R. SARASWATHI *et al*, International Journal of Computer Science and Mobile Applications,
Vol.6 Issue. 2, February- 2018, pg. 31-49 **ISSN: 2321-8363**
**Impact Factor: 5.515**

# Broadcasting Based Energy Efficient Protocol to Enhance the Routing Performance in MANET Using BTSNA-DS Algorithm

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**Abstract** — A Mobile Adhoc Network (MANET) is multihop wireless networks, during which nodes move and communicate with one another without any centralized administration control or Infrastructure and additionally member nodes square measure will be a part of or leave at any time within the network. every node during a MANETs square measure act as a router, source node transmission the information packets to the destination receiving the packets transmitted by alternative source, in routing the information packets that square measure destined to another node. In MANET, the topology of the network often changes. By this reason frequent link failures occur. Therefore providing an efficient and effective routing in MANET with restricted resources like radio communication varies, information measure and power could be a difficult task. In recent analysis years, it's received tremendous quantity of attention from researchers that led to the planning and implementation of many routing protocols. The applications of those networks square measure in battle field, disaster recovery and emergency rescue operations. In this paper, proposed a new routing algorithm named Binary Tree Structured based Network Approach using Depth Search (BTSNA-DS) for restricted broadcast based energy efficient path between sender and receiver. Finally, proposed BTSNA-DS algorithms provide a better performance compare to existing Energy Efficient Neighbor Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR) Protocol, and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG) and also reducing End-to-End Delay, Routing Overhead, and Transmission Power with the number of nodes, transmission range, and mobility are increased.

**Keywords:** Broadcasting, Transmission Power, Overhead, Neighbour Coverage, Delay.

## I. INTRODUCTION

A Network facilitates the distribution of files and knowledge between multiple computers. Computer networks may be interconnected through either local area network cables or exploitation wireless cards that send and receive information or wireless medium like air. A commercial hoc network establishes a link between varied nodes with none base station. Mobile ad hoc Networks (MANETs) area unit quickly changing into a typical mode in telecommunication due to simple preparation and quick configuration. They're utilized in disaster conditions like earthquake, flooding, and cyclone and military. These networks use broadcasting as a technique for communication, for change the topology, maintaining the network, giving warning messages. They contains a bunch of nodes that communicate with

one another over a wireless medium like air while not the necessity for any predefined infrastructure. All the nodes square measure operating as supply, router or destination. The topology of the network will modification dynamically as a result of the nodes move in several directions, leave or be a part of it. Such modification creates issues in maintaining the routing method through energy loss, delay and instability in linking. So, the routing protocol should be designed to produce energy maintenance, avoid delay and create the link stable.

MANETs operate in extremely dynamic atmosphere and thanks to that their topology cannot be forever outlined and limitation poses a retardant of security of the network and there's forever a desire for optimized and secured routing protocol. Till now, variety of routing protocols are developed for MANETs the set of applications for MANETs is numerous, starting from little, static networks that square measure affected by power sources, to large-scale, mobile, extremely dynamic networks. In ad hoc networks, nodes don't have a priori information of topology of network around them, they need to find it. Mobile Adhoc Networks (MANETs) represent a replacement kind of communication consisting of mobile wireless terminals wherever it's associate infrastructure less IP based mostly network of mobile and wireless machine nodes connected with radio. In recent years, Manet has gained quality and much of analysis is being done on totally different aspects of Manet. It's associate infrastructure less network having no fastened base stations. Manet is characterized by dynamic topology low information measure and low power consumption. All the nodes within the network square measure moving i.e. topology of the network is dynamic that the nodes will act each as host furthermore as router to route data redundant for its use. Nodes of a Manet don't have a centralized administration mechanism. It's well-known for its routable network properties wherever every node act as a router to forward the traffic to alternative such node within the network. Manet could be a wireless multihop network with none mounted infrastructure, in distinction to today's wireless communications, which is predicated on fastened, pre-established infrastructure. All networking functions, like deciding the topology, multiple accesses, and routing of knowledge over the foremost acceptable methods, should be performed during a distributed manner. These tasks square measure notably difficult, because of the restricted communication information measure obtainable within the wireless channel.

**Challenges of MANET**

Due to dynamic topology changes and lack of administration of the MANETs, there are so many challenges/complexities in implementation of classical wired and wireless protocols. The following are the challenges in the MANETs.

**Dynamic Topology:** Because of node mobility the network topology keeps on changing. This increases the risk of network maintenance at a node. The dynamic nature of the MANETs creates the necessity of changing all the classical protocols in order to support topological changes.

**Bandwidth Constrained Variable Capacity Links:** Since the MANETs use wireless medium, the wireless links between nodes are of lower capacity when compared to wired networks. Bandwidths of wireless links are influenced by the effects of fading, interference conditions and multiple accesses.

**Battery Constraints:** Devices with limited battery power are used in the MANETS. Sometimes the network may get partitioned or the established routes are disconnected because of nodes failure with battery constraints. In the network, transmission power of a node is influenced by the routing, MAC protocols and CPU computations.

**QoS Provisioning:** In MANETs, usually bandwidth, time delay, jitter delay, throughput, and trustworthiness are considered as QoS parameters. Defining the QoS parameters purely depends on the context of application. Due to limited resources and lack of administration, the QoS provision is not a trivial task in MANETs.

**Security Threats:** The usage of physical wireless medium in MANETs causes security threats. A node can over hear the other node's activities and creates the security problems. In the network, nodes may turn selfish when they lack resources.

**Error Prone and Shared Channel:** Bit Error Rate of wireless medium is much higher than the wired network. Designing of routing protocols should take into consideration the signal to noise ratio and the signal strength of wireless links.

## II. ROUTING PROTOCOLS IN MANET

The aim of the routing protocols in the MANET is to establish the route with minimum length from the source node to destination node; which are multi hop away distance with each other. Due to dynamic network topology changes, the existing wired network routing protocols can't be applied to the MANET. Many authors have proposed routing protocols for the MANET by enhancing the existing routing protocols so that they can support MANET characteristics. Based on routing information management methods, the routing protocols in the MANETs are classified into three categories i.e. proactive (table driven) routing protocols, reactive routing (on demand) protocols and hybrid routing protocols.

**Proactive or Table-Driven Routing Protocols:** The table driven routing protocols maintain the network information before it is required. Here every node maintains the adjacency information for all nodes in the network. The routing information is maintained in the form of tables and is shared among the neighbour nodes. The information in the routing tables keeps on changing according to the changes in topology. The table driven routing protocols are not recommended for the larger networks, since they require maintaining an entry for each node in the network. This increases the control overhead of routing protocols and consumes node resources.

**On-Demand or Reactive Routing Protocols:** Reactive routing protocols do not maintain any topology information and the routing process is initiated when it is required. Here the routing overhead is less, since these categories of protocols do not exchange any routing information. The routing process is the combination of route discovery and route maintenance phases.

**Hybrid Routing Protocols:** This category of routing protocols uses the best features of the both reactive and proactive routing protocols. In the network, the group of nodes within a particular region is called as a zone. The routing process within the zone is proactive and outside the zone is reactive.

## III. RELATED WORKS

Survey of Broadcast Expenses Controlling Techniques in Mobile Adhoc Networks have been studied and discussed from Naeem Ahmad, et.al (2015). Performance Analysis of Broadcast Based Energy Efficient Routing Protocol for MANET Using BTSNA-DS Algorithm have been proposed by Saraswathi, R. et al (2018). Performance Analysis of Location Aided Routing (LAR) and Limited Hop Broadcasting Algorithm (LHBA) for MANET were discussed and analyzed from Saraswathi, R. et al (2018). Energy Efficient Neighbor Coverage Protocol for Reducing Rebroadcast in MANET were discussed and analyzed from RagulRavi.Ra, et al (2015). Enhance Internet Access Ability for Adhoc Network with On-Demand Gateway Broadcast Strategy were studied and discussed from Huaqiang Xu, Lei Ju, and Zhiping Jia, (2015). An efficient broadcast-based information transfer method based on location data over MANET were discussed from Yosuke Totani, et. al (2016). Network resource efficient routing in mobile ad hoc wireless Networks have been discussed from Ahyoung Lee, and Ilkyeun Ra, (2015). Performance analysis of an extended grid based broadcast algorithm in mobile ad-hoc networks have been discussed nad analyzed from Abderezak Touzene, et al (2015). Location Based Dynamic Probabilistic Broadcasting for MANETs have been discussed from Imran Ali Khan et al (2011). A review of routing protocols for mobile adhoc networks were studied and discussed from Abolhasan, M. et al (2004). A strategy to reduce the control packet load of AODV using weighted rough set model for MANET were discussed from Aitha, N., and Srinadas, R. (2009). Performance comparisons of routing protocol in MANET were discussed from Prabu, K., et.al, (2012). Energy efficient routing in MANET through edge node selection using ESPR algorithm were discussed and analyzed from Prabu, K., et.al, (2014). Cluster based controlling of route exploring packets in ad-hoc networks were investigated by Hussain, S.Z., and Ahmad, N., (2014). Minimizing Broadcast Expenses in Clustered based Mobile Adhoc Networks were studied by Hussain, S.Z., and Ahmad, N (2016). Enhanced blocking expanding ring search in mobile ad hoc networks were discussed by Pu, I.M., and Shen, Y (2009). Analytical studies of energy–time efficiency of blocking expanding ring search were analyzed by Pu, I.M., and Shen, Y., (2010). Multipoint relaying for flooding broadcast messages in mobile wireless networks were studied by Qayyum, A. (2002). On the broadcast storm problem in ad hoc wireless networks were studied and discussed by Tonguz, O.K., (2006). On reducing broadcast expenses in ad hoc route discovery have been discussed by Zhang, H., (2005).

## IV. PROPOSED CONCEPT

**Depth Search (D-Search):** The exploration of a replacement node cannot begin till the node presently being explored is absolutely explored. D-search like state area search is termed LIFO (Last In First Out) search that uses stack data structure. For instance the D-search allows us to consider the following tree (fig.1):

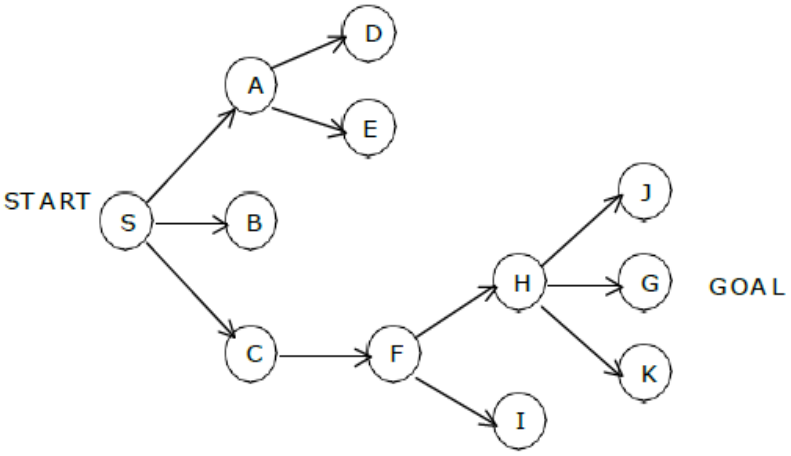



Figure 1. Tree Structure

The search order for goal node (G) is as follows (fig.2): S, A, B, C, F, H, I, J, G. The result tree is:

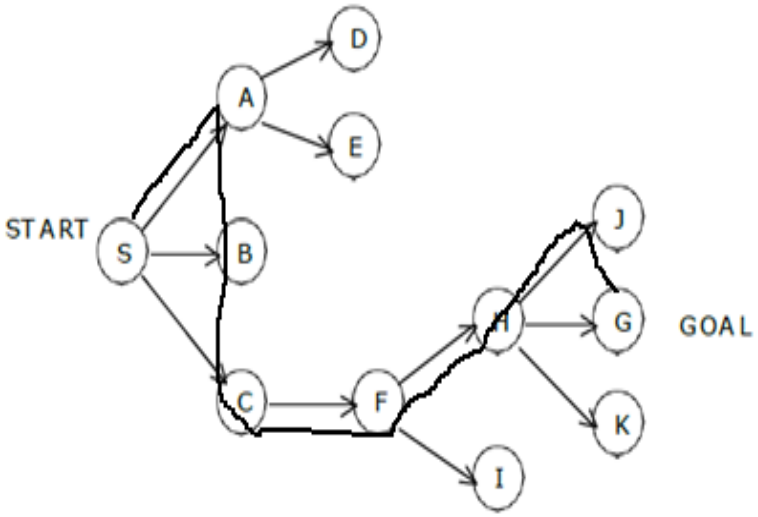



Figure 2. Path Using D-Search.

The given network, the broadcasting signal is flooded the neighbor nodes in the adhoc networks. The communication signal forward to next range of nodes which are presented surrounding the source node, its forward flow of direction from source to destination. Each signal forward towards the destination so it consider the directed graph (fig.3).

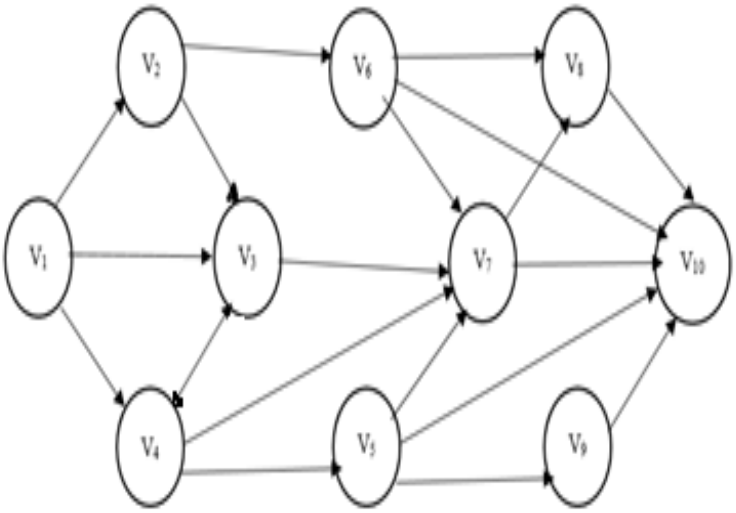



Figure 3. Directed Graph.

In the above graph the node V3 three times received the broadcasting signal from node V1, in via V1,V2 and V3, then V1 toV3 finally V1,V4, and V3. In this case the node V3 received the duplicate signal from various node, this situation rise the network complexity, So Instead of this the node V3 receive the signal only one time it reduce the complexity and also it helps to quick forwarded message to next nodes for that case this research introduce the new algorithm to construct the **Binary Tree Structured based Network Approach using Depth Search** (BTSNA-DS).

**Algorithm for (BTSNA-DS)**

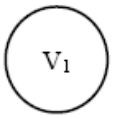
i) Calculate the in-degree and out-degree for each node.
ii) Assign source node (in-degree=0).
iii) Find the destination node (out-degree=0).
// other node have out-degree =0 that node 0 is called terminated node.
iv) Construct the tree structure for given node.
Id: In-degree
Od: Out-degree
$E_i$: In-degree Edge $\in$ E
$E_o$: Out-degree Edge $\in$ E
//construct the tree, the node have no child ($R_{child}$, $L_{child}$) first add $L_{child}$ then $R_{child.}$
// whenever added the new node to existing tree to find the minimum distance from root node to that node.
// which edges have to create the minimum path length, that edges will be selected, other edges simply rejected.

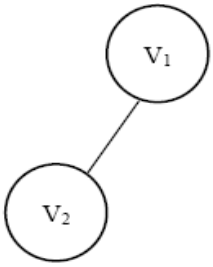
Table 1. In-degree & Out-degree for Given Directed Graph.

| Vertex | In-Degree | Out-Degree |
|---|---|---|
| V1 | 0 | 3 |
| V2 | 1 | 2 |
| V3 | 3 | 1 |
| V4 | 2 | 2 |
| V5 | 1 | 3 |
| V6 | 1 | 3 |
| V7 | 4 | 2 |
| V8 | 2 | 1 |
| V9 | 1 | 1 |
| V10 | 5 | 0 |

Step 1: First select $V_1$ have the no in-degree so consider as a root node.

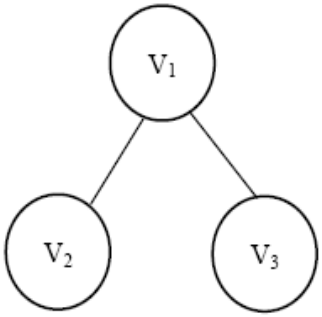



Step 2: Select $V_2$, that node have in-degree=1, out-degree=2.Node $V_2$ have only one in-degree edge ($V_1$-$V_2$) $E_i$, so take it as it is. Then $V_1$node does not have $L_{child}$ so add $V_2$ as left child of $V_1$.

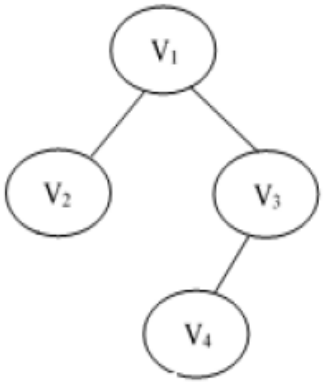



Step 3: Next select $V_3$ node, it have in-degree=3, out-degree =1, that node have three $E_i$ in-degree edges ($V_1$-$V_3$) ($V_2$-$V_3$) ($V_4$-$V_3$). In these three edges first we consider ($V_2$-$V_3$) edge that connect from node $V_2$, the node $V_3$ connect $V_2$ left child the level will be increased by 1, so that node added right child of node $V_1$through edge ($V_1$-$V_3$), in this case the node $V_2$, $V_3$ have the same level. Then ($V_4$-$V_3$) edge not yet finalized so simply it discarded.

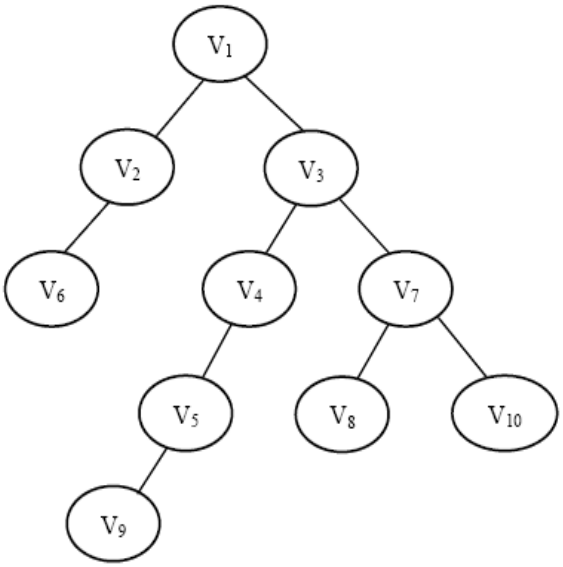



Step 4: Next select $V_4$ node, it have in-degree=2, out-degree =2, that node have two $E_i$ in-degree edges ($V_1$-$V_4$) and ($V_3$- $V_4$). In these two edges first we consider ($V_1$-$V_4$) edge that connect from $V_1$ node that node already have two child V2, V3 nodes. So, that edge ($V_1$-$V_4$) is simply rejected. Another edge is ($V_3$, $V_4$), the node V3 does not have any child. So, the node V4 added the left child of the node V3.




Step 5: In this manner the remaining nodes all are added to construct the Binary Tree Based Network Structured created using Depth Search Technique.




- Using this technique the broadcast the message is faster way and also reduce the duplicate message.
- The node have only one in-degree edged that parent node already have two child, no other way to connect the parent node. So, that node consider as a dummy node from that networks.
- Reconstructing the node structure is very easy for at that time of emergency.
- Finally to find the level of each node, that node received the broadcast message only one time.

Table 2. Level of the Vertex.

| Level | Vertex |
|---|---|
| Level 0 | $V_1$ |
| Level 1 | $V_2$, $V_3$ |
| Level 2 | $V_4$, $V_6$, $V_7$ |
| Level 3 | $V_5$, $V_8$, $V_{10}$ |
| Level 4 | $V_9$ |

**Pseudo code for Binary Tree Structured Networks Construction using Depth Search:**

**Algorithm BTSNA-DS (Graph G)**

*// G is a graph (Network structure)*
*// T ← 0 is empty tree before constructing the binary tree structure networks*
*// Input is a Ad-hoc network structure*
*// Output is Binary tree structured networks*
*// the given graph is consider as a directed graph because the broadcasting signal send // toward to destination node*

//$Id_i$ in-degree, $Od_i$ out-degree of that node
//Ei in-degree edge and Eo out-degree edge of that node

**Find in-degree (Id) and Out-degree (Od) of every vertices**

*For i = 1 to N // N number of node present in the networks.*
*{*
*$V_i$ ($Id_i$, $Od_i$)*
*$Id_i$ = {Ei}∈E // i = 0 to $Id_i$*
*$Od_i$ = {Eo} ∈ E, // i = 0 to $Od_i$*
*}*

**Root Node Construction**

*(i.e Here root node is source node that node does not have in-degree )*
*for i = 1 to N*
*{*
*If ($V_i$ ($Id_i$) == 0)*
*then that node have successor*
*$V_i$ is root node*
*else*
*$V_i$ is terminated node (that nodes does not have successor i.e., dead end node)*
*End if*
*}*

**Binary Tree Structure Network Construction**

*Select next Vertex (Node)*
*Root node $V_1$*
*// the selected vertex have only one in-degree edge*
*for i = 2 to N*
*{*
*if ($V_i$($Id_i$) == 1)*
*then*
*select edge $V_i$(Ei) // select in-degree edge of that node*
*if root node $V_i$ does not have $L_{child}$ or $R_{child}$*
*then*
*Add $V_1$ ($L_{child}$ ($V_i$ (Ei))*
*else*
*Add $V_1$ ($R_{child}$ ($V_i$ (Ei))*
*End if*
*else*
*Call D-search ($V_i$) // node have more than one in-degree edges*
*End if*
*}*

***Algorithm D-search (Vi)***

*Select next Vertex*
*Root node $V_1$*
*// the selected vertex have more than one in-degree edge*
*For i = 2 to N*
*{*
    *if ($V_i$ ($Id_i$) > 1)*
    *then*
    *for i=0 to $Id_i$*
    *{*
    *select edge $V_i$ (Ei)*

    *if root node $V_1$ does not have $L_{child}$ or $R_{child}$*
    *then*
    *Add $V_1$ ($L_{child}$ ($V_i$ (Ei))*
    *else*
    *Add $V_1$ ($R_{child}$ ($V_i$ (Ei))*
    *End if*

*//if root node $V_1$ have both child*
*// Then check the next level nodes left child or right child edges*
*//then*
*//search the next level nodes using Depth search (D Search)*
*if (L == 0) // root node*
*all nodes have both child in the level L*
*then*
*level L will be increased by 1*
*L=L+1*
*for i=1 to LN // number of node present in the same level L*
*{*
*If ($V_i$($L_{child}$($V_i$ (Ei))) does not have $L_{child}$*
*then*
*Add $V_i$ ($L_{child}$ ($V_i$ (Ei))*
*else*
*Add $V_i$ ($R_{child}$ ($V_i$ (Ei))*
*End if*
*If ($V_1$ ($R_{child}$($V_i$ (Ei))) does not have $L_{child}$*
*then*
*Add $V_i$ ($L_{child}$ ($V_i$ (Ei))*
*else*
*Add $V_i$ ($R_{child}$ ($V_i$ (Ei))*
*End if*
*}*
*End if*
*}*

A vertex contain more than one in-degree edges, at that same time more than one nodes does not have left child or right child, in this case we choose the level as a main constrains, We select which edge have minimum level (length of the path) that edge connected to their parent. The remaining edges simply discarded.

## V. RESULTS AND DISCUSSION

The performance of the proposed scheme is evaluated using Network Simulator version 2 (NS-2). Some of the basic assumptions made for the simulations are the mobile adhoc networks works in a secure environment and thus not prone to any sort of attack, each of the mobile nodes has a maximum battery power that a mobile node in a MANET could offer since it has to be used in the military battlefield which may require a high backup to sustain for a longer duration of each and every node has enough memory to store a copy of the token being circulated. The simulator parameters are listed in Table 3. The network area is confined within 1000× 1000 $m^2$. Each mobile node has a position and a velocity and moves about over a rectangular flat space. Each node in the network has a transmission range of 250m. A two-ray ground reflection model is used as the radio propagation model. The MAC layer scheme follows the IEEE 802.11 MAC specification. The broadcast mode with no RTS/CTS/ACK mechanisms is used for all message transmissions, including HELLO, DATA, and ACK messages. The movement pattern of each node follows the random way-point model. Each node moves to a randomly selected destination with a constant speed between 0 and the maximum speed 25m.

Table 3. Simulation Parameters.

| Parameters | Values |
|---|---|
| Simulation | NS-2 |
| MAC Layer Protocol | IEEE 802.11 |
| Mobility Model | Random Waypoint |
| Node Placement Random | Uniform |
| Terrain Range | 1,000 X 1,000 $m^2$ |
| Transmission Range | 250 Meters |
| Examined routing protocol | BTSNA-DS |
| Channel Bandwidth | 2 Mbps |
| Speed | 05-25 m/s |
| Application Traffic | CBR |
| Simulation Time | 1000 s |
| Propagation mode | Free space |
| Data Packet size | 512 bytes |
| Packet rate | 2 packets/s |
| Number of mobile nodes | 20–100 |

The following performance metrics to evaluate through networks simulation (NS2):

1. **End-to-End Delay:** delay is number of bytes or bits per seconds at time interval t.

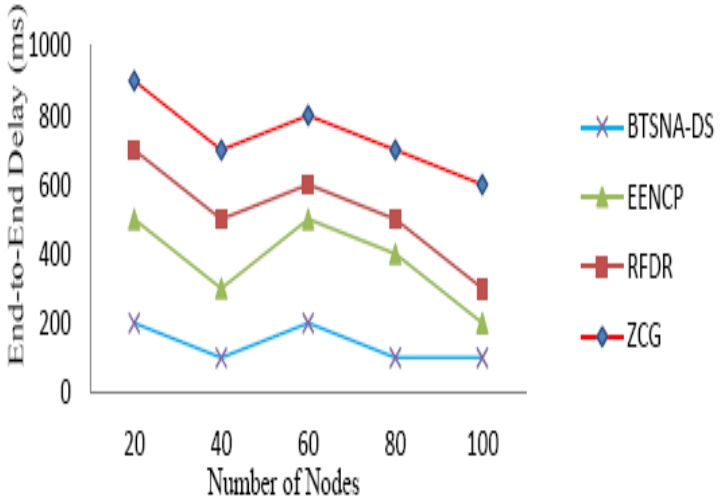



Figure 4. End-to-End Delay (ms) Vs. Number of Nodes.

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 4 the proposed BTSNA-DS algorithm provides better performance compare to existing algorithm and also reduced end-to-end delay with number of node is increased.

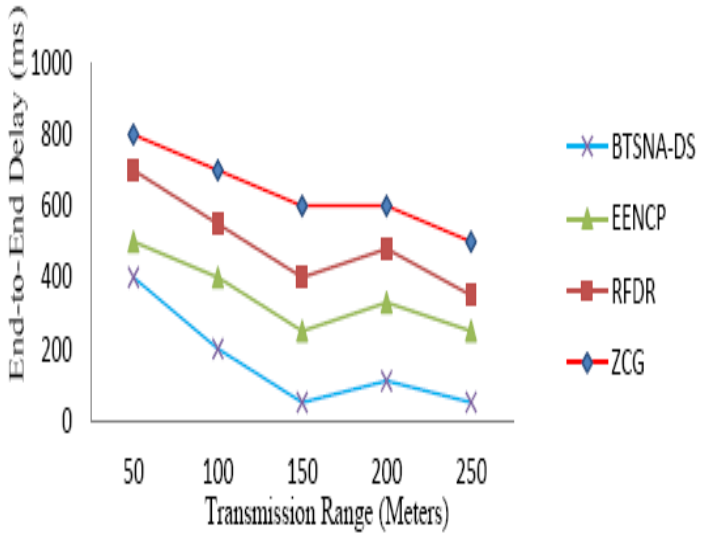



Figure 5. End-to-End Delay (ms) Vs. Transmission Range (Meters).

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 5 the proposed BTSNA-DS algorithm provides better performance

compare to existing algorithm and also reduced end-to-end delay with transmission range (meters) is increased.

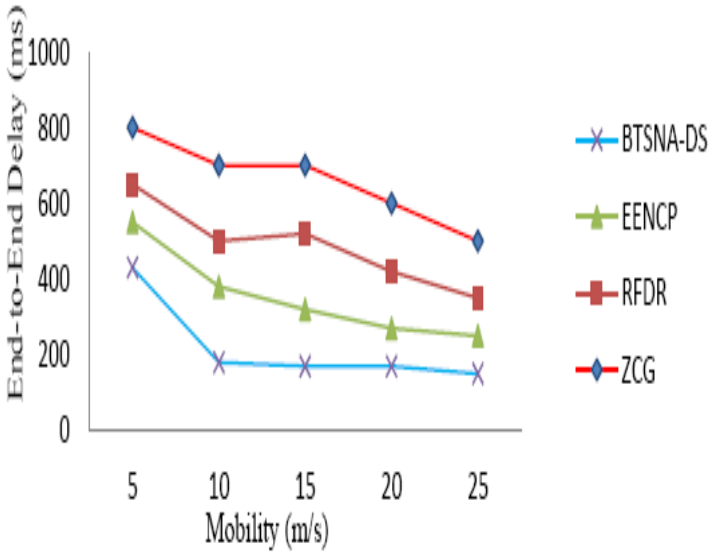



Figure 6. End-to-End Delay (ms) Vs. Mobility (m/s).

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 6 the proposed BTSNA-DS algorithm provides better performance compare to existing algorithm and also reduced end-to-end delay with mobility is increased.

**2. Routing Overhead:** Numbers of forwarded messages are generating as separate metrics.

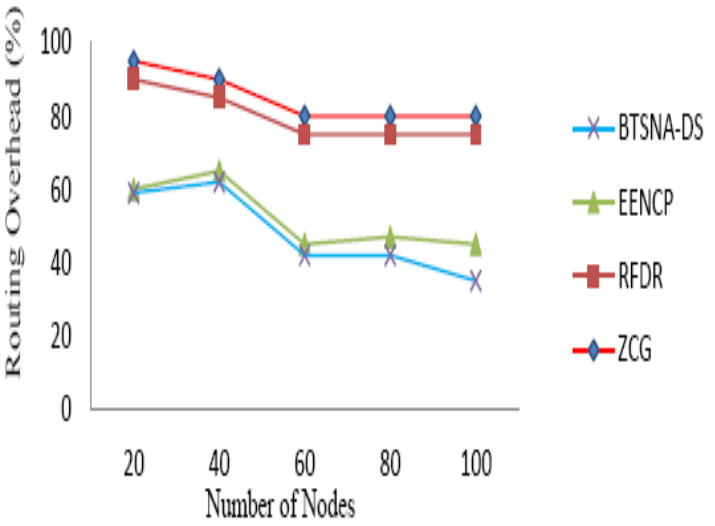



Figure 7. Routing Overhead Vs. Number of Nodes.

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 7 the proposed BTSNA-DS algorithm provides better performance compare to existing algorithm and also reduced routing overhead with number of node is increased.

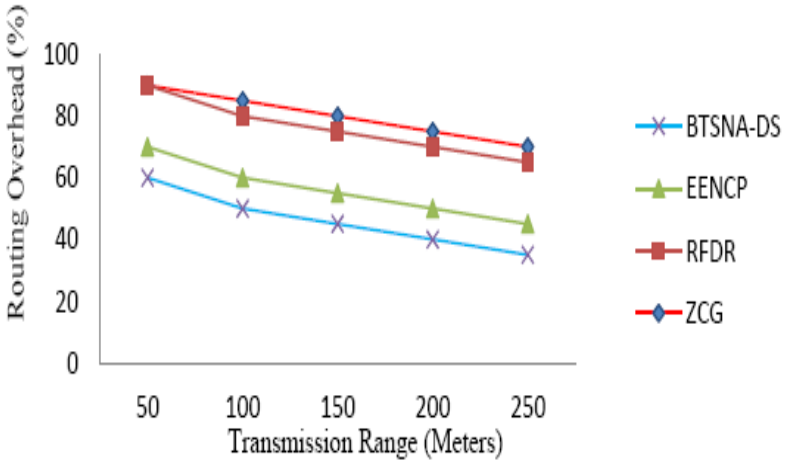



Figure 8. Routing Overhead Vs. Transmission Range (Meters).

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 8 the proposed BTSNA-DS algorithm provides better performance compare to existing algorithm and also reduced routing overhead with transmission range (meters) is increased.

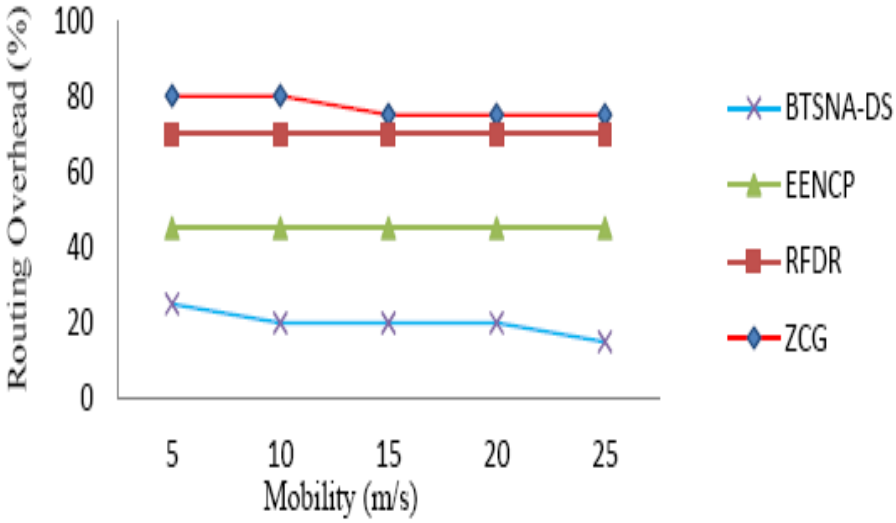



Figure 9. Routing Overhead Vs. Mobility (m/s).

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 9 the proposed BTSNA-DS algorithm provides better performance compare to existing algorithm and also reduced routing overhead with mobility (m/s) is increased.

**3. Transmission Power:** Total transmission powers are expensive at time interval t.

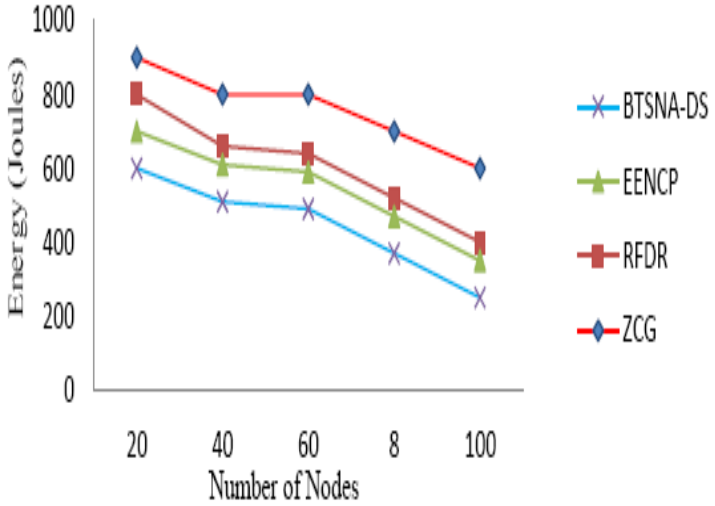



Figure 10. Energy (Joules) Vs. Number of Nodes.

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 10 the proposed BTSNA-DS algorithm provides better performance compare to existing algorithm and also reduced transmission power with number of node is increased.

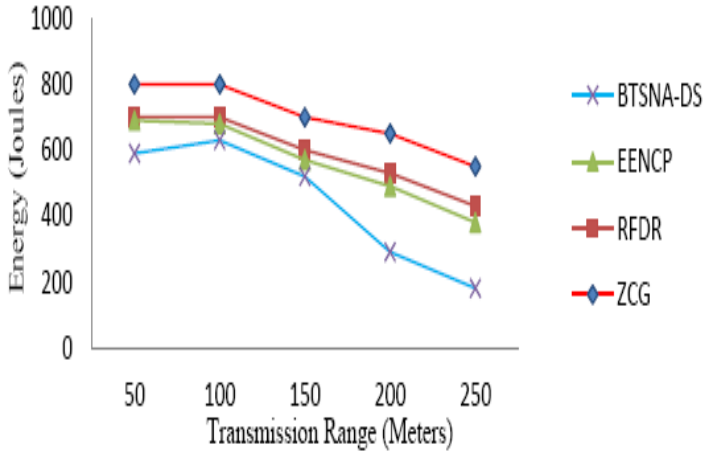



Figure 11. Energy (Joules) Vs. Transmission Range (Meters).

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 11 the proposed BTSNA-DS algorithm provides better performance compare to existing algorithm and also reduced transmission power with transmission range (meters) is increased.

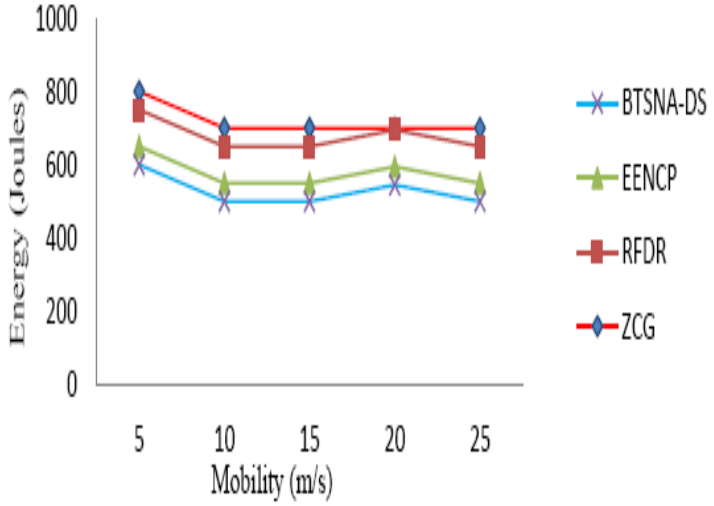



Figure 12. Energy (Joules) Vs. Mobility (m/s).

In this part performance analysis of proposed BTSNA-DS algorithm with existing Energy Efficient Neighbour Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR), and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG). In Fig. 12 the proposed BTSNA-DS algorithm provides better performance compare to existing algorithm and also reduced transmission power with mobility is increased.

## VI. CONCLUSION

Mobile Ad hoc Networks (MANETs) are considered as the most active research areas in the recent trends in communication networking. Mobile Adhoc Networks are the wireless infrastructure in which the nodes in the mobile ad-hoc networks do not have any fixed infrastructure and communication happens in the ad-hoc manner. The infrastructure less networks and mobile networks are energy constrained, but no limitation at the base station. A node accessing mechanism; each node in MANET is independent and acts as a router, so it is required to maximize the energy efficiency and lifetime of MANET. In this paper, proposed a new routing algorithm named Binary Tree Structured based Network Approach using Depth Search (BTSNA-DS) for restricted broadcast based energy efficient path between sender and receiver. Finally, proposed BTSNA-DS algorithms provide a better performance compare to existing Energy Efficient Neighbor Coverage Protocol (EENCP), Restricted flooding and directional routing (RFDR) Protocol, and Zone based Routing with Parallel Collision Guided Broadcasting Protocol (ZCG) and also reducing end-to-end delay, routing overhead, and transmission power with the number of nodes, transmission range, and mobility are increased.

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