# COMPARATIVE STUDY OF DESIGN AND DEVELOPMENT OF THE ROUTING PROTOCOL FOR BETTER PERFORMANCE OF THE WIRELESS SENSOR NETWORK

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## ABSTRACT

*The sensor factors are located in an open location, however, the nodes are stricken with the aid of using restricted battery life, making the community the exceptional answer for fast capture, processing, and switch of vital information. As an end result, in a wi-fi sensor community, community strength and fitness are critical. By choosing a hard and fast of verbal exchange rules, ZigBee has a reasonably-priced cost, low strength consumption, and is appropriate for wi-fi networks. Routing protocols are small applications that are used to manipulate the wsn. The superior shortcut tree routing protocol is an example of routing protocol. Vm ware device and community simulator are used to have a look at the evaluation and overall performance of everything. In contrast to ESTR and AODV, the Advanced shortcut tree routing protocol is projected to symbolize a brand new community protocol in ZigBee for accelerated overall performance, packet shipping ratio (PDR), and latency. We`d want to introduce the powerful Advanced Shortcut Tree Routing method ASTR right here in an effort to enhance ESTR method delays even further. Ad hoc networks, Routing Protocol, Network Simulator, VMware, and ZigBee are a number of the phrases used to analyze the Ad hoc networks.*

*Keywords – AODV, ASTR, ESTR, PDR, ZigBee, NS2.35, VMware*

## INTRODUCTION

Sensors are very useful devices in wireless sensing networks. They are used for sensing as well as processing purposes. We are using multiple nodes for networking purposes. Sensors are monitoring and controlling this node. Transmission and reception of the data is achieved at the node. Therefore while the ancient network aims to understand the high level of service delivery, network agreements should focus entirely on energy savings. Multi-hop communications can also effectively overcome the form of signal transmission that results in wireless connectivity. There are several ways to deliver data packets from feed to route delivery is the way to choose one method between them. The route is made up of quite a number of networks. but most of all we have a tendency to get involved in packet exchange networks

The power and health of the network are key factors in the wireless sensor network. Zig Bee has low cost, low power consumption and is useful for wireless nerve networks by selecting a series of communication rules. Route protocols such as AODV. A wireless network of sensing element (WSN) can be a group of nodes in a systematic way within a network. WSN nodes enlarging low power devices consisting of or more sensors, processor, memory or storage, radio and trans-receiver connected inside an antenna that can be internal or external. Sensors can be mechanical, thermal, biological, chemical, optical, magnetic and other distant. Symptoms created by the senses are naturally analogous. therefore Analog to digital device (ADC) has been used to convert sensory-induced sensors into digital form and integrated into the process unit. The ASTR is expected to represent Zig Bee's new network protocol for improved performance Packet Delivery ratio (PDR) and delays compared to ESTR and AODV. We have a tendency to introduce here the economic process of Advanced Shortcut Tree Routing technique (ASTR). Overcrowding, overflow, packet delivery ratio (PDR). Introduces Advanced shortcut tree routing (ASTR). As we all have a habit of holding the Wireless seeing element Network that's the ideal result for quick recording, processing and transmission of important information.

## LITERATURE REVIEW

Sensors nodes are known as a Sensing unit. A processing unit usually associated with a small end unit is used to manage a process that enables the sensors nodes to interact with other nodes to perform a designated monitoring function[1]. The trans-receiver unit connects the node to the network.A compatible antenna that can be an internal or external that are the most important part of the sensor element node uses the power function in every sensory component. it is therefore customary for the sensor node to select a location detection system, however depends on the system. Needed to move the sensor node if' needed to perform a specific task [2]. All of these subunits are likely to fit a module the size of a matchbox[3]. The size you want can be as small as a cubic inch thick enough to stay suspended in the air. Apart from the scale, there are other robust aspects of sensing node elements [4]. Sensors are placed away from a specific position or events. throughout this process we need large sensors with advanced techniques or the ability to distinguish between target and sound from the environment itself. most active sensors are sent to the correct location. The position of sensory and communication technology is technically advanced. They transmit a series of events in the center of the center where real additions are made. As a large variety of sensor nodes are transmitted at the worst possible distance to each other. Communication from there to the sensor node is advance because it consumes very less energy compared to a single hop connection[6-10]. This is because energy saving is one of the most important aspects of the sensor node, as sensors node usually carry an undefined power source. therefore while the ancient network aims to understand the high level of service delivery, network agreements should focus entirely on energy savings. Multi-hop communications can also effectively overcome the form of signal transmission that results in wireless connectivity[10]. There are several ways to deliver data packets from feed to route delivery that is the way to choose one method between them[15]. The router is made up of quite a number of networks. Most of all we have a tendency to get involved in packet exchange networks[20].

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## AD-HOC ON DEMAND DISTANCE VECTOR ROUTING

Ad hoc on-demand distance vector routing (AODV) is a wireless network routing method that is designed to operate in a mobile node environment while tolerating a range of network nodes such as node migration, connection failure, and packet loss. This section summarizes the AODV protocol; complete protocol details can be found in [6]. At each node, AODV retains a routing table. A routing table item for an end point must have a next hop node, a sequence range, and a hop count. If it was, send RREP to the supply node; if not, check the routings in the rout table that will reach the target node, then send RREP to the source node, or if the source node is still inundated, send RREQ. By broadcasting howdy messages on a regular basis, the AODV protocol will keep routing nodes alive. If a link breaks, all nodes receive ERROR messages, and faulty records are either wiped or the routing is corrected in the meantime [7]. In ZigBee, network addresses are assigned via a dispersed addressing technique in which each capability parent is assigned a finite fraction of community addresses. The community creates a tree topology. Every device will be able to manage the sinking area's influence. If a node's address region has a vacation spot influence, the node sends the packet to at least one of its child nodes. In the opposite situation, it forwards the packet to its make out node. The confirm or baby node that receives the packet chooses the resulting hop node.

## ZIGBEE DEVICES

ZigBee devices are expected to be employed in low-cost home and building automation because they are built for low cost and minimal knowledge. In addition, most networks are simply increased in terms of coverage and size. In ZigBee network layers, there are a variety of operational frequency ranges. Unlicensed frequency ranges like as 2.4GHz, 868MHz, and 915MHz are used by ZigBee. Operation at a low speed The knowledge transfer rate is only 20Kbps-250Kbps. The price is low. Because the ZigBee protocol is simple, it is less expensive and does not require patent fees. There is a brief pause in the action. It takes 20 milliseconds to search for a device, 10 milliseconds to activate a dormant device, and 10 milliseconds to access an active device channel. The amount of energy used is little. The amount of power required to receive and send communications is incredibly low. In addition, the dormant state is commonly used, and the work cycle is short. The network holds a great deal of promise. It can fit 254 slave devices and one master device in one ZigBee network. At the most, the ZigBee network can support 65,000 devices. The amount of effective scope is limited. It offers a range of 10 to 75 metres of coverage. High level of protection. The coding formula is AES-128. In the meanwhile, its security characteristics are usually determined on a case-by-case basis. Exceptional resiliency. In shortcut tree routing, every node routing is critical.

## ADVANCED SHORT CUT TREE ROUTING

The various routing methods are used to study the every nodes status. Sensors are positioned far from the actual position or phenomena. During this approach giant sensors are needed that have the complicated techniques or capability to differentiate between the target and noise from the particular position. They transmit series of development to central nodes wherever actual computations are performed. Since an oversized range of sensors nodes are deployed to a very much distance with one another. Thus multipath and multihop communication in sensor node is adopted as a result of it consumes very less power as compared to the single hop communication. It is because power saving is one of the most important constraint in wireless communication. Sensor nodes typically carry irreplaceable power source. Thus ancient network aim to know top quality of service provisions, sensing element network protocols should focus altogether on power conservation. Multi-hop communication may also overcome form of the signal spread effect practiced in long distance wireless communication. The sensing element nodes are typically scattered throughout a sensor field..

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# RESULT AND ANALYSIS

## *A.* Jitter

| PARAMETER | NO.OF NODES | AODV | ESTR | ASTR |
|---|---|---|---|---|
| Jitter | 100 | 85 | 66 | 47 |
| | 125 | 84 | 65 | 45 |
| | 150 | 82 | 61 | 43 |
| | 175 | 81 | 59 | 42 |
| | 200 | 80 | 56 | 41 |

Table 1 Readings for Simulation time Vs. Jitter

Jitter of the Proposed system is less as compared to AODV and ESTR as shown in the diagram. For 100 nodes Jitter is 47 for ASTR. For ESTR it is66 and for AODV it is 85. Readings for 125 nodes Jitter of ASTR is 46, for ESTR it is 65, and for AODV Jitter it 84. Readings for 150 nodes Jitter of ASTR are 45, for ESTR it is 61 and for AODV jitter is 82. Readings for 175 nodes Jitter of ASTR is 44, for ESTR it is 59, and for AODV Jitter is 81. Readings for 200 nodes Jitter of ASTR is 43, for ESTR it is 56, and for AODV Jitter is 80.

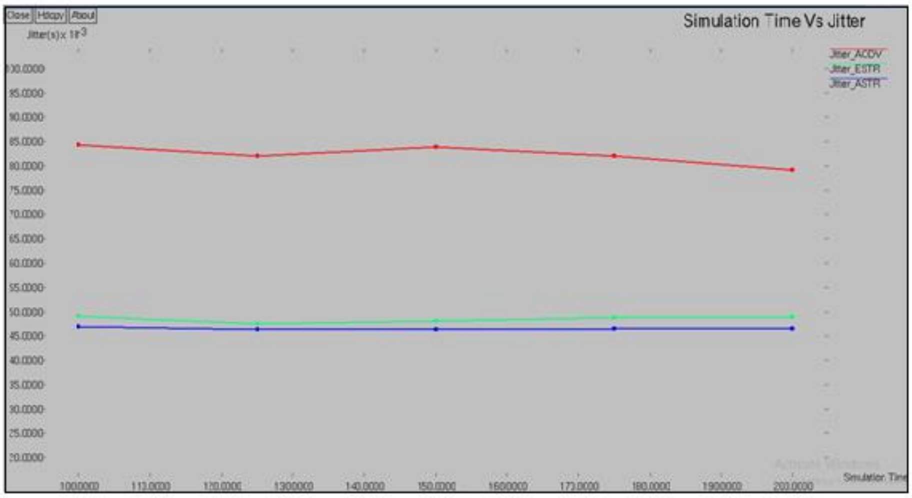


Figure 1.1: Simulation time Vs. Jitter

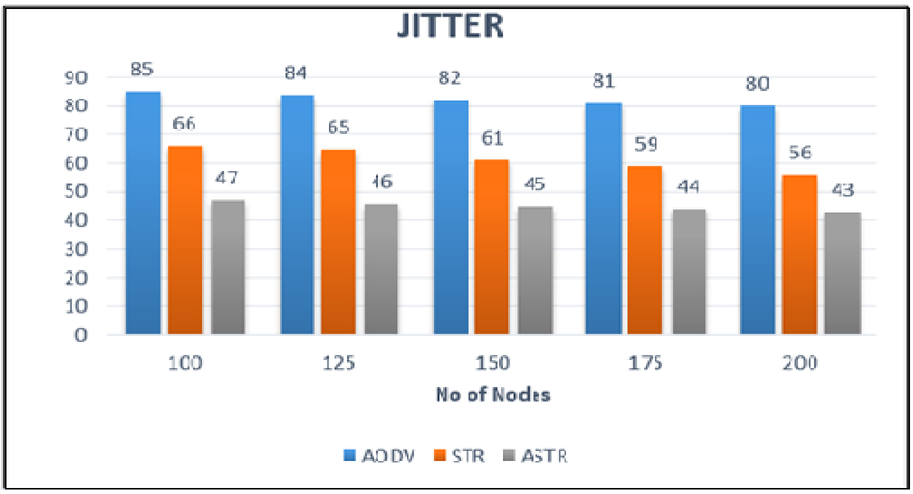


Figure 1.2 Bar chart of Simulation time Vs. Jitter

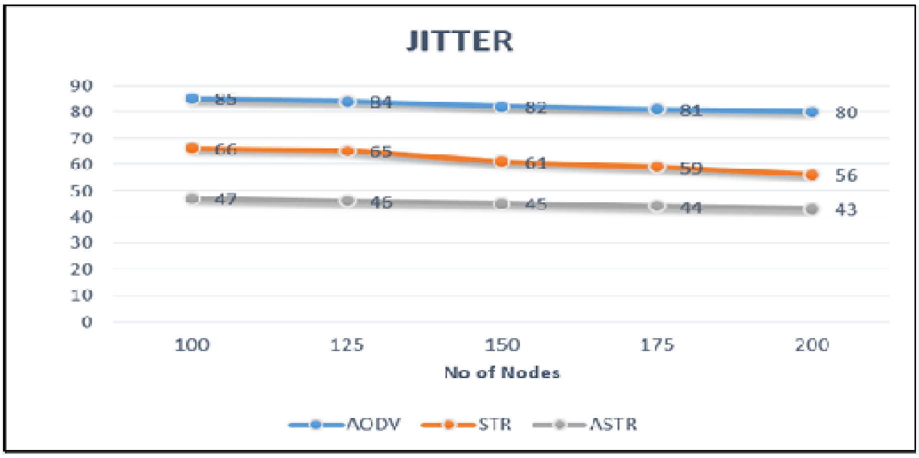


Figure 1.3 Graph of Simulation time Vs. Jitter

***B.*** Result table for Simulation time Vs. Delay

| PARAMETER | NO.OF NODES | AODV | ESTR | ASTR |
|---|---|---|---|---|
| Delay | 100 | 0.57 | 0.19 | 0.07 |
| | 125 | 0.49 | 0.24 | 0.15 |
| | 150 | 0.44 | 0.19 | 0.08 |
| | 175 | 1.04 | 0.2 | 0.1 |
| | 200 | 0.88 | 0.21 | 0.06 |

TABLE NO..2 Readings for Simulation time Vs. Delay

From the observation table, it is clear that the delay of the recommended system is less as compared to AODV and ESTR as shown in the table. For 100 nodes delay is 0.07s for ASTR. For ESTR it is 0.19s and for AODV it is 0.57s. Readings for 125 nodes delay of ASTR is 0.15s, for ESTR it is 0.24s and for AODV delay is 0.49s. Readings for 150 nodes delay of ASTR is 0.08s, for ESTR it is 0.19s and for AODV delay is 0.44s. Readings for 175 nodes delay of ASTR is 0.1s, for ESTR it is 0.2s and for AODV delay is 1.04s. Readings for 200 nodes delay of ASTR is 0.06s for ESTR it is 0.21s and for AODV delay is 0.88s. From this reading, we can conclude that the proposed system has very less delay as compared to ESTR and AODV

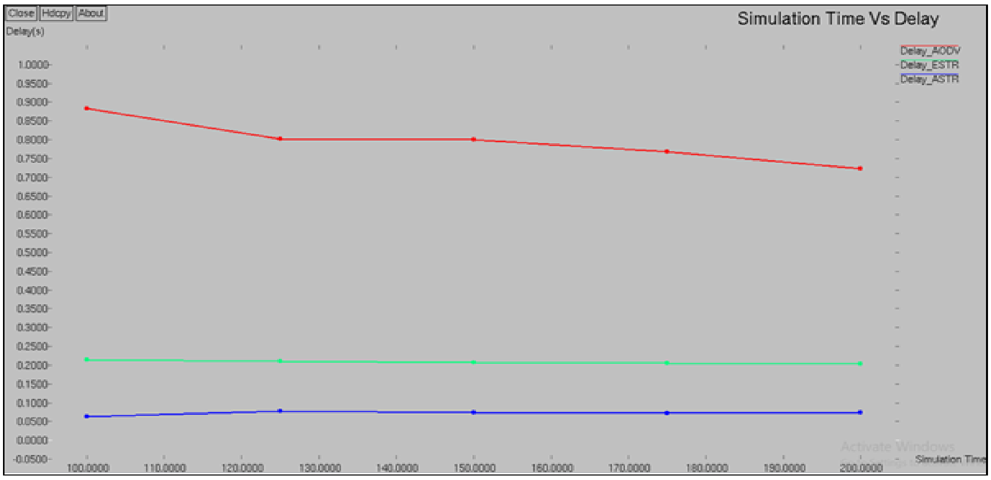


Figure 1.4: Simulation time Vs. Delay

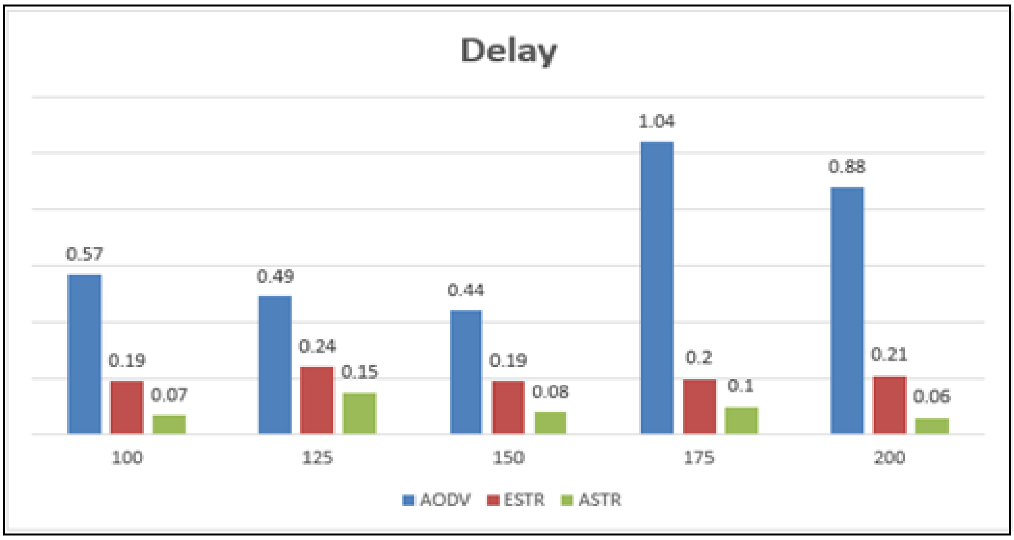


Figure 1.5: Bar chart of Simulation time Vs. Delay


**Figure 1.6: graph of Simulation time Vs. Delay**

## CONCLUSION

The problem with the AODV routing protocol is discussed in this paper, along with a Extended Shortcut Tree routing protocol that . In this proposed system, we established in the ASTR protocol which improves the performance parameters of the routing protocol. The ASTR technique is effective in terms of routing performance and time complexity.

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