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An Implementation of Speed aware and Energy aware routing under Wireless sensor network

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ABSTRACT: *Wireless Sensor Networks (WSNs) are currently used in many application areas including military applications, healthiness related applications, control and tracking applications and atmosphere and locale monitoring applications.How to use Energy saving and QoS of the network. However, sensor nodes represent a major drawback mainly in terms of energy autonomy and therefore of life period, for the batteries have to be too little power. This is the reason why demanding research is being conducted nowadays on how to control sensor energy consumption within a network. For this purpose we use our approach to design energy saving methodology and calculate energy consumption within wireless sensor network for each node wireless sensor networks, according to the packet data rate (PDR), and throughput.PDR is the proportion to the total amount of packets reached the receiver and amount of packet sent by source the quantity of nodes and the distance between them. Sensor networks are constructed to handle the sensing data and transmission process. Sensor networks are constructed with the set of sensor devices. Sensor devices send the data to other nodes. In this network I am calculate throughput on the node. Throughput is the ratio of the total amount of data that a receiver receives from a sender to a time it takes for receiver to get the last packet. A low delay in the network translates into higher throughput.*

In addition, I have succeeded on energy saving management processes in network and reducing energy consumption within sensor networks using different node energy with calculates packet data rates, throughput using aodv routing protocol.

Keywords- *Wireless sensor network (WSN), Structure wsn network, Residual Energy, Packet Data Fraction (PDF), AODV, Throughput.*

1. Introduction:

Wireless sensor network is composed of a large number of small, low power sensor nodes that are deployed in a wide area with very low powered sensor nodes. The wireless sensor networks can be used with in a various meaningful information, limited memory, and computation and telecommunication application. The sensor node are very small devices with wireless communication capability .which can collect information about sound, light, motion, temperature etc and processed different sensed information and transfers it to the other nodes or Base Station(BS). Base Station is work as a gateway from sensor network to the other network. The Base station is very large storage and large data process in capabilities. It passes the data it receives from sensor nodes to the server from where end-user can arrange them. Wireless sensor networks consist of different types of sensor such as seismic, thermal, visual and infrared. Sensor is monitoring, pressure and characteristics of objects and their movement. The Sensor networks are fault-tolerant because two or more than two node is sensing the same event. Further, the node cooperates and collaborates on their data, which ideas to accurate sensing of events are sensor network are Data dissemination and other is Data gathering.

Characteristics of wireless sensor network are as follows:

- Self-configuration, Self-healing, Self-optimization, and Self-preservation capabilities
- Limited broadcast communication and multi-hop routing

- Dense deployment and helpful effort of sensor nodes
- Frequently changing topology due to fading and node failures
- Severe limitations in energy capacity, computing power, memory, and transmit power.

2. Wireless Sensor Node Architecture

The basic block diagram of a wireless sensor node is presented in Figure 1.2. It is made up four basic components: a sensing unit, a processing unit, a transceiver unit and a power unit.

There can be application dependent additional components such as a location finding system, a power generator and a mobilize. A MICAZ mote is shown in Figure 1.2.

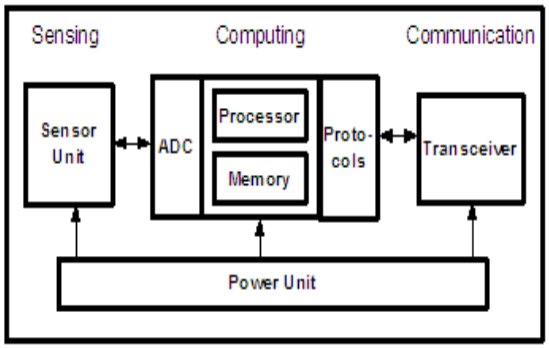


Fig. Architecture of a Wireless Sensor Node

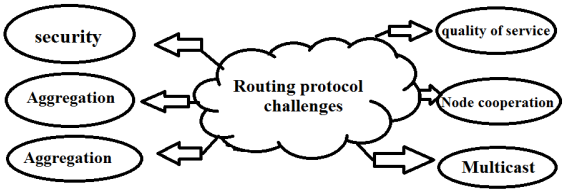
ROUTING: In networks, does routing mean selecting best path? The term "Routing" has been used traditionally to indicate forwarding of network traffic between networks. This process of routing is done for several types of networks, including, the telephone network (circuit switching), electronic data networks and transportation networks. In packet switching networks, routing forwards packets over intermediate nodes. Intermediate nodes may include routers, bridges, gateways, firewalls or switches, these are network hardware devices. The process of routing maintains a routing table record to several network destinations. Therefore, constructing routing tables is very important for efficient routing.

REACTIVE PROTOCOLS – AODV In on-demand driven routing, routes are discovered only when a source node desires them. Routing has two main techniques: route discovery and route maintenance. The route discovery is the process of sending route request packet from a source to its neighbour nodes, which then forward the request to their neighbours, and so on. After the route request packet reaches the destination node, it reply's by a reply packet through the neighbour from which it first receive the request packet, and this reply is in the same way propagated to the source node. Also when the route-request reaches an intermediate node that has sufficiently up-to-date route information, it stops forwarding and sends a route-reply message back to the source.

PROACTIVE PROTOCOLS – OLSR: With table-driven routing protocols, each node challenges to maintain reliable, up-to-date routing information to all further nodes in the network. This is finished in answer to changes in the network by consuming each node update its routing table and broadcast the updates to its adjacent nodes. Thus, it is proactive in the logic that when a packet wants to be progressed the route is already known and can be nearly used. Many routing protocols with Destination-Sequenced Distance Vector (DSDV) and Fisheye State Routing (FSR) protocol fit to this grouping, and they differ in the number of routing tables operated and the systems used to interchange and maintain routing tables. [1]

OLSR defines three basic types of control messages:

- HELLO - HELLO messages are transferred to all neighbours. These messages are used for neighbour detecting and MPR calculation.
- TC - Topology Control messages are the link state indicating finished by OLSR. This messaging is enhanced in several methods using MPRs.



- MID – Multiple Interface Declaration messages are transferred by nodes successively OLSR on more than one interface. These messages lists all IP addresses used by a node. [1]

3. Motivation

When Wireless Sensor Networks are deployed mainly for military and health applications, there is a high need of secure communication among sensor nodes. There are different techniques to secure network data transmissions, but due to power constraints of WSN, group key based mechanism [11] is the most preferred one.

When we are working on identification of the project topic in the field of wireless sensor network in energy consumption, we found that much works have been already done. But when we review the research papers and journals on the topic of wsn in energy consumption. Problem we can see that many networks for energy consumption are used only routing protocol and minimum work has based architecture of wsn related to energy, packet data fraction and throughput.

Hence to implement scalable energy efficient secure group communication, the best approach would be hierarchical based like Clustering. The unique properties mentioned above become challenges to set up a sensor network. The key challenge in setting up and proper operation of WSN is increase the lifetime of the network by minimizing the energy consumption. Since from last few years' variety of changes have been made to limit the energy requirement in WSN, as mainly energy dissipation is more for wireless transmission and reception.

4. Overview of The Modified AODV

In this work, we make some assumptions and establish the network model of MAODV. We also argue why we focus our security solution on routing protocol in the network layer.

Static nodes in WSNs often communicate with one another through an error-prone, bandwidth-limited, and insecure wireless channel. We do not concern the security problem introduced by the instability of physical layer or link layer. We only assume that: (1) Each node in the network has the ability to recover all of its neighbors; (2) Each node in the network can broadcast some essential messages to its neighbors with high reliability; (3) Each node in the network possesses a unique ID, the physical network interface address for example, that can be distinguished from others.

In the MAODV, we also assume that the system is equipped with some monitor mechanisms or intrusion detection units either in the network layer or the application layer so that one node can observe the behaviours of its one-hop neigh-bors. These mechanisms have been proposed in some previous work, such as intrusion detection system in [26] and watchdog technique in [27].

5. Residual Energy on WSN

Wireless Sensor Network is Multi hops Self-configuring Wireless Network consisting of sensor nodes. The meaning of this study is that there has been a very restricted study of the effect of mobility models on routing protocol presentation such as Packet Delivery Ratio (PDR), Throughput and Latency in Wireless Sensor Network. In this paper, we have considered the influence of pursue group and random based entity mobility models on the presentation of Ad Hoc On-Demand Distance Vector Routing Protocol (AODV) routing protocol.

A brief survey of performance metrics, mobility metrics and routing in WSNs is presented in this section.

5. Implementation & Result Analysis:

In this work, the random way point mobility model is used for the simulation of WSN routing protocols. The source-destination pairs are spread randomly over the network where the point to point link is established between them.

In this work TCP agent with FTP traffic is used with random packet size and rate used for the transmission. The simulation configuration for static nodes consists of many network components and simulation parameters that are shown in the table in detail.

Table: Simulation Parameter

Simulation Tool	Network Simulator-2.35
IEEE Scenario	WSN (802.15.4)
Mobility Model	Two Ray Ground
Number Of Nodes	50, 75, 100
Node Movement speed	Static network
Traffic Type	TCP
Antenna	Omni Directional Antenna
MAC Layer	IEEE 802.15.4
Routing Protocols	AODV, DSDV, MAODV
Queue Limit	50 packets
Simulation Area(in meter)	2000*2000
Queue type	Drop tail
Channel	Wireless Channel

Simulation Results for Residual Energy

It is the total amount of remaining energy by the nodes after the completion of Communication or simulation. If a node is having 100% energy initially and having 70% energy after the simulation than the energy consumption by that node is 30%.The unit of it will be in Joules.

Residual Energy: Figure and table shows the Residual Energy under AODV, DSDV and MAODV for the various node density.

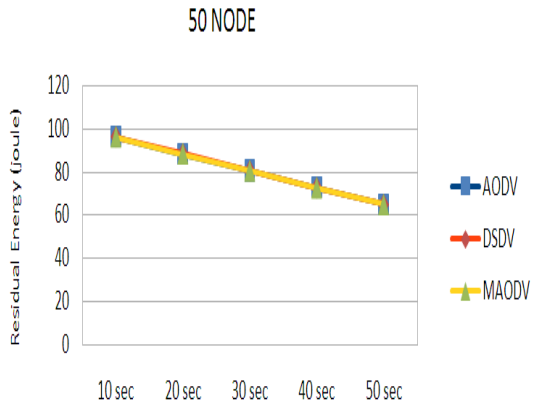


Figure:- Residual Energy for 50 nodes under AODV, DSDV and MAODV

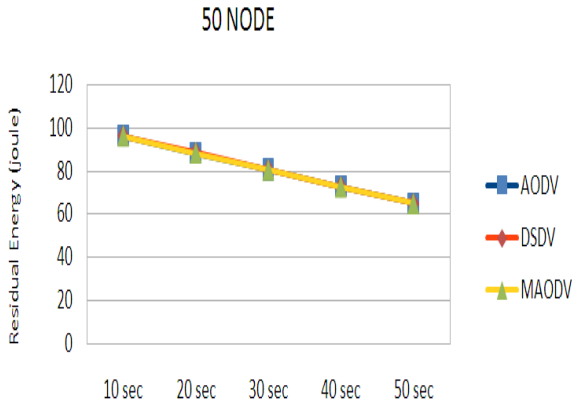


Figure:- Residual Energy for 75 nodes under AODV, DSDV and MAODV

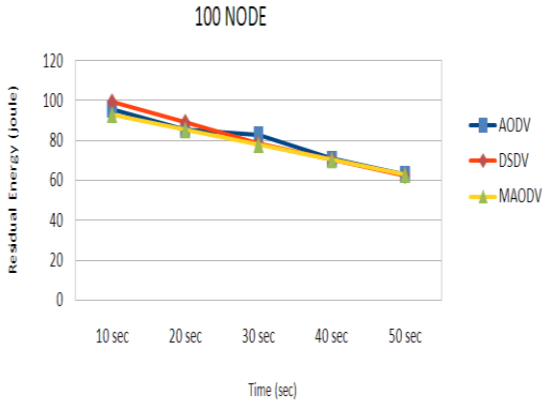


Figure:- Residual Energy for 100 nodes under AODV, DSDV and MAODV

Simulation Results for Throughput

There are two representations of throughput; one is the amount of data transferred over the period of time expressed in kbps. The other is the packet delivery percentage obtained from a ratio of the number of data packets sent and the number of data packets received.

Throughput: Figure and table shows the Throughput under AODV, DSDV and MAODV for the various node density.

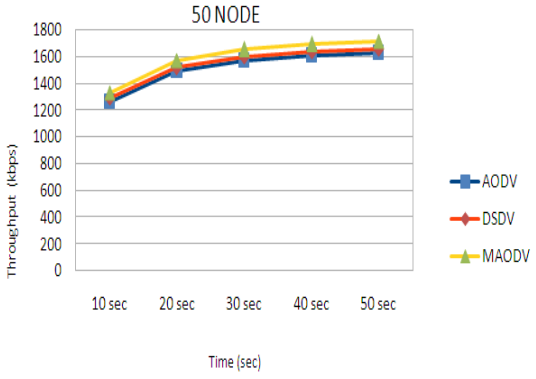


Figure:- Throughput for 50 nodes under AODV, DSDV and MAODV

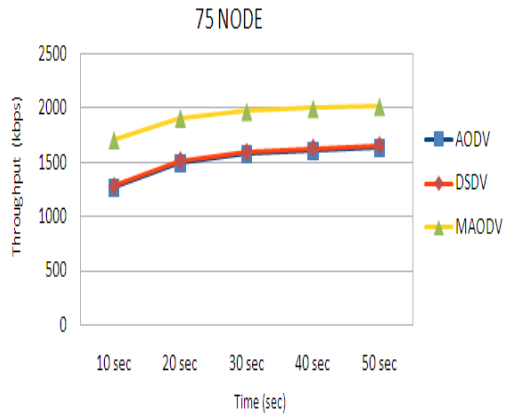


Figure:- Throughput for 75 nodes under AODV, DSDV and MAODV

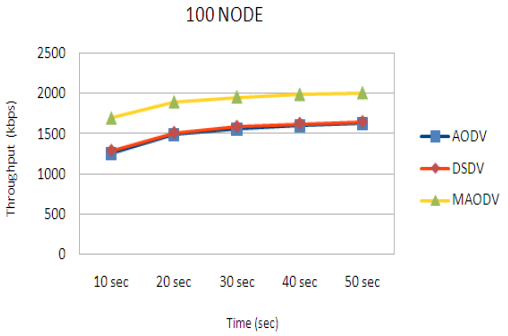


Figure:- Throughput for 100 nodes under AODV, DSDV and MAODV

6. Conclusion

This work carried out the detailed analysis of DSDV and MAODV (AODV with modification) routing protocols through the trust mechanism with AODV routing protocol which is simulated by NS-2 for WSN on the basis of different performance metrics viz. packet delivery ratio, end to end delay, residual energy and average throughput. These performance metrics are analyzed for the AODV, DSDV and MAODV routing protocols by varying the node density for fixed network. Simulation of routing protocols provides the facility to select a good environment for routing and gives the knowledge how to use routing schemes in wireless sensor network. Simulation results show that, as the density of nodes increases in the network, the performance of the routing protocols decreases. AODV affect the performance of routing protocols most as path break increases. According to simulation results as the AODV gives better effectiveness through the MAODV, the packet delivery ratio, Throughput and End to End delay of routing protocol increases as compare to the AODV and DSDV through the MAODV.

7. Future Work

In wireless network community WSN received attention of many researchers due to its unique nature. Although amount of research has been thoughtful to the various routing issues in WSN but still there are some areas that need more scrutiny. Due to time constraint, we only focused on static ad hoc routing with various node densities for AODV protocol but still there are some areas in these routing protocols that need more attentions.

- Other performance metric such as jitter etc can be measured for MAODV in WSN.
- Secure routing is one of the challenging fields. Due to the insecure and ad hoc nature of WSN, it is prone to several security attacks that may lead to devastating consequences. So some other security attacks may be checked i.e. black hole, Sybil, sink hole etc in WSN.
- New algorithms may be proposed to provide good QoS for safety and comfort applications in WSN.

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