

# Survey of Selfish Node Detection in Wireless Sensor Networks Using Watchdog Method

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**Abstract:** Zigbee protocol is used to send the packet from source to destination. It does not have any routing table and route discovery method. Tree topology method followed by ZigBee Tree Routing (ZTR). But it will not be provided the best routing path from source to destination. Shortcut Tree Routing (STR) can be used to provide best optimal path. STR will calculate the hop count from source to destination with help of Zigbee protocol. Zigbee protocol having the hierarchical addressing format. Shortcut Tree Routing method does not have security procedure option. Because of this our technique will be protected in safe manner. Most of the sensor networks are having self centered node. Due this there is a possible to get performance degradation between source and destination. These selfish node should be identified to get make better formance for sensor networks. Main theme of our paper is to find selfish node from the networks and providing best route between source to destination. Our aim is to get efficient data delivery using Watchdog method.

**Keywords:** Misbehavior node detection, Watchdog method, WSN, Shortcut Tree Routing method (STR), ZigBee protocol.

## I. INTRODUCTION

In Control Networks and Sensor Networks, Zigbee protocol can be used. It is used to create personal area network from small network due its high level communication. It is also having low power utilization and line of sight. We can use this protocol for long distance communication. For distance communication mesh network will be preferred. Zigbee protocol is varied in system to system based on the application level. AODV is called as representative routing protocol in mobile adhoc network. By using AODV, reactive routing protocol can be derived for ZigBee protocol. Hierarchical address will be followed in each node of ZigBee tree routing method. This hierarchical address will be compared with destination address. If it is matches then packet will be forwarded to parent node or any other node by source or an intermediate node.

Due to alternate path problem and traffic problem, network performance will be affected in Zigbee Tree routing protocol. Shortcut Tree Routing will provide best path to the sensor networks. Here selfish node will not forward the packets to destination node or parent node. This problem will be identified using Watchdog method and alternate path will be established between source and destination.

## II. RELATED WORKS

Proactive Routing Protocol and Reactive Routing Protocol are important protocol in MANET. Route table will be maintained in Proactive routing protocol. But it will not be used in all times. This protocol is usefull for real time applications. It consists of some important advantage is, less delay. In case of reactive routing protocol it is too high. OLSR, DSDV, and WRP are the most important proactive routing protocols. AODV, DSR and TORA are the most important reactive routing protocols. In reactive routing protocol if request link is established from the receiver then route will be established between source and destination. In case of no packet transmission, routing protocol will not create the control packets. Due to this network will be affected by large delay for finding path between source and destination. If we need to update all routing table which is presented in a network then the size of routing table will become as too large. ZigBee tree routing protocol normally have three methods of traffic prototypes.

- One-to-many traffic method
- Many-to-one traffic method
- Any-to-any traffic method

In a network if all the nodes are source and destination then it is called as any-to-any traffic pattern. If the network have only one node as destination and many nodes as sources then it is called as many-to-one traffic pattern. Here except destination node remaining nodes will collect the information in a network. In one to many traffic method consist of many nodes as destination nodes and only one node as source node.

Traffic method is not presented in Shortcut Tree Routing method. By using one-hop neighbor method, traffic will be reduced in STR. Here transmission and receiving operation will be done by only one hop.

Finding selfish node in a network is more important for betterment of result. For that we have introduced a new method is called as Watchdog method.

Selfish node will misbehave in mobile networks so that performance will be degraded.

- Misbehavior nodes will be identified by Watchdog and it will copy the packets in buffer nodes.
- Neighboring nodes will be monitored by Watchdog, those node should transfer the packets without and changes.
- If there is a mismatch between forwarded packets with the packets which is in buffer then it will be removed.
- Packets which is stored in buffer will be kept for a threshold period of time. After that it will be removed.
- All nodes are having responsibility to forward the packets.

### III. PREVIOUS WORKS

Apart from the above concept we could use an efficient flooding algorithm method for finding shortest path. But here we have face two major problems. Initial problem is less number of forwarding nodes. Second major problem is more computational time. Due to this packets will be merged in flooding method. We can achieve best performance in link state routing protocol. But to save packets will require large memory space and this method power consumption is too high. Collection Tree Routing Protocol will support only for small Networks. It will leads the system as irregularity routing way. It is impossible to use above methods for Sensor Networks due to their disadvantages present. Best solution is combining Watchdog method with Shortcut Tree Routing Method.

### IV. ZIGBEE TREE ROUTING

Without any route discovery table ZTR will works. It is fully based on hierarchical addressing scheme. In this scheme each node will forward the packets only to the child. That child node should be a destination node. If it is not so packet will be forwarded to parent node. In Fig. 1 Source node S will forward the packet to destination node D1 since it is the child node of S. There is no need to use alternate path here. In case Fig. 2 Source node should establish the path to D2 destination node. It should cross through more than 4 nodes to reach final destination node D2. Here detour path problem will arise. Since D2 node is not child node of source node S. It is impossible to apply direct transmission rule.

Apart from the alternate path, one more problem in ZTR is traffic problem due to the limited number of nodes in a network structure. Therefore all packets will pass through all nodes. This will degrade the network performance.

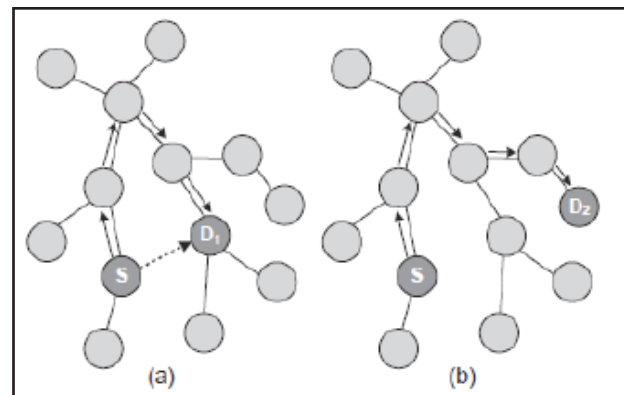


Fig. 1: (a) and (b) ZigBee Tree Routing (ZTR)

### V. SHORTCUT TREE ROUTING

The new system is called as Shortcut Tree Routing is applicable for ZigBee networks. It will break the limitations of ZTR method. Moreover, it will provide the best performance with low cost. Most important notification in STR is sufficient performance and less computational time. STR is similar to ZTR. But STR will select one neighbor node as hop node. Fig. 2 show the STR structure. Here from source to destination N4 will be selected as hop node. This node is used to transmit the packets from source to destination node without any packet loss. Mainly by using ZTR we can calculate remaining tree hops from the source node to destination node.

Due to this we can combine along with Watchdog method to obtain good performance of the network. It will use the routing table. Due to this computational time will be reduced. Watchdog will check the entire networks. It is used to find the selfish node. Once selfish node found in network, that node will be discarded. So that new route or alternative path will be established between source to destination.

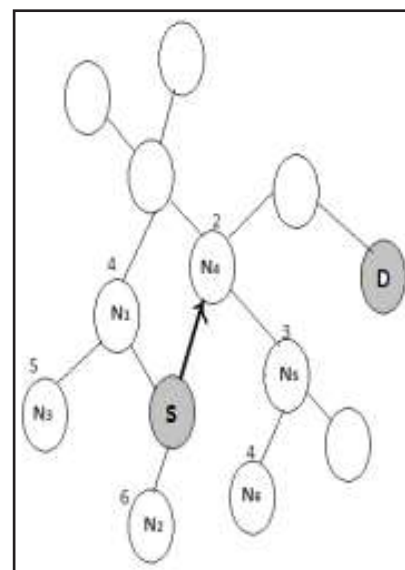


Fig. 2: Shortcut Tree Routing (STR)

## VI. PROPOSED WORK

Even though STR have many advantages, it does not have detection of selfish node. These nodes will never forward the packets to destination nodes. Due to this problem we can not expect much more performance in sensor networks. To improve the network performance we could choose the best option as Watchdog method. Detection of selfish node is not presented in Shortcut Tree Routing method. Due to this we can not expect best performance. About this selfish node, parent node will pass the information to remaining nodes in the network. Parent node will decide the alternative path to forward the packets.

In WSN many nodes will not transfer data to next destination nodes. These nodes are called as misbehaving nodes. These nodes are detected by Watchdog method. Fig. 4 illustrates the working of Watchdog method. Node C can not receive data from Node A directly. But Node C can listen the traffic in node B. Therefore Node A will transfer data to node B. Here time will be fixed for receiving data. Within time limitation if data is not received by destination node (Node B) then source node (Node A) will be found as selfish node.

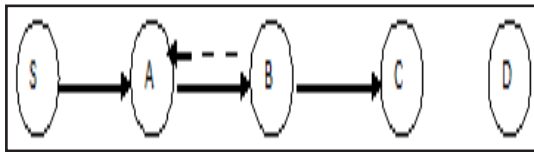


Fig. 4: Working of Watchdog Method

Here we need to face encryption problem. There is no separate encryption technique for each link due to high expensive. For maintenance of buffer and comparing overhead packets, Watchdog method is preferred. If there is a match with buffer packets then it will be forwarded. Mismatched packets in the buffer for more than timeout period then Watchdog method will send failure message to source node. That particular node is found as misbehaving node.

## V. CONCLUSIONS

STR having many advantages over ZTR. It has low power energy consumption and low memory consumption. Moreover less number of nodes are used to transfer the packets from source to destination. STR is used self centered mechanisms. Due to this performance will be degraded. So we introduced a new system is called Watchdog method for identification of selfish node. It is used to find alternate path from source to destination. Due to this method we can achieve high performance and good efficiency.

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