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APPLICATION TYPE	ORDINARY APPLICATION
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APPLICANT NAME	1 . DR. MUNISHWAR RAI 2 . NIPPUN KAMBOJ
TITLE OF INVENTION	A SYSTEM FOR PERFORMANCE OF MODIFIED ENERGY AWARE AODV OVER TRADITIONAL AODV IN RESTRICTED ENVIRONMENT
FIELD OF INVENTION	COMMUNICATION
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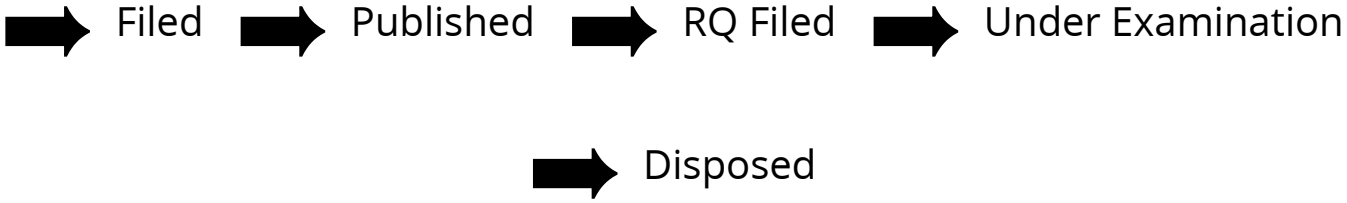

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FORM 2

THE PATENTS ACT 1970

(39 of 1970)

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THE PATENT RULES, 2003

COMPLETE SPECIFICATION

(See section 10 and rule 13)

1. TITLE OF THE INVENTION: - A SYSTEM FOR PERFORMANCE OF MODIFIED ENERGY AWARE AODV OVER TRADITIONAL AODV IN RESTRICTED ENVIRONMENT

2. Applicant(s)

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3. PREAMBLE OF THE DESCRIPTION

The following specification particularly describes the invention and the manner in which it is to be performed

FIELD OF INVENTION

This invention relates to a system for performance of modified energy aware AODV over traditional AODV in restricted environment.

BACKGROUND OF INVENTION

In recent years mobile ad hoc networks (MANET) become very popular and useful for communication. Mobile ad hoc network is a collection of mobile nodes which communicate to each other without any infrastructure and base station. In mobile ad-hoc network there is no central administration for managing mobile node & due to absence of any central administration nodes have to manage it. For communication nodes interact with each other until they remain in the radio range of each other, after some time energy of a node exhausted due to participation in the communication. When energy of a node becomes exhausted it becomes idle and fired out from the network topology. Therefore routing in MANET is a difficult task due to highly dynamic nature of network. In mobile ad-hoc network there are three types of routing protocols a) Proactive Routing Protocols b) Reactive Routing Protocols c) Hybrid Routing Protocols. E.g. Military Communication, Rescue Operation. One of the widely used reactive protocol AODV is used in this research paper for data communication.

CA 2728007 SRD INNOVATIONS INC; MURIAS, RONALD G; discloses a method of improving signal quality in an ad hoc on-demand distance vector (AODV) mesh network, comprising detecting at a node the signal quality of a received AODV protocol message, comparing the signal quality of the received AODV protocol message to a threshold; and on detecting that the signal quality of the received AODV message is not above the threshold, dropping the received AODV message. Further, a method of improving AODV mesh operation by detecting at a node the signal quality of the RREQ messages received at that node; and dropping any RREQ messages for which the signal quality is not above a threshold.

CN 101267401 BEIJING JIAOTONG UNIVERSITY; Li Xu; discloses mixed topologic control method improving route protocol performance and system integral performance combines with AODV protocol. The technical solution is that method comprises an area division, a topologic control in an area and a topologic control among areas, characterized in that further comprises steps of improving AODV route protocol; adding two control messages POSITION and POWER in the AODV route protocol, respectively to send the

topologic information to a central node by a node in the area and to send the power configuration information to each corresponding node by the central node, adding corresponding message sending and receiving function as well as a timer to carry out the topologic control; on another hand, mending a Hello message format and process flow of AODV and solving single way channel problem that could occur after topologic control and carrying out distributing control.

US 20070053309 TEXAS INSTRUMENTS INCORPORATED; POOJARY NEERAJ; discloses a mesh point operable in a decentralized wireless network is provided. The mesh point includes a transceiver and a processor. The transceiver is operable to communicate with other mesh points. The processor is programmed to execute a routing protocol such that, when a first policy of the routing protocol is selected and a transmission failure occurs between the mesh point and a current parent node of the mesh point, the processor is operable to execute instructions to promote finding another route to a root. The other route to the root is found by referencing a topology, if the topology is available, to identify the route to the root. If the route is not found, the transceiver transmits a one-hop broadcast route request. If the route is still not found, the mesh point enters a route discovery state.

KR 1020100059163 SAMSUNG ELECTRONICS CO., LTD; KIM, BYOUNG CHUL; discloses a packet transfer device and method are provided to obtain safe routing information by sensing fake routing information of malicious node. CONSTITUTION: A routing request message is transmitted to neighboring nodes, and a routing response message is received from adjacent nodes. Among the received routing response messages, the firstly received routing response message is selected. The first message is transmitted to adjacent nodes transmitting the selected routing response messages. The first message comprises at least the one of a different sequence number and identical sequence numbers which directs to create a random number similar to a destination node to the different sequence number. COPYRIGHT KIPO 2010

None of the prior art indicate above either alone or in combination with one another disclose what the present invention has disclosed. This invention relates to a system for performance of modified energy aware AODV over traditional AODV in restricted environment.

SUMMARY OF INVENTION

Ad-hoc on demand distance vector routing (AODV)[4][5][6]**:** AODV is the most usable reactive routing protocol of Mobile Ad-hoc Network. In AODV, when a source node initiates to transfer data to target node it does not know the final route from source to target node in press forward then source node send a route request packets (RREQ) all over the network. In turn intermediate node forwards data packet to their neighbor node until packet reaches target node. If the duplicate RREQ is received by any node, equivalent packet is discarded. After RREQ, if there exist a suitable route from source to target then a route reply (RREP) packet are sent to source node. In another case i.e. no valid path found between source and target a route error (RERR) packet is sent to source node.

Performance Parameters[7][1][5]**:**

1. **Average End to End Delay**[8]

   An average time duration between the making and successful transmission of data packets for all mobile nodes in the network is known as End to End delay. Discarded data packets or lost are not included in the computation of this End to End Delay metric. Network traffic influences a lot on average delay because higher the traffic or overhead higher the delay. Hence network overhead is directly proportional to delay.

2. **Throughput**[9]

   The successful transmission rate in a network is termed as throughput of network, and is generally stated as the amount of data packets effectively transmitted to their final destination per unit of time. Throughput of the network is measure aspect and difficult to achieve maximum throughput. Because there are some parameters which degrade network throughput like network overhead, mobility of nodes etc.

3. **Packet Delivery Ratio**

   The ratio of the data packets received by the destination to those generated by the source is termed as Packet Delivery Datio.

4. **Pause Time**[10]

   In MANET the time duration for which a mobile node holds the identical positions at waypoints is known pause time of a node. Hence if the pause time is high it will give

better throughput for network, this is because off nodes resides at the similar position leads high to less routing process & nodes conserve a lesser amount of energy.

BRIEF DESCRIPTION OF DRAWINGS:

Fig 1 and 2: Graph 1 & graph2 depicts the analysis of AODV routing protocol for MANET on the basis of various pause time and constant speed.

Fig 3 and 4: Graph 3 & graph 4 depicts the analysis of AODV routing protocol for MANET on the basis of various speed and constant pause time.

Fig 5 and 6: Graph 5 & graph 6 depicts the analysis of AODV routing protocol (for 50 Nodes) for MANET on the basis of various pause time and constant speed.

Fig 7 and 8: Graph 7 & graph 8 depicts the analysis of AODV routing protocol **(for 50 Nodes)** for MANET on the basis of various speed and constant pause time.

DETAILED DESCRIPTION OF INVENTION

In first step all tcl script is created. After that the tcl script is given to the network simulator as input value that executes the given tcl script and generate trace & NAM file. After calculating PDR, Throughput and Delay graphs have been generated for the proposed scenario. Simulation setup parameters are given in table 1.

Simulation Setup Parameters:[11][12]

Simulation Parameter	**Parameter Value**
Simulator	NS-2.34
Channel	Wireless
MAC Type 802.11	MAC Type 802.11
Antenna Type	Omni Radio Propagation Two Ray Ground
Interface Queue Type	Drop Tail PriQueue (AODV) CMUPriqueue (DSR)
Simulation Area	670m X 670m (for 20 nodes) 1000m X 1000m (for 50 nodes)
No. of Nodes	20/50
Pause Time (Sec)	100/200/300/400/500
Routing Protocol	AODV

Connection Type	TCP
Performance Metrics	PDR, Throughput, Delay
Speed (msec)	1/2/3/5/7/10

Table1.

Experimental Results: Here in this section experimental results of AODV are discussed. PDR and Throughput are calculated for different pause time and speed. After the above said work the results are analyzed.

(Results of 20 Nodes)

Graph 1 & graph2 depicts the analysis of AODV routing protocol for MANET on the basis of various pause time and constant speed. In this graph PDR & Throughput is calculated for various pause time. There are three PDR parameters in graph 1 i.e. PDR-N, PDR-EL & PDR-M. PDR-N shows the PDR of original AODV, PDR-EL shows the PDR of original AODV with energy model & PDR-M depicts the modified or enhanced version of original AODV with energy model & in graph 2 three parameter matrices are discussed i.e. Throughput-N, Throughput-EL & Throughput-M. Throughput-N shows the throughput of original AODV, throughput-EL shows the throughput of original AODV with energy model & throughput-M depicts the modified or enhanced version of original AODV with energy model.. It is clear from the graph that PDR-N is always better than PDR-EL & PDR-M. When an energy model is added to original AODV then the PDR(PDR-EL) as well as Throughput (Throughput-EL) decreases. PDR-M gives the modified version of AODV which gives the higher PDR rate than PDR-EL and Throughput-M gives the modified throughput of AODV. So is clear from the graph1 & graph 2 that the modified algorithm for AODV gives the better PDR (PDR-M) as well as Throughput (Throughput-M) than original AODV with energy model It is concluded that modified algorithm is better than old one in case of PDR & Throughput.

Graph 3 & graph 4 depicts the analysis of AODV routing protocol for MANET on the basis of various speed and constant pause time. It is clear from the graph that PDR-N is always better than PDR-EL & PDR-M. When an energy model is added to original AODV then the PDR(PDR-EL) as well as Throughput (Throughput-EL) decreases. PDR-M gives the

modified version of AODV which gives the higher PDR rate than PDR-EL and Throughput-M gives the modified throughput of AODV. So is clear from the graph 3 & graph 4 that the modified algorithm for AODV gives the better PDR (PDR-M) as well as Throughput (Throughput-M) than original AODV with energy model. From the study of above said graphs we conclude that the new algorithm is much better than older one.

(Results of 50 Nodes)

Graph 5 & graph 6 depicts the analysis of AODV routing protocol **(for 50 Nodes)** for MANET on the basis of various pause time and constant speed. It is clear from the graph that PDR-N is always better than PDR-EL & PDR-M. When an energy model is added to original AODV then the PDR(PDR-EL) as well as Throughput (Throughput-EL) decreases. PDR-M gives the modified version of AODV which gives the higher PDR rate than PDR-EL and Throughput-M gives the modified throughput of AODV. So is clear from the graph 5 & graph 6 that the modified algorithm for AODV gives the better PDR (PDR-M) as well as Throughput (Throughput-M) than original AODV with energy model. From the study of above said graphs we conclude that the new algorithm is much better than older one for 50 nodes.

Graph 7 & graph 8 depicts the analysis of AODV routing protocol **(for 50 Nodes)** for MANET on the basis of various speed and constant pause time. It is clear from the graph that PDR-N is always better than PDR-EL & PDR-M. When an energy model is added to original AODV then the PDR(PDR-EL) as well as Throughput (Throughput-EL) decreases. PDR-M gives the modified version of AODV which gives the higher PDR rate than PDR-EL and Throughput-M gives the modified throughput of AODV. So is clear from the graph 7 & graph 8 that the modified algorithm for AODV gives the better PDR (PDR-M) as well as Throughput (Throughput-M) than original AODV with energy model. From the study of above said graphs we conclude that the new algorithm is much better than older one for 50 nodes.

After the analysis of the above graphs we can say that our modified algorithm is much better than traditional algorithm for AODV.

Conclusion: In this present invenion, we develop a new algorithm for AODV which is more efficient than traditional AODV. In this paper we added an energy constraint in original

AODV and calculated PDR & throughput using network simulator. After that we compare these matrices with PDR & throughput of original AODV. And this study gives that modified algorithm outperforms original AODV protocol. In future more work will be performing on modified algorithm for making it more efficient.

We Claim:

1. **A** system for performance of modified energy aware AODV over traditional AODV in restricted environment comprises

Simulation Parameter	**Parameter Value**
Simulator	NS-2.34
Channel	Wireless
MAC Type 802.11	MAC Type 802.11
Antenna Type	Omni Radio Propagation Two Ray Ground
Interface Queue Type	Drop Tail PriQueue (AODV) CMUPriqueue (DSR)
Simulation Area	670m X 670m (for 20 nodes) 1000m X 1000m (for 50 nodes)
No. of Nodes	20/50
Pause Time (Sec)	100/200/300/400/500
Routing Protocol	AODV
Connection Type	TCP
Performance Metrics	PDR, Throughput, Delay
Speed (msec)	1/2/3/5/7/10

2. The system as claimed in claim 1, wherein in AODV, when a source node initiates to transfer data to target node it does not know the final route from source to target node in press forward then source node send a route request packets (RREQ) all over the network.

3. The system as claimed in claim 1, wherein **i**n turn intermediate node forwards data packet to their neighbor node until packet reaches target node.

4. The system as claimed in claim 1, wherein **i**f the duplicate RREQ is received by any node, equivalent packet is discarded.

5. The system as claimed in claim 1, wherein **a**fter RREQ, if there exist a suitable route from source to target then a route reply (RREP) packet are sent to source node.

Dated this 13th day of September, 2018

(Ashish Sharma)
Authorized Agent for the Applicant
Indian Patent Agent Regn No. IN/PA-3021

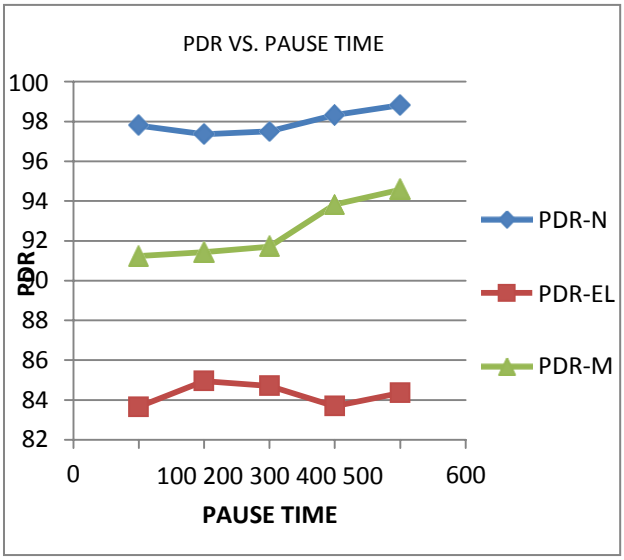

Fig. 1 Graph 1

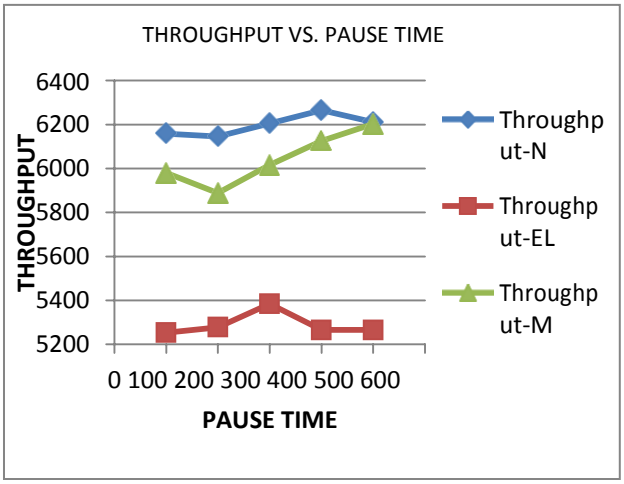

Fig. 2 Graph 2

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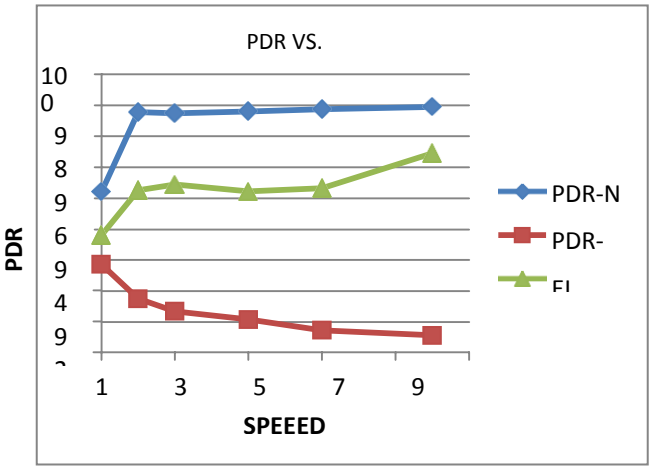

Fig. 3 Graph 3

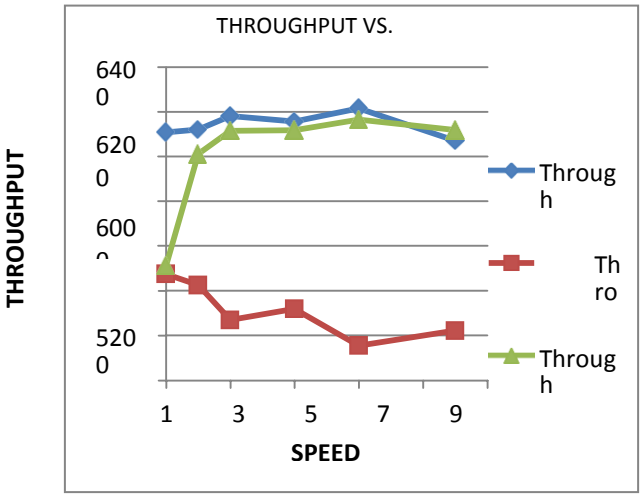

Fig. 4 Graph 4

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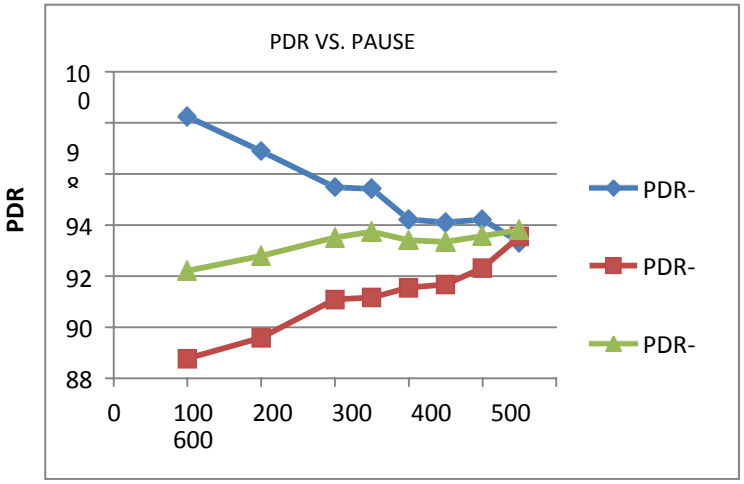

Fig. 5 Graph 5

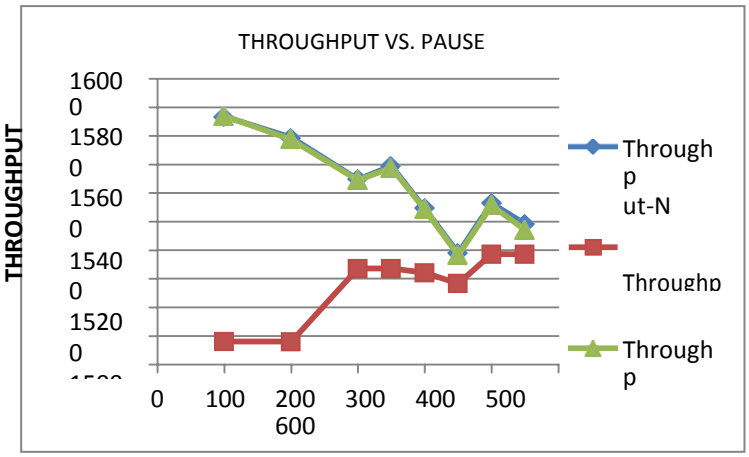

Fig. 6 Graph 6

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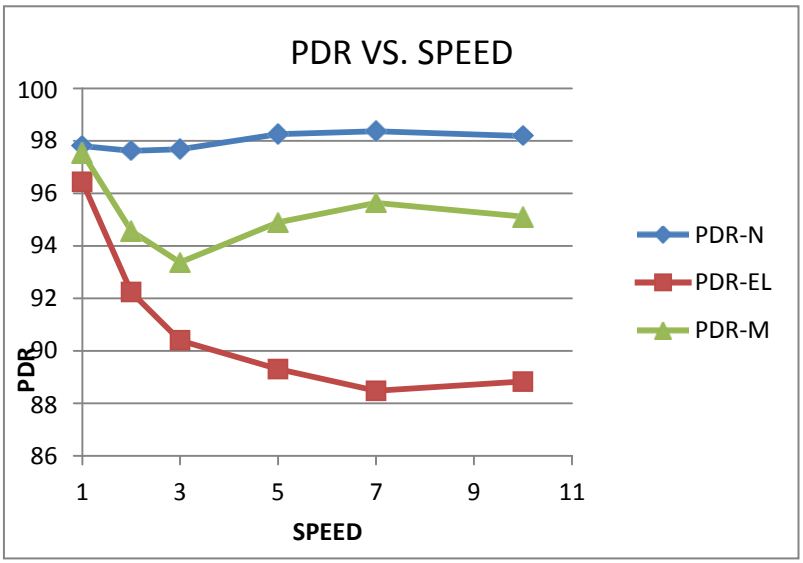

Fig. 7 Graph 7

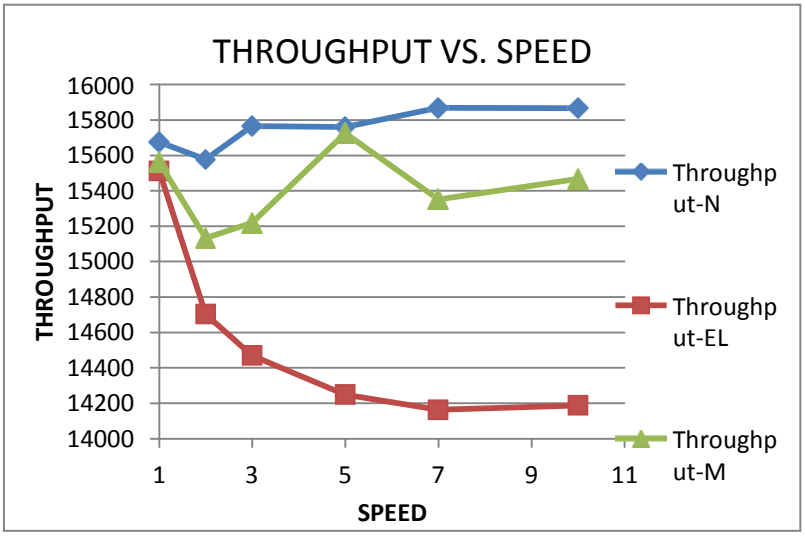

Fig. 8 Graph 8

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ABSTRACT

A SYSTEM FOR PERFORMANCE OF MODIFIED ENERGY AWARE AODV OVER TRADITIONAL AODV IN RESTRICTED ENVIRONMENT

From a couple of decades Mobile Ad-hoc Network (MANET) becomes a very powerful & useful source for data communication in computer networks. MANET is a combination of mobile nodes that communicates to each other until they remain in their radio range of each other. MANET is a self-organized network without any infrastructure[1]. Participating nodes requires energy for communication, after energy exhaustion a node become idle and it can't participate in the communication. Due to energy problem stability of the network becomes very slow[2]. Energy conservation for different routing protocols is an important challenge for MANET future[3]. In few last year's different routing protocols have been discussed for mobile ad-hoc network. In this paper, we discussed AODV routing protocol which is used for data communication. In this paper a new algorithm is designed i.e. modified AODV with energy constraint. This paper also gives the comparative study of original AODV and modified AODV. In this research paper, we develop a new algorithm for AODV which is more efficient than traditional AODV. In this paper we added an energy constraint in original AODV and calculated PDR & throughput using network simulator. After that we compare these matrices with PDR & throughput of original AODV. And this study gives that modified algorithm outperforms original AODV protocol. In future more work will be performing on modified algorithm for making it more efficient.