iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** XII **Month of publication:** December 2018

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue XII, Dec 2018- Available at www.ijraset.com

Enhanced DSR-An Efficient Routing Protocol for MANET

Ms. P. A. Madnaik[1], Prof. Mrs. P.P. Belagali[2]
[1]*ME, E&TC Eng., JJMCOE, Jaysingpur*
[2]*Associate Professor of E&TC Engg, JJMCOE, Jaysingpur*

***Abstract:** An ad-hoc network is a group of wireless mobile nodes which are self-creating, self-organizing, and self-administering. The main aim of this network is selection of routing protocol which may enhance the performance of ad-hoc networks in terms of Energy consumption, average end to end delay, average jitter and throughput, Packet delivery ratio. To fulfill this aim, an efficient algorithm viz. enhanced DSR (EDSR) is proposed in the present work. In this algorithm the flooding of RREQ (route request) packets in the network reduces which results in the reduced congestion and energy consumption. In this when a node receives a RREQ packet it checks, its own residual battery. If the defined thresholds for the node for these mentioned parameters satisfy then the RREQ packet will be forwarded in the network. If it doesn't meet the defined threshold, the RREQ packet will be discarded. Hence the proposed algorithm prohibits the unnecessary flooding of RREQ packets. This results in the improved system performance.*
***Keywords:** Ad hoc networks, EDSR, flooding, RREQ, routing protocols.*

I. INTRODUCTION

In infrastructure Network, the communication occurs only between the wireless nodes and access points (AP), but not directly between wireless nodes. In ad-hoc network, each node communicates directly with other nodes, so no access point control is needed. Ad-hoc networks are wireless networks such kind of networks is created dynamically. However, when the number of nodes in the network increases to Hundreds or even thousands, the mass control message will even block the data transmission.

Routing protocols are the software that allow routers to dynamically advertise and learn routes, determine which routes are available and which are the most efficient routes to a destination. Routing protocols between any pair of nodes within an ad hoc network can be difficult because the nodes can move randomly and can also join or leave the network. This means that an efficient route at a certain time may not work seconds later. Routing in a MANET depends on many other factors including topology, selection of routers and location of request initiator because of that it is difficult to finding the path quickly and efficiently.

In present work we have proposed an efficient and simple algorithm which reduces the number of RREQ packets flooded in order to enhance the performance of an Ad-hoc network. This algorithm modify the route discovery mechanism at intermediate nodes. The alteration process includes modification of Route discovery mechanism by defining Threshold. In this process those nodes are discarded which don't possess the defined conditions. Therefore those nodes will not further forward route request packets. Hence congestion in network will reduce.

II. NEED FOR REDUCING THE ROUTE REQUESTS IN AD-HOC NETWORK

The dynamic source routing protocol (DSR) is a reactive MANET routing protocol. When source node communicating a destination node which is not present in the route cache of the source node, it will buffer the data packets and broadcast a route request (RREQ) into the neighboring node. The neighboring DSR nodes broadcast the RREQ packet to the intended destination node. The destination node then will send a Route Reply (RREP) on the reverse route back to the source node.

If no RREP is received after a fixed number of attempts and within the time, the data packets from the buffer will be dropped. If more number of data packets are received, a new route discovery process will be initiated. Increasing number of route requests will saturate the network which makes it unable for further transmission of data packets. Proactive routing protocol is on demand because of flooding it can seriously degrade the performance of reactive routing protocols and affect a node in the following ways:

During the process of route discovery the data packets are buffered in the memory. The increased number of RREQ packets in the network results in increase in collisions, congestion as well as delay for the data packets in the network.

Power and bandwidth management is important in MANET due to transmission of large number of RREQ can increase the power and bandwidth consumption.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue XII, Dec 2018- Available at www.ijraset.com

III. BASIC DSR OPERATION

A. Existing DSR Algorithm:

In existing DSR algorithm when the packet arrives, first of all, node checks following conditions/possibilities:

1) If it is RREQ packet then the route discovery mechanism initiates and the step one of the algorithm (shown in fig.3.4.2) will be executed.

2) If it is RREP packet then route reply mechanism works and the step two of the algorithm (shown in fig 3.4.3) will be executed.

3) If it is data packet then data is forwarded from source to destination. This is shown in figure (3.4.1).

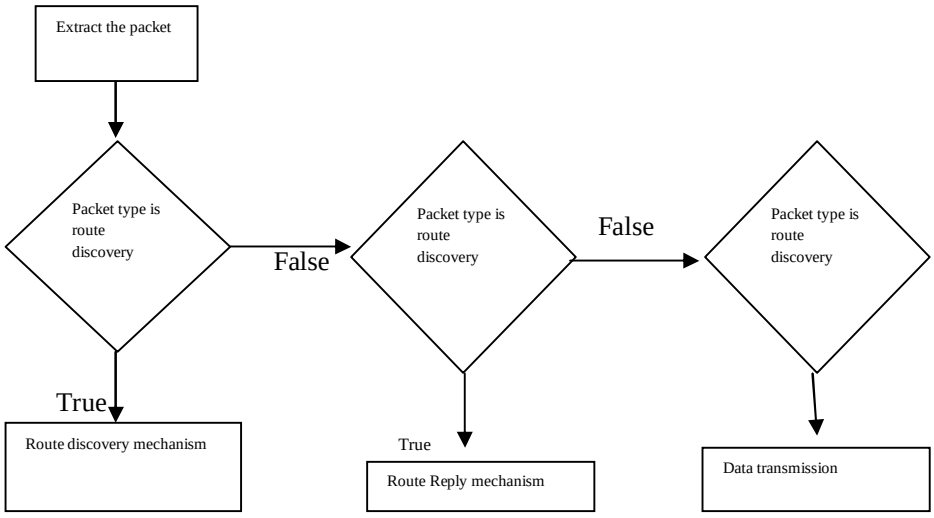


Fig.1 Flowchart of Existing DSR Algorithm.

B. Route Discovery Mechanism

Route discovery mechanism is as follows:

1) When RREQ flooded, it reaches to the nodes which are in the transmission range of source node. When a node receive a RREQ packet, following conditions/possibilities will be checked:

a) If it is the destination node, it sends a route reply to the sender.

b) If this node receiving the route request has recently seen another route request message from this initiator bearing the same request identification and target address it discard the request.

OR

If this node's own address is already listed in the route record in the route request, this node discards the request.

c) If the above condition does not hold then the node add it's on address in the request packet and forward it.

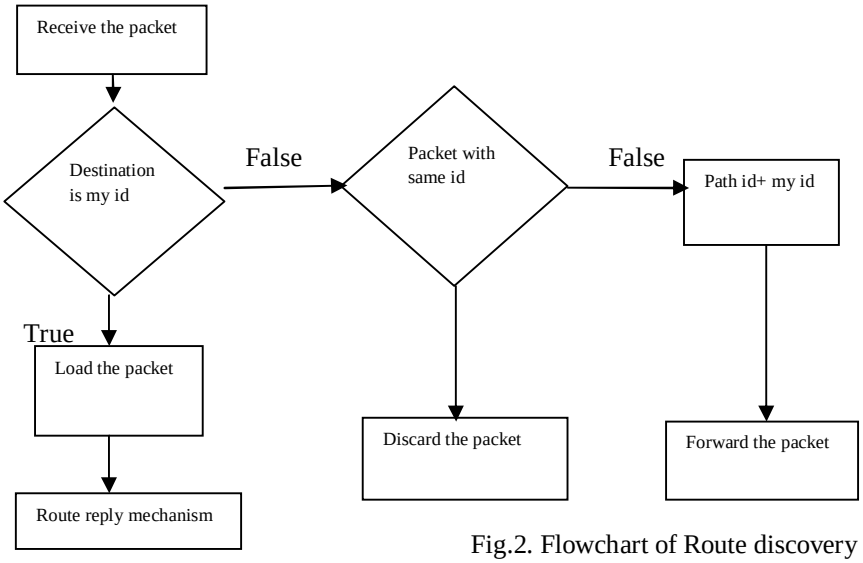


Fig.2. Flowchart of Route discovery mechanism.

©IJRASET: All Rights are Reserved

C. Route Reply Mechanism

Route Reply mechanism is as follows

1) If routes are bidirectional, then reverse path is set up and place that path in the header of the packet and forward it to the source.

2) Otherwise, if an entry to the source node exists in the route cache of destination node, forward the packet to the source by using that route.

3) If above condition does not happen, then destination initiates the route discovery for source node, but to avoid possible infinite recursion of route discoveries, it must piggyback this route reply on the packet containing its own route request for source.

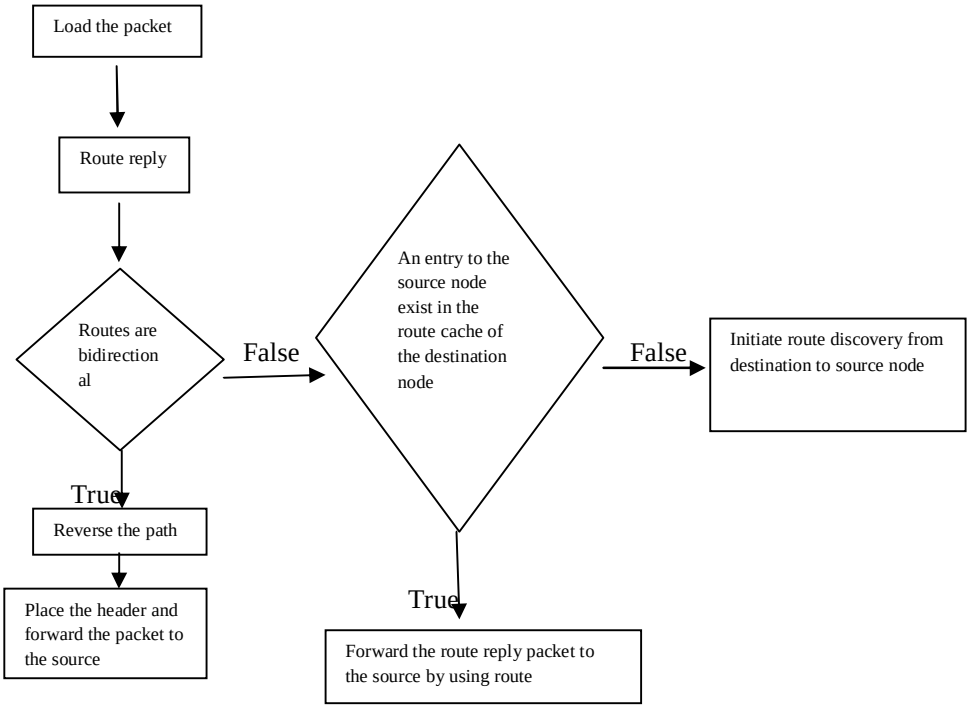


Fig.3.Flowchart of route reply mechanism.

IV. PROPOSED EDSR ALGORITHM

The flow chart of proposed algorithm viz. EDSR is shown in figure. It shows the mechanism of forwarding the route request packets by the intermediate nodes.

For proposed EDSR the modifications made in route discovery process only, which is as follows:

1) When RREQ flooded, it reaches to the nodes which are in the transmission range of source node. When a node receive a RREQ packet, following conditions/possibilities will be checked:

2) If it is the destination node, it sends a route reply to the sender.

3) Else if this node receiving the route request has recently seen another route request message from this initiator bearing the same request identification and target address, or if this node's own address is already listed in the route record in the route request, this node discard the request.

Else

If {value of the received signal strength is less than the threshold received signal strength i.e. = 10J}

Discard the request.

©IJRASET: All Rights are Reserved

Else the node adds its own address in the request packet and forwards it.

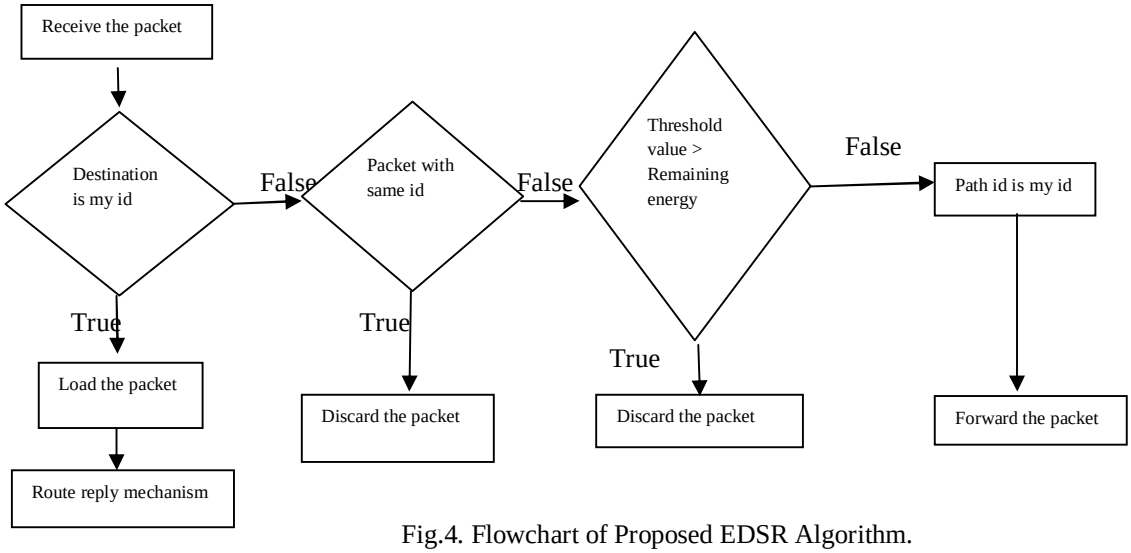


Fig.4. Flowchart of Proposed EDSR Algorithm.

V. IMPLEMENTATION AND RESULT

Table no.1 shows the Parameter configuration used while performing simulation experiments. The various combinations used shows variation in results which are detailed further simulation code has been developed in NS2.

Table no.1- Parameter configuration

Simulator Used	Ns-2
Protocol Under Test	DSR,EDSR
Node	10,20,50,60,240
Dimension Of Simulation Area	756 X 599
Simulation Time	1000 Sec
Traffic Type	CBR
Packet Size	UDP 1000 Bytes

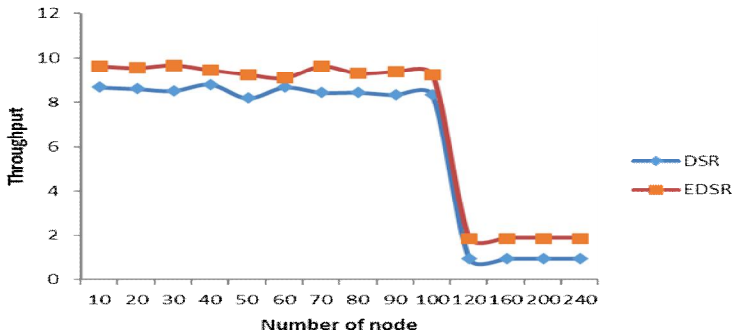


Fig no.5: Throughput Graph

The figure 5 shows throughput of the network vs .number of nodes. The better performance of ESDSR as compare to DSR this is due to Reduction in congestion, Bandwidth consumption and Delay. Hence for EDSR number of successful bits received per second increases and throughput increases. The graph show the values of throughput on different number of nodes like after 10, 20, 30, 50 and 240 nodes

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue XII, Dec 2018- Available at www.ijraset.com

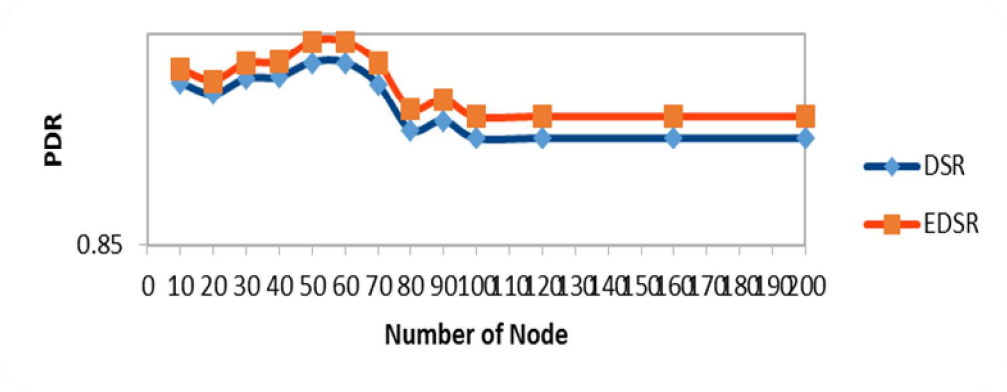


Fig no.6: PDR graph

The Packet Delivery ratio is that is packet deliver to the destination is higher in EDSR as compared to DSR. The figure 6 shows the better performance of EDSR as compare to DSR. ESDSR provides considerable improvement of PDF. This indicates that EDSR is more resistive in stressful situation than DSR because it uses transmit power control. The transmit power control reduces the collision rate of the packets. Even the stress (number of connections and traffics) is high, every data packet must be transmitted with appropriate power level.

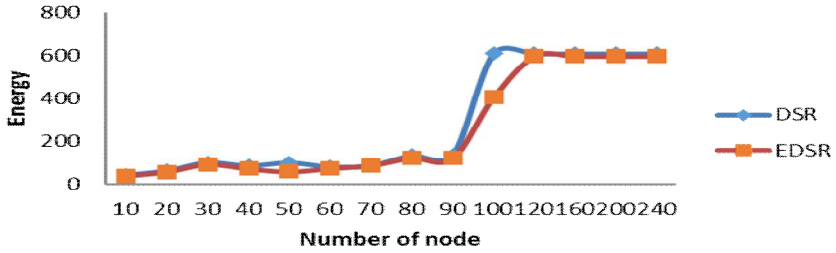


Fig no.7: Average Energy consumption graph.

The figure 7 shows the graph of average energy consumption vs. number of nodes and the nodes in EDSR will consume less energy as compare to the nodes in DSR. The green line shows the average energy consumption of DSR and red line shows the average energy consumption of EDSR on different number of nodes. We compare the values of average energy consumption on different number of nodes.

It can be seen from graphs that average energy consumption in EDSR based network is reduced compared to DSR based network.

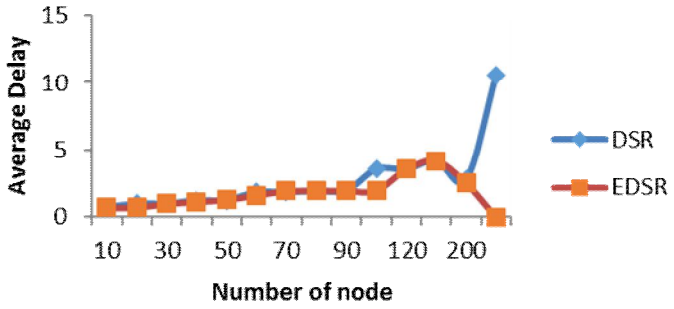


Fig no.8: End to End Delay graph.

The figure 8 shows the graph of end to end delay between DSR and EDSR. Here the Delay of ESDSR is slightly less than DSR. This shows that ESDSR has better performance for speedy packet delivery. As fixed and reliable route is considered, the packet delivery success has increased which reduces the requirement of number of retransmissions for lost packets. This gives benefit in terms of decrement in delay.

©IJRASET: All Rights are Reserved

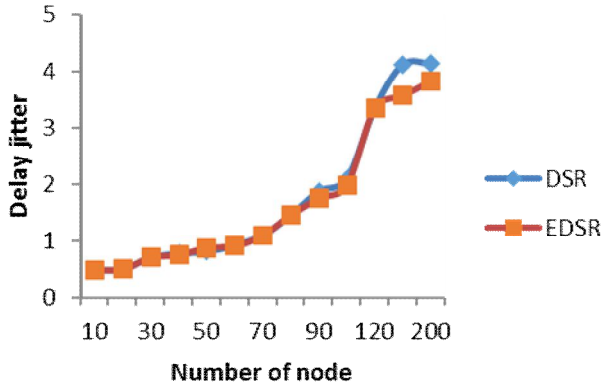


Fig no.9: Jitter graph

The results in figure 9 it can be observed that jitter in ESDSR is less than DSR. As end to end delay is less and also, reliable path assures maximum delivery success, number of retransmissions and fixed path scenarios assures effectively fixed and less delays. Hence jitter is less in ESDSR compared to DSR.

VI. CONCLUSION

The main important task in MANET is Need of controlling the flooding of RREQ because it consumes more power and bandwidth of the network due to that high congestion and delay in the network. In EDSR Modification in route discovery mechanism reduces congestion and energy consumption by not taking into account those nodes whose battery is lesser than the defined threshold level. If following assumptions are not considered the chances of network failure increases and saturate the network. It results in increased throughput and average Energy consumption of the node and decreased average end to end delay and jitter.

In designing the routing protocol there are lot of problem but Energy efficiency is the main problem. Modifying the DSR protocol less energy consumed. In Particular in small size networks DSR are comparable. But in medium and large size network the EDSR produce good result and the performance of EDSR in terms of throughput is good.

REFERENCES

[1] Mohamed Sharifdeen., Dhavamaniprakash .D“An Energy Efficient DSR Routing Protocol for Energy Consumption in MANET”International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Special Issue 6, May 2015.

[2] SukantKishoroBisoy, Prasant Kumar Pattnaik, “Analysis of a Network of AQM Router Supporting TCP Flows and Comparison with XCP” Fourth International Conference of Emerging Applications of Information Technology DOI 10.1109/EAIT.2014.32 978-1-4799-4272-5/14 © IEEE 2014.

[3] SnehaV.Sangolli, JayavigneshThyagarajan,”An Efficient Congestion Control Scheme Using Cross-Layered Approach and Comparison of TCP Variants for Mobile Ad-hoc Networks (MANETs)”First International Conference on Networks & Soft Computing978-1-4799-3486-7/14/ IEEE2014.

[4] TaranpreetKaur , Amanjot Singh Toor , Krishan Kumar Saluja,“Defending MANETs against Flooding Attacks for Military Applications under Group Mobility” Proceedings of 2014 RAECS VIET Punjab University Chandigarh, 06 - 08 March, 2014.

[5] Shyam Singh Rajput,Dr. Munesh C. Trivedi, “Securing Zone Routing Protocol in MANET using Authentication Technique”2014 Sixth International Conference on Computational Intelligence and Communication Networks 978-1-4799-6929-6/14 © 2014 IEEE.

[6] TarunVarshney, AishwaryKatiyar, Pankaj Sharma, “Performance Improvement of MANET under DSR Protocol using Swarm Optimization” 978-1-4799-2900-9/14/©2014 IEEE.

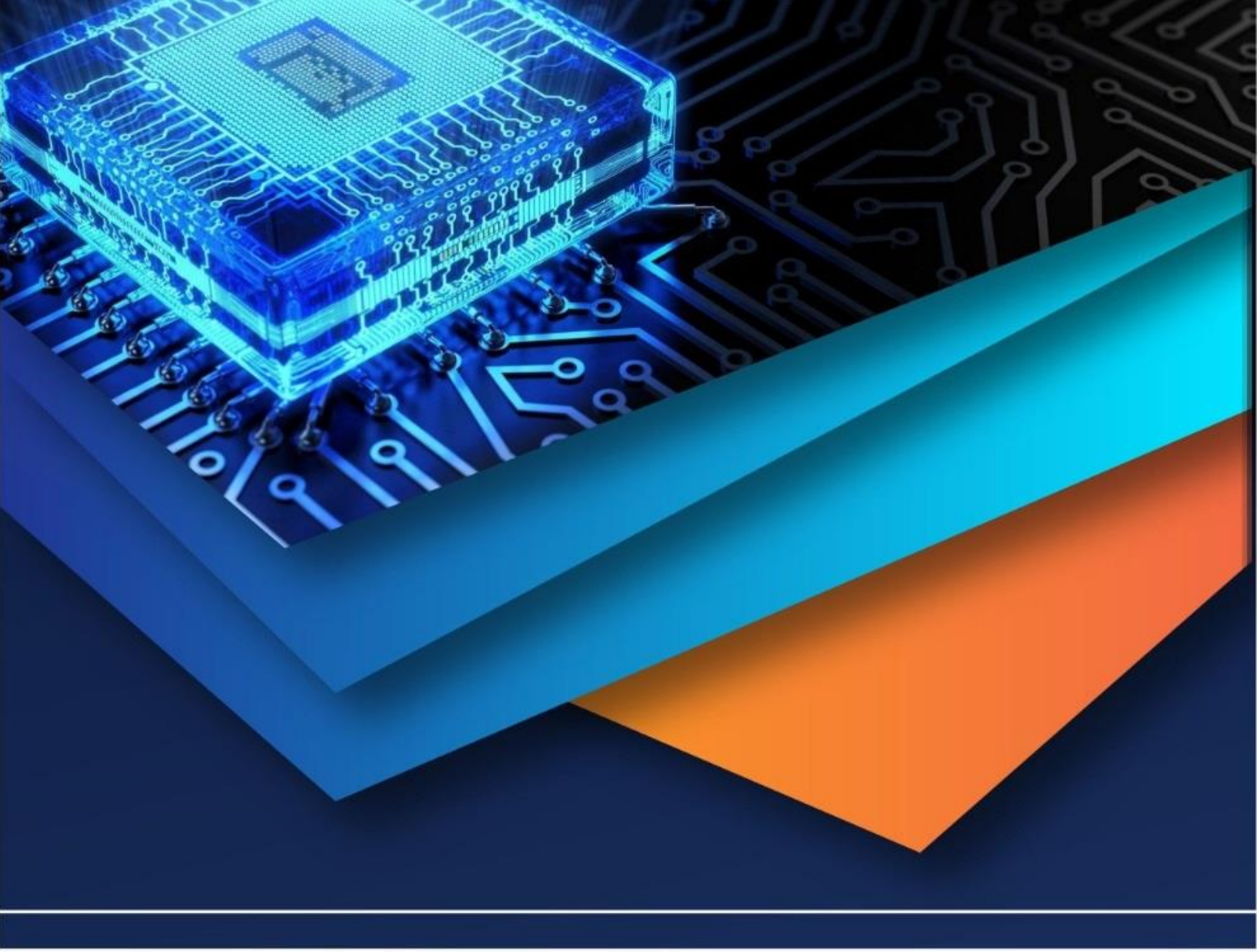
[7] Shivashankar,Dr.Varaprasad G, Dr. Suresh.H.N, DevarajuG,”Implementing a Power Aware QoS Constraints Routing Protocol in MANETs” 4th ICCCNT July 4-6, 2013.

[8] Jacob, J., Seethalakshrni. V., “Performance Evaluation of Various Routing Protocols in MANET”, An International Journal of Engineering Sciences,5, pp.208-220, 2011.

[9] Cheng ,R.H, Wu,T.K, Yu,w.c. , "A highly topology adaptable ad hoc routing protocol with complementary preemptive link breaking avoidance and path shortening mechanisms", Wireless Network, DOl 10.1007/s11276-009-0203-0,pp.1218-1311,2010.

[10] Smys, s.,Bala, G.J., Jennifer, S, "Mobility management in wireless networks using power aware routing", International Conference on Intelligent and Advanced System (ICIAS), doi: 10.1109/ICIAS.5716234.2010.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)