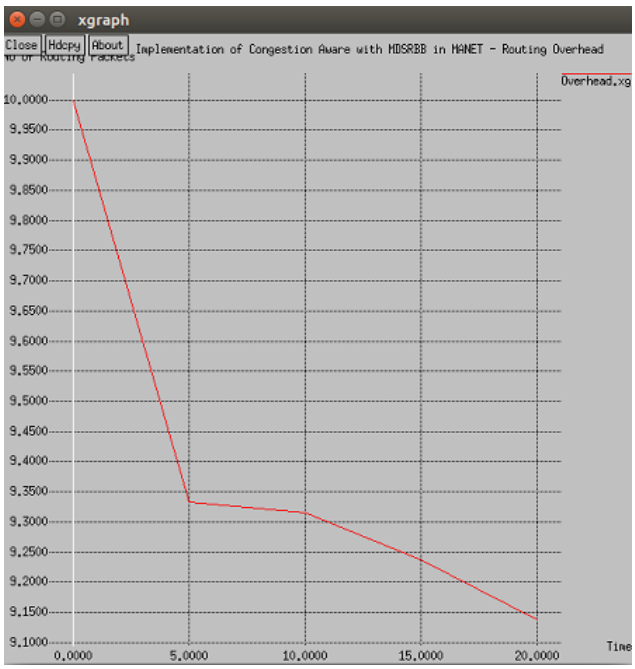

Figure.3:Pausetime Vs Routing overhead

B. Throughput:

In a network device communicate through exchanging data packets. Throughput refers to successful packet delivery from source to destination.

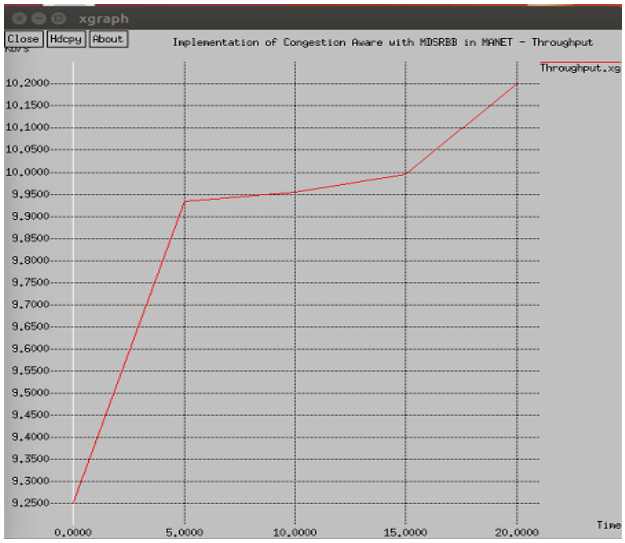

Figure.4: Pause time vs Throughput

C. **Packet Delivery Ratio(PDR/s)**

The ratio of packets successfully delivered to a destination that have been compared to number of packets sent by sender. The calculation of packet PDR= Total no of packets sent/No of received packets

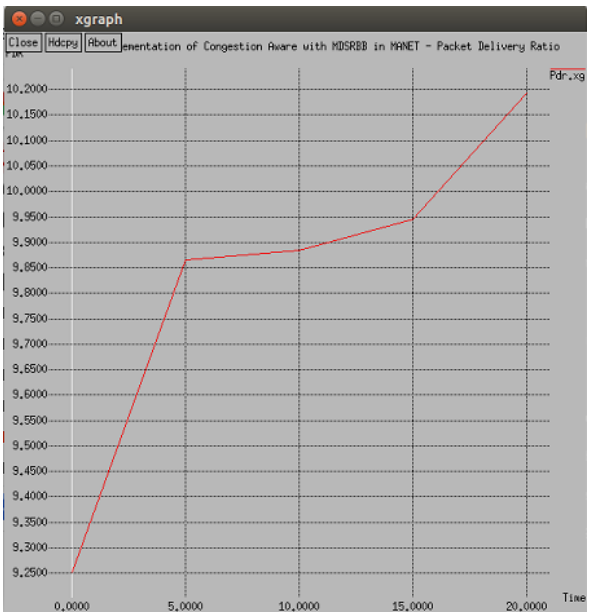

Figure.5: Pause Time vs Packet Delivery ratio

D. End to End Delay(Delay/s)

The time taken for a packet to be broadcast from basis to target. The end to end delay is use to store and forward between the links.

End to End delay can be calculated as EED=N*L/R ,

N = link to send packets

L = Length of a Packet

R=Transmission rate for sending packets

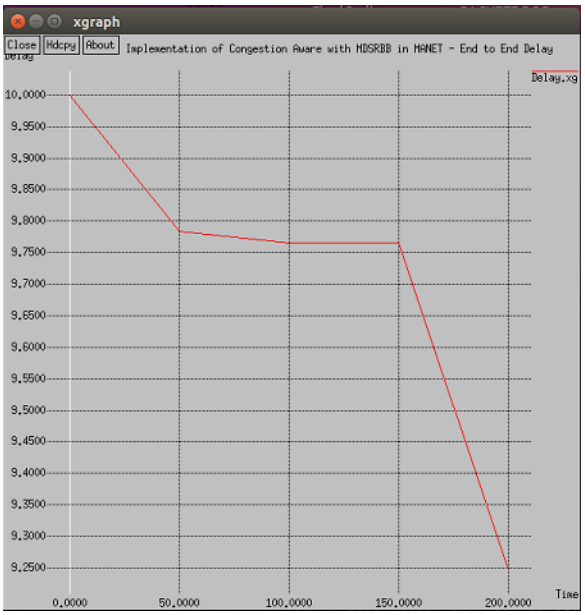

Figure. 6: Pause time vs End – End Delay

E. Nodes energy(Energy/s)

The node in the network has specific amount of energy and the energy fatigued at every transmission occur between the nodes. The energy is represented as nodes.

The node energy can be calculated as

Nodes Energy = CE-IE Where CE= current Energy

IE= Initial Energy

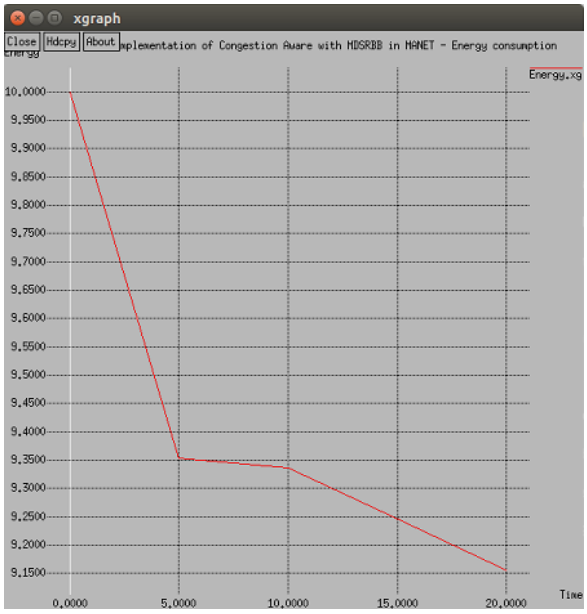

Figure.7:Pause Time vs Energy consumption

Packet Delivery Ratio

The significant count of data were delivered to the destination node , Rate of missed packet in transmission were calculated through packet delivery ratio

PDR= ∑ packet received count / count of packet sent by the sender

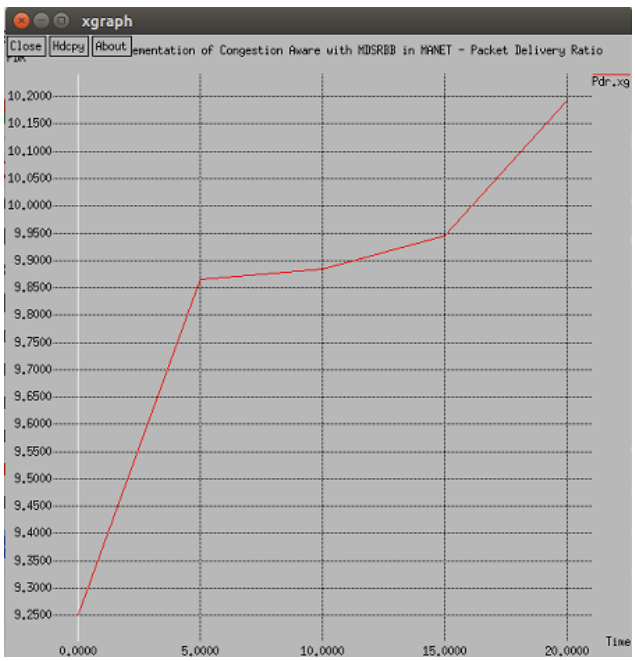

Figure.8 :Pause Time vs Packet Delivery Ratio

F. Network life time

A state of node with maximum Duration in network life time is achieved by the formula as

LTN=SE/RE

LTN= display the value of life time

SE= Sending Energy

RE= Receiving Energy

Figure. 9: Pause Time vs Network life Time

6. Conclusion

A Modified dynamic source routing protocol with optimized branch and bound along with congestion aware mechanism were proven that the optimized path selection and energy utilization were varied ie reduced with mobile adhoc network. Hence the network were functioning with different threshold limits and the congestion aware control to avoid a traffic in network This implementation has reduced overhead, delay time time and increase the efficiency in a network, The MDSRMBB is used to route the packets and it minimize the energy consumption, quality of service and fault tolerance when compared with existing algorithm. The proposed work performs and provide optimal route to be achieved. The performance Metrics such as PDR, throughput , end to end delay and routing overhead is optimized by delay time and hence PDR and throughput values are improved in proposed work. The Proposed algorithm of MDSRMBB achieves better optimal result in the network transmission. Hence the efficiency of the energy level is improved in MANET with the proposed algorithm of Modify Branch and Bound with Modify DSR protocol.

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