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Performance analysis of AODV and DSDV Routing Protocol of Wireless Sensor Network: A REVIEW

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ABSTRACT

Wireless Sensor Network is collection of ad-hoc network and many number of mobility sensor nodes. Wireless Sensor Network has numbers of sensing nodes which is provides facility like communication, computation and sensing capability. Recently WSN highly growing technology and it is provides many large area of Research. Routing is one of the areas for research in WSN. The main classes of routing algorithm are Proactive and Reactive Routing algorithm for routing in WSN for packet transmission of sense data. We have proposed to study AODV (Ad-hoc On-demand Distance Vector) and DSDV (Destination-Sequenced Distance Vector) for sensor network which is one type of reactive and proactive routing protocol respectively. The main intention of this Review paper is study performance and evaluation of AODV and DSDV Routing Protocol in WSN.

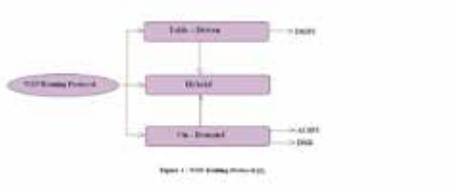
INTRODUCTION:

Wireless Sensor Networks have become very significant roles in wireless communication system. WSN is type of Wireless network which is unstructured means it is a collection of sensor nodes and these establish in ad-hoc manner into a region and there are no need of attention and it performs monitoring and reporting functions. There is also not need of infrastructure [1]. A wireless network containing of many small devices nodes which is used to senses and monitor physical or environmental conditions such as pressure, temperature, moisture and motion etc, when placed at different areas.[2]. The main characteristic of the wireless sensor network are limited energy, dynamic network topology, lower power, node failure and mobility of the nodes, short-range broadcast communication and multi-hop routing and large scale of deployment. Routing is one of the challenging issues in the wireless sensor network. Different kind of routing protocols are use in WSN for routing packets. This paper compares and performance evaluation of two different routing protocols AODV and DSDV.AODV is reactive and DSDV is proactive routing protocol respectively which is category of routing protocol in WSN. The primary goal of this study is to analyze the performance of the routing protocols in Wireless Sensor Networks. The ease of design, implementation and to get the better understanding on how these protocols perform under particular condition is reason behind the study.

Classification of Routing Protocol in WSN:

In Wireless Sensor Network routing protocols can be classified in a two major categories [2].

1. Proactive Routing Protocols.
2. Reactive Routing Protocols.



Proactive Routing Protocols:

Proactive routing protocol is known as a "table-driven" routing protocol. Proactive routing protocols work to carry on routing information to all nodes in the network every time up-to-date .The updated tables is frequently transmitted throughout the network and maintain routing table consistently. Advantage of proactive routing protocol is the routes instantly available when it is wanted. DSDV, Fisheye State Routing (FSR), Fuzzy Sighted Link State (FSLS), Optimized Link State Routing (OLSR) are example of this type of routing protocols [3].

Reactive Routing Protocols:

Reactive routing protocol is known as an "on demand" routing protocol. In reactive routing protocols, the routes are created as when required. When a source wants to send to a destination, it invokes the route discovery mechanism to find the path to the destination. This process is completed when once a source is found or all possible route permutation has been examined. Once a route has been discovered and established, it is maintained by some form of route maintenance procedure until either the destination becomes inaccessible along every path from the source or route is no longer desired [3].

1.AODV and DSDV:

Ad-hoc On-demand Distance Vector (AODV) is routing protocol which most trendy form of reactive protocols in WSN. AODV is use traditional routing tables which contain one entry of destination and destination sequence numbers. It is used to determine whether routing information is up-to-date and also used to prevent routing loops. Generally AODV protocol performs two phase. One is discovery of destination nodes and another maintains connectivity of nodes. Destination-Sequenced Distance Vector (DSDV) is one of the types of proactive routing algorithm. The main objective of DSDV is to maintain a routing table which is contains information of all destination nodes, the shortest distance between source to destination node, no. of nodes to reach the destination and destination sequence number (DSN). Advantage of DSDV is to prevent routing loop and counting to infinity. It is uses periodic updates. [2].

Many researchers have implemented, analyzed and compared the AODV and DSDV routing protocol and got some interesting result to improve routing process in sensor network. The main objectives of this paper are to study and scrutinize performance of AODV and DSDV Routing protocols.

REVIEW:

Fasee Ullah et al (2010) in this paper the effect to AODV and DSDV routing protocol is examined in Adynamic WSNs with different simulation parameter with help of NS2.He was study delay and packet loss. The parameter which used to experiment is shows in below table-1.

Parameter	Value
Simulation time	60 Seconds
Routing Protocol	AODV & DSDV
Propagation Model	Two Ray Ground
Mac Type	802.11
Link Layer Type	LL
Interface Type	Queue/ Droptail / Priq
Number of Nodes	3
Traffic Type	CBR
Packet Size	512 Bytes
Time Interval	0.1s ,0.2s ,0.3s
Area	500m2

Table-1: simulation parameters for both experiments

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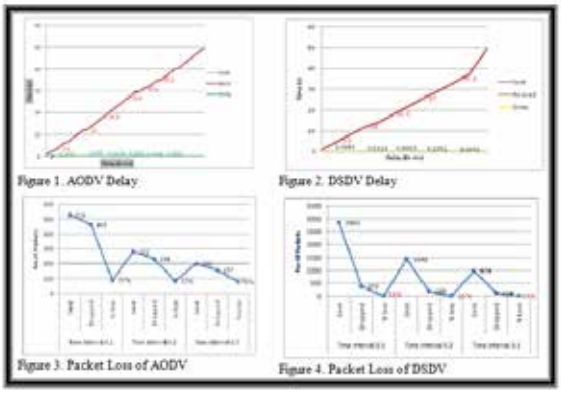
In this experiment, the below fig-1, 2 indicate the delay of AODV and DSDV with respect to time(s). It is shows that DSDV marked higher delay and poor performance than AODV. And in fig-3, 4 for packet loss of AODV and DSDV, it display that AODV has less packet loss compare DSDV.



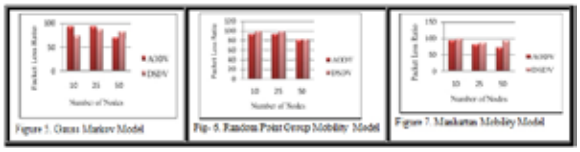
With the comparisons of the both protocol researchers conclude that AODV is much better than DSDV in terms of delay and packet loss [4].

R.Alagu Pushpa et al (2011) were evaluated in his paper different kind of mobility model of WSN like Random way point, Manhattan, Gauss Markov implemented with AODV and DSDV and examine packet loss ratio. He had taken some different simulation parameter for mobility model of WSN which can be shows as below table-2.

Parameter	Unit	Value
Terrain size	meter	1000 * 1000
Simulation Time	Seconds	10
Velocity	m/s_2	100
Hop count	-	< 25 and > 25
Throughput	Bits/second	-

TABLE-2: SIMULATION PARAMETERS

In fig-10 indicate that packet loss ratio of nodes in Gauss Markov Model with AODV and DSDV protocol. It clearly shows that AODV is much better than in terms of packet loss compare to DODV in this mobility model for more number of nodes.Fig-11 compares packet loss ratio of AODV and DSDV in Random Point Group Mobility model. It clearly shows that AODV perform much better than DSDV. Fig-12 is display packet loss ratio of nodes in Manhattan Mobility Model. This fig. also clarify that AODV is better that DSDV in packet loss ratio performances



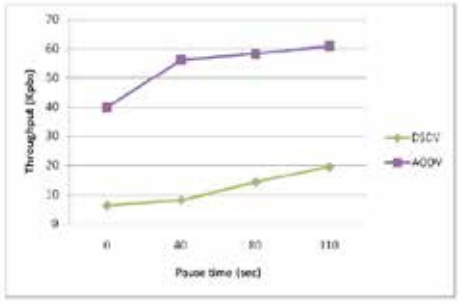
The Simulation result shows that AODV gives better performance in packet loss ratio than DSDV in different mobility model of WSN. Conclusion is that AODV is much suitable routing protool for different mobility model in Wireless sensor network [5].

Adel.S.El ashheb (2012) in his experiments he was taken different simulation parameter to examine performance of AODV and DSDV routing protocol in WSN environment. With the help of the NS2 simulator programming, he evaluated packet delivery fraction, end-to-end delay and average throughput. He had done two experiments for above routing protocol with the some different simulation parameter for both experiments which are show in following table-3.

SIMULATION PARAMETERS		
Experiment	One	Two
Examined Protocols	DSDV&AODV	DSDV&AODV
Channel Type	Wireless Channel	Wireless Channel
Simulation Area (m x m)	500x500	500x500
Simulation time	150 sec	150 sec
Number of nodes	100	100
(number of nodes/ number of connections)	10	10
Mobility (m/s)	2	2
Node movement mode	Random waypoint	Random waypoint
Initial energy	5 J	5 J
Transmitting Power	0.5 mw	0.5 mw
Receiving Power	0.25 mw	0.25 mw
Node pause time	0,40, 80,110(sec)	2 (sec)
Traffic Type	CBR	CBR
Packet size (bytes)	50	50
Performance Parameters	Throughput, PDF, E-E delay	Throughput

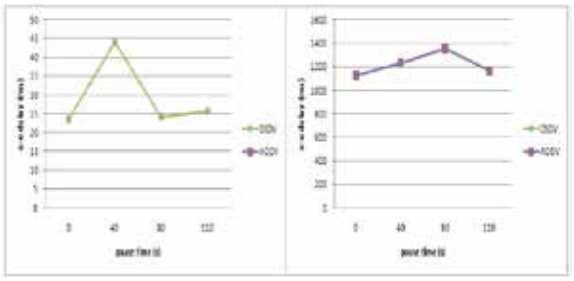
Table3: simulation parameters for both experiments

In Experiment-1, For varying pause time and keeping the number of nodes (100), area size of the simulation 500mx500m, speed (2 m/s) and simulation time (150 sec). When the chosen pause time is 0 sec, it means that the nodes are in continuous motion and do not stop. On the contrary, if the pause time is 150 sec, this indicates there is no node mobility since the total simulation time is also 150 sec. So these varying pause times affect the average speed of the mobile nodes.



Figurer 8: The throughput in DSDV and AODV protocols in experiment one with the pause time 0, 40, 80 and 110

The simulation results in figure 8, shows that the throughput performance of AODV is better than the DSDV. Throughput increases in both protocols with increasing pause time, but it is increased more dramatically in AODV protocol.



Figurer 9: Average E-E delay in for both DSDV and AODV in experiment three with the pause time 0, 40, 80and 110 sec The simulation results in figure 9, for e-e delay with pause time shows that DSDV perform much better that AODV in terms of time delay. From fig-10 we can show the packet delivery frac-

tion (PDF) in AODV with different pause time is very much better when compared with DSDV in all scenarios. The reason for the better packet delivery fraction in AODV over DSDV is that AODV protocol tries to guarantee that the packets will be delivered to the destination by delay compromising.

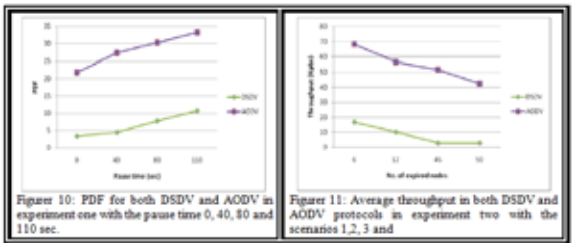


Figure 10: PDF for both DSDV and AODV in experiment one with the pause time 0, 40, 80 and 110 sec.

Figure 11: Average throughput in both DSDV and AODV protocols in experiment two with the scenarios 1,2, 3 and

Through the simulation results that AODV performed much better in terms of throughput and packet delivery fraction than DSDV [6].

Sengar Abhishek et al (2012) were evaluating in his paper both the AODV and DSDV routing protocol in ad-hoc network environment. He studied packet delivery ratio, throughput and routing overhead for different simulation parameter with the help of ns-2.

The parameter is shows in given table.

Channel	Channel/Wireless Channel
Propagation	Propagation/Two ray ground
Network interface	Phy/WirelessPhy
NS version	NS-allinone-2.31
MAC	Mac/802_11
CBR Packet Size	512 bytes
Interface Queue	Queue/Droptail/PriQueue
Link layer	LL
Antenna	Antenna/Omni Antenna
Interface Queue Length	50
No. of nodes	12 (6-senders, 6-eceivers)
Simulation area size	700*600
Simulation duration	60 second
Routing protocols	AODV, DSDV
Performance Metrics	Throughput, Packet Delivery Ratio, Routing Overhead

Table4: simulation parameters for both experiments

Fig – 12 and 13 is display the throughput of both protocols AODV and DSDV with respect to time. On the base of graph, it is evaluated that AODV is better than DSDV in terms of throughput.

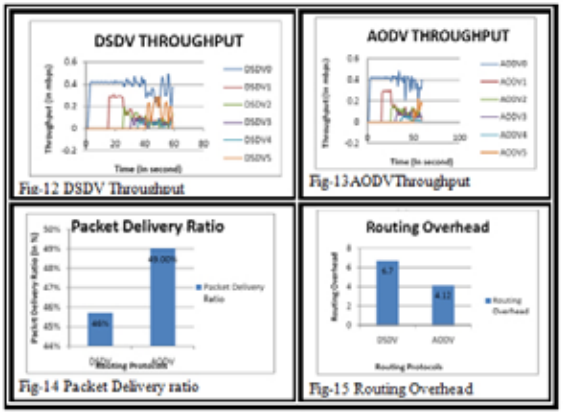


Fig-12 DSDV Throughput

Fig-13 AODV Throughput

Fig-14 Packet Delivery ratio

Fig-15 Routing Overhead

Fig – 14 shows packet delivery ratio of both protocols. It is observed that the DSDV is less packet delivery ratio and AODV is more packet delivery ratio. Fig- 15 shows routing overhead of both protocols. According to routing overhead chart DSDV protocol is maximum routing overhead and AODV protocol is minimum routing overhead [3].

CONCLUDING REMARKS:

In this paper, the performance analysis of AODV and DSDV is done in specific criteria. The simulation result obtain that AODV is better than DSDV in terms of packet delivery ratio, routing Overhead and throughput and end-to-end packet delivery.

SCOPE OF WORK:

From the above review it is concluded that the AODV protocol is better option for routing in WSN. The main goal of this work is to be finding the best suitable routing protocol for WSN. Scope of our work is to implement, scrutinize and compare both AODV and DSDV with different simulation parameter.

REFERENCE

[1] Kiran Maraiya et al, "Application based Study on Wireless Sensor Network" , International Journal of Computer | Applications (0975 – 8887) Volume 21– No.8, May 2011 | | [2] Poulomi Goswami, Dr.A.D.Jadhav, "Evaluating the performance of Routing Protocol in Wireless Sensor Network", | International Journal of Computer Technology and Electronics Engineering (IJCTEE) Volume 2, Issue 3, June 2012 | | [3] Sengar Abhishek, "Performance Evaluation of AODV and DSDV Routing protocols for Ad-hoc Networks", Research | Journal of Engineering Sciences, Vol. 1(6), 51-55, December (2012) | | | [4] Fasee Ullah et al, "Simulating AODV and DSDV For Adynamic Wireless Sensor Networks", IJCSNS International Journal | of Computer Science and Network Security, VOL.10 No.7, July 2010 | | [5] R.Alagu Pushpa et al, "Impact of Mobility models on Mobile Sensor Networks", International Journal of Communication | Network & Security, Volume-1, Issue-1, 2011 | | | [6] Adel.S.El ashheb, "Performance Evaluation of AODV and DSDV Routing Protocol in wireless sensor network | Envirnment", 2012 International Conference on Computer Networks and Communication Systems (CNCS 2012) | IPCSIT vol.35(2012) © (2012) IACSIT Press, Singapore |