# NODE ADDRESSING SCHEMES FOR SCALABLE ROUTING IN HIERARCHICAL WSN

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**ABSTRACT**

Wireless Sensor Network has a capacity of communication computation with node in a network. The sensor performs many significant tasks in a selective area. In this paper proposing the new idea to improve issues on node address Methodology that combine the structure of hierarchical tree with the flexibility of AODV algorithm. The AODV Routing algorithm was proposed for mesh network with extremely mobile node and is not suitable for hierarchical sensor network. Previously this two algorithm ZigBee and Cskip implement's a hierarchical routing but not support fault tolerance and has limitation on network depth. The basic plan is to use hierarchical address structure, to develop the proposed scheme, and assigning address to new node in a network. At last simulation results shows the new scheme importantly and decreases the failure of network formation

**KEYWORDS**:-Wireless Sensor Network, Hierarchical Addressing, Zig-Bee, AODV

## 1. INTRODUCTION :

Wireless Sensor Network (WSN) contains hundreds or thousands of sensor nodes. These sensors have the capability to communicate each other or directly to an external base-station. A greater number of sensors allows for sensing over larger geographical regions with greater accuracy. A WSN brings sensing, computing and communicational capabilities into a single node [1]. The nodes are generally deployed to collect environmental and other information in harsh and unconditioned areas where unpredictable events can reduce the effective operation of a WSN [2]. The nodes have limited communication range and the data is propagated to a central data repository (designated as a sink) in a multi hop fashion. The nodes compute in a distributed way, the best route for multi hop data distribution. We revise the case of a wireless sensor network with sensors being located at particular points in the region to be monitored. The sensed parameters include temperature, vibration and gases. The sensors are placed at pre-determined locations and the sensed information is transported to a centralized data repository located at a sink [1].Sensor are used to séance the data but it can't participate in packet forwarding in a network, because of this the many intermediate relays are used in a network at appropriate location, such type of networks are called two tiered network.[1] and are the most common form of sensor network deployment. The AODV is a routing algorithm it can create a route tables by flooding the entire network with route request control packets (RREQ)

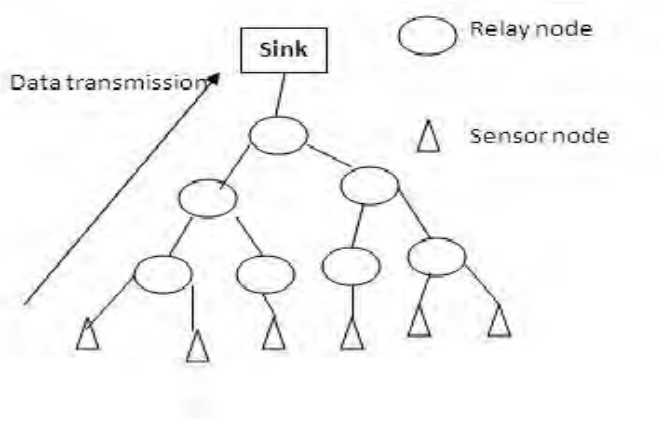


Figure 1: Hierarchical tree with data communication

But such packets are expensive because wireless devices are battery powered and packet transmission more energy/power. Entire network if node failure is accord it can generate two packets RREQRRER to establish a new rout. The AODV algorithm was designed for a mesh network where nodes are predominantly mobile. This is scalable and fault tolerant. It is expensive because it requires more memory for the rout table Interesting characteristic of hierarchical network topology is every node must have a single parent. Without using routing table packets are forwarded to do such task it? Use address of node. Let us consider the Cskip hierarchical algorithm used by ZigBee. This algorithm earmarks each node to have a fixed number of children. This fixed allocation restricts the total depth (number of hops) that the network can support [1] Recently, many sectors are using wireless Sensor Networks like Area monitoring, Environmental/ Earth monitoring, Air quality monitoring, Ambient monitoring, Agriculture etc. In Wireless sensor network, the sensors are placed at particular points in the region to monitor and sense the data .Sensed data are transferring to sink. It offers a lower-cost for collecting data to reduce energy and better management of resources. In WSN remote monitoring covers a wide range of applications and reduces the cabling cost. This paper mainly focused on development of a node addressing method that merges the structure of a hierarchical tree with the flexibility of AODV. The reminder of this paper is as follows. Section ii) is a related work; section iii) is Programmer's design along with mathematical module; section iv) is Conclusion; and last references

## 2. RELATED WORK :

Ad-hoc on-demand distance vector routing algorithm generates routing tables. Before the Ad-hoc on-demand distance vector routing algorithm there was one algorithm that is destination sequenced distance vector (DSDV) it is more effective for making an Ad-hoc network for small mobile nodes but in this size of network is restricted. DSDV store the route information within a network. It can create a route on demand at the time of packet forward from one node to another node .route creation on demand process take more time and long wait before transmitting urgent data this is the disadvantage of the DSDV. AODV broadcast route discovery mechanism that is used in DSR algorithm. Routing protocol are divided into two category that is reactive proactive .AODVDSR are reactive type protocol and the hierarchical routing is a example of proactive protocol has been well studied in wired network [1] and preliminary comparisons with AODV have been made recently in IEEE 802.15.4 based wireless networks [4]. The properties and fallouts of AODV and the hierarchical routing in ZigBee have been well explained [4] Hierarchical routing is a labeling scheme that renames or labels the vertices of a tree network graph. In network layer header of packet is labeled by destination address source address. AODV compare the destination address with the routing table and then it makes the routing decision. When a source node want to communicate to another node then the path discovery process is initiated. And it has no routing information in the table[9] source node start path discovery by broadcasting a route request (RREQ)packet to its neighbor the request contains source address ,surceases, broadcast id ,destination address ,destination –seq hop-count. Every neighbor satisfies the RREQ by sending a route reply (RREP) back to source [9] it contain the following information (source address ,destination address destination seq, hop count, life time) or rebroadcast the RREQ to its own neighbors after increasing the hop count [9]. In such technique one thing is note that multiple copies of the same route broadcast packets form various neighbors. If this happen then the repeated copies are drooped and do not broadcast once again. In such algorithm the route table management and path maintenance is the challenging task. in other word when source node want route to destination node but there is no valid route in a routing table at that time the node broadcast the route request packet (RRER) to destination node .when every node meet that RRER packet in a routing table .after updating route table source node can use the uncast packet to destination. Size of the routing table is large when the network is growing. A related concept is that of compaction; where the route table size is made compressed by skip some information

of the network topology. In this paper, we are worried with the distributed way of assigning addresses to nodes as they join the network (using IEEE 802.15.4 MLMEASSOCIATE. request and MLME-ASSOCIATE .response)[1].in wireless sensor network the manual assignment of address is not feasible because large size of network. And allocation should be dynamic and self adjustable. We have seen two type of address that is local MAC addressed and global network address [10].MAC identifies a neighbor node within the transmission rang of node. And also it can identify the specific node and resolves the disagreement for the medium among the neighbors [10] such address are unique in that network. Network address acts as global ID of a node that is used to find the route to specific destination node possibly several hops away from the sender [10]. As we know various addressing protocol used in wireless sensor network that are used to assign the MAC address and Network Address .there are some address allocation protocols for sensor network 1. Dynamic addressing for wireless media Access 2.Distributed Assignment of MAC Address. 3. Energy efficient node addresses naming 4.Tree Cast 5.Hierarchical Numbering. We focus on the completeness of our algorithm and compare with modified AODV memory requirement

## 3. PROGRAMMER'S DESIGN :

To understand addressing technique without using routing table in hierarchical addressing scheme we have to take one hierarchical tree which divided in to two sub trees, X sub-tree and Y sub-tree with number of node N and M. All nodes inside the tree have been assigned address they are working properly. As per our aim want to insert node into the following network, and we define the strategy that would be for routing in the hierarchical network. Let the above network is represented in

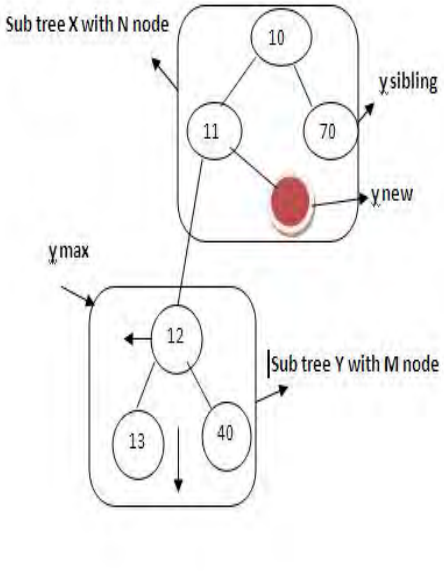


Figure 2: Assignment of an address to node joining the network.

to matrix notation. First row is representing the parent address and remaining row represents the child node address. Node that the order in which the matrix is filled is the order in which the nodes have joined the network i.e. node Xij has joined the network before XNj 8N _ i.

$$\begin{vmatrix} 10 & 11 & 12 \\ 11 & 12 & 13 \\ 70 & y\,new & 40 \end{vmatrix}$$

### 3.1. Mathematical Model

Xij ——'Child node

XNM——'Parent node

X (N+1) M—-'Parent's immediate sibling sibling of the parent's parent.

Xij >XNM Xij < X (N + 1) M

So we define the hierarchical routing strategy as

Xij >XNM where X1M = X (i − q)j All N >0,>, q – 1 all i, j >1 (1)

Xij (N+1) M All i, j, N > 1, M where XNM = X1j (2)

For example, in figure 2, node 40>12 but < 70.

Routing would then work as follows: if node 10 receives a packet destined for 40, it checks the addresses of its child, 40>11but40 < 70. Therefore, node 10 forwards the packet to node 11. Similar

forwards brings the packet to its Intended destination by studying above concept there is no routing table has been used and this is the spirit of hierarchical routing.

3.2. Flow diagram for packet routing:

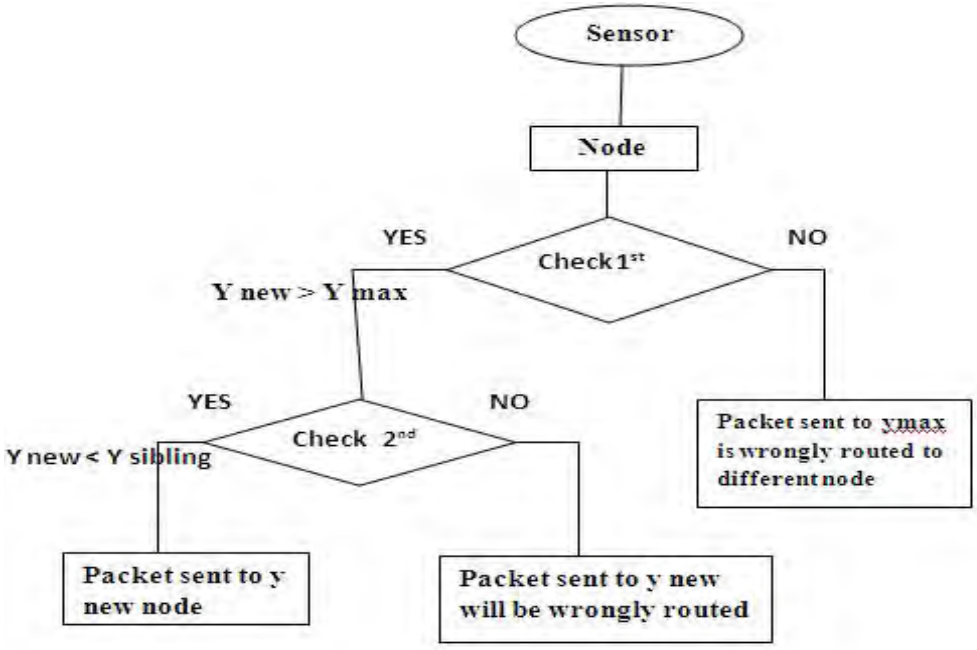


Figure 4: Flow diagram for packet routing

When any node wishes to join the network as in fig 2.Ymax stand for the max address in Y sub-tree, then, for routing to be preserved, the following situation are to be complete:

Y new >*Y max*−−−− (*first check*)

*Y new* <*Y sibling*− − (*second check*)

*If* (*first check*) *is not met,*

A packet sent to Y max from the sink will be wrongly routed to a different node.

If (second check) is not met,

Then a packet sent to Y new will be wrongly routed to a different node.

Note that conditions (first check) and (second check) are already captured in (1) and (2). Now, routing strategy defined, we develop our algorithms

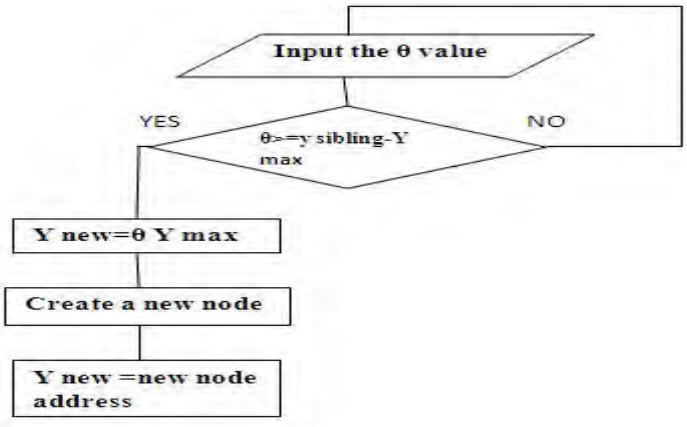


Figure 5: Address assign to the new node

## 4. CONCLUSIONS :

As we know the wireless sensor network is the challenging area of technology .having the many application in real life world, so we have shown that the hierarchical technique is the best then the AODV because more memory require in AODV then the hierarchical We can conclude that there is a more than 50 percent of improvement in memory exhaust over modified AODV algorithm. We find the future effort would be to reduce the address collision probability

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