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Reduce the Consumption of Energy in Wireless Sensor Network Using Improved STR Protocol

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Abstract: In current scenario ZigBee wireless sensor network suffered from distribution of power and route cost for the selection of root tree node and communicating node. The power supply process of wireless sensor network is fixed type. The process of power used battery. Now most of authors followed the location based and heretical based protocol for minimization process of energy factor in wireless sensor network. In consequence of efficient energy and route cost minimization one is very famous routing protocol is shortcut tree routing protocol. In the process of improvement of ZTR protocol one protocol are available such are called as STR protocol. Basically STR protocol is a combination of two different routing protocols for the processing of energy saving mode and cost. The research gap between ZTR and STR is sharing of information for the selection of tree node process. During the cluster node selection more power is consumed. Now reduction of this power effect used reference node selection mode for the selection of tree head and data transmission for the communicating node.

Keywords: WSN, ZTR, STR, ZigBee Wireless Network.

I. INTRODUCTION

Wireless sensor networks (WSNs) have gained world-wide attention in recent years, particularly with the proliferation in Micro-Electro-Mechanical Systems (MEMS) technology which has facilitated the development of smart sensors. These sensors are small, with limited processing and computing resources, and they are inexpensive com-pared to traditional sensors [6]. These sensor nodes can sense, measure, and gather information from the environment and, based on some local decision process, they can transmit the sensed data to the user.

Smart sensor nodes are low power devices equipped with one or more sensors, a processor, memory, a power supply, a radio, and an actuator. A variety of mechanical, thermal, biological, chemical, optical, and magnetic sensors Smart sensor nodes are low power devices equipped with one or more sensors, a processor, memory, a power supply, a radio, and an actuator. A variety of mechanical, thermal, biological, chemical, optical, and magnetic sensors may be attached to the sensor node to measure properties of the environment. Since the sensor nodes have limited memory and are typically deployed in difficult-to-access locations, a radio is implemented for wireless communication to transfer the data to a base station (e.g., a laptop, a personal handheld device, or an access point to a fixed infra-structure). Battery is the main power source in a sensor node. Secondary power supply that harvests power from the environment such as solar panels may be added to the node depending on the appropriateness of the environment where the sensor will be deployed. Depending on the application and the type of sensors used, actuators may be incorporated in the sensors. A WSN typically has little or no infrastructure. It consists of a number of sensor nodes (few tens to thousands) working together to monitor a region to obtain data about the environment. There are two types of WSNs: structured and unstructured. An unstructured WSN is one that contains a dense collection of sensor nodes. Sensor nodes may be deployed in an ad hoc manner into the field.

Once deployed, the network is left unattended to perform monitoring and reporting functions [11]. In unstructured WSN, net-work maintenance such as managing connectivity and detecting failures is difficult since there are so many nodes. In a structured WSN, all or some of the sensor nodes are deployed in a pre-planned manner. The advantage of a structured network is that fewer nodes can be deployed with lower network maintenance and management cost. Fewer nodes can be deployed now since nodes are placed at specific locations to provide coverage while ad hoc deployment can have uncovered regions. Wireless Sensor networks are vulnerable to security attacks due to the broadcast nature the transmission medium. Furthermore, wireless sensor networks have an additional vulnerability because nodes are often placed in a hostile or dangerous environment where they are not physically protected [7]. Basically attacks are classified as active attacks and passive attacks. Figure1 shows the classification of attacks under general categories and Figure shows the attacks classification on WSN.

II. CLUSTERING IN WSN

Clustering has proven to be an effective approach for organizing the network into a connected hierarchy. In this

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article, we highlight the challenges in clustering a WSN, discuss the design rationale of the different clustering approaches, and classify the pro-posed approaches based on their objectives and design principles [3]. To support data aggregation through efficient net-work organization, nodes can be partitioned into a number of small groups called clusters. Each cluster has a coordinator, referred to as a cluster head, and a number of member nodes. Clustering results in a two-tier hierarchy in which cluster heads (CHs) form the higher tier while member nodes form the lower tier. Figure illustrates data flow in a clustered net-work. The member nodes report their data to the respective CHs. The CHs aggregate the data and send them to the central base through other CHs. Because CHs often transmit data over longer distances, they lose more energy compared to member nodes [12]. The network may be reclustered periodically in order to select energy-abundant nodes to serve as CHs, thus distributing the load uniformly on all the nodes. Besides achieving energy efficiency, clustering reduces channel contention and packet collisions, resulting in better network throughput under high load.

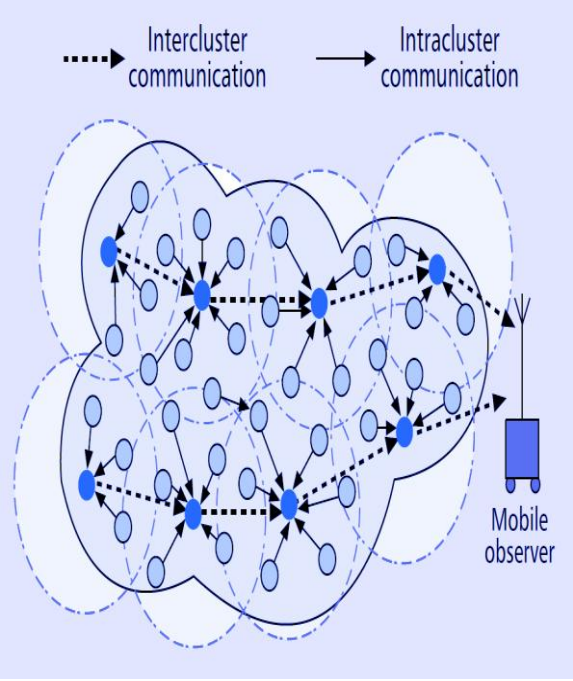

Figure 1: Illustration of data flow in a clustered network.

Clustering has been shown to improve network lifetime, a primary metric for evaluating the performance of a sensor network. Although there is no unified definition of "network lifetime," as this concept depends on the objective of an application, common definitions include the time until the first/last node in the network depletes its energy and the time until a node is disconnected from the base station.

Clustering has been extensively studied in the data processing and wired network literatures. The clustering approaches developed in these areas cannot be applied directly to WSNs due to the unique deployment and operational characteristics of these networks. Specifically, WSNs are deployed in an ad hoc manner and have a large number of nodes. The nodes are typically unaware of their locations. Hence, distributed clustering protocols that rely only on neighbourhood information are preferred for WSNs (however, most studies in this area still assume that the network topology is known to a centralized controller). Furthermore, nodes in WSNs operate on battery power with limited energy [10]. Hence, the employed clustering approach must have low message overhead. Finally, harsh environmental conditions result in unexpected failures of nodes. Hence, periodic reclustering is necessary in order to heal disconnected regions and distribute energy consumption across all nodes. Periodic reclustering is also necessary, as the parameters used for clustering (e.g., the remaining energy, node degree, etc.) are dynamic. The clustering techniques pro-posed for data processing typically consider static parameters, such as the distance between the nodes, and assume that nodes are more reliable. Clustering is a useful topology-management approach to reduce the communication overhead and exploit data aggregation in sensor networks. We have classified the different clustering approaches according to the clustering criteria and the entity responsible for carrying out the clustering process. We have focused on distributed clustering approaches, which are more suitable for large-scale sensor networks.

III.MOBILE WIRELESS SENSOR NETWORKS (MWSN)

Information in a mobile wireless sensor network gets invalidated more quickly if all the nodes are moving. In the article, Hu and Evans introduce a localization algorithm dealing with these different characteristics. Their approach builds upon Monte Carlo Localization methods used in robotics to locate a mobile robot.

There are at the moment few localization protocols specifically designed for mobile wireless sensors networks. This section presents the work of different groups that aim at enabling localization and supporting mobility in a sensor network or in a mobile ad-hoc network. Apart from the experiments with the Monte Carlo Localization, there are at the moment few localization protocols specifically designed with mobile wireless sensors in mind.

Mobility introduces a real-time component to the localization algorithms. Wireless sensor networks are usually considered delay-tolerant. To the contrary, mobility makes a sensor network delay intolerant: information gathering and location calculation should happen in a timely manner, dependent on the speed of both the nodes and the anchors. This means that in a mobile wireless sensor network, methods relying on global knowledge such as calculating the number of hops or distances to all the anchors in the network are to be avoided. Similarly, a mobile node cannot really benefit from iterative localization techniques where the location

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estimation is refined whenever a node receives more information from the network. Besides possible information decay, a localization algorithm deployed in a mobile wireless sensor network should be able to cope with the temporary lack of anchors. In other words, the algorithms should be able to produce a location estimate in such conditions if the application layer has a need for it. In such cases, the location estimation could easily be tagged as uncertain, providing a mean for the application to assess how much the results of the localization algorithm should be trusted.

IV. PROPOSED METHOD

The In this paper improved the shortcut tree routing protocol for ZigBee wireless network. The ZigBee wireless network is well known personal area network for the communication in road traffic, hospital management and many more home appliance functions through this network. In ZigBee wireless network basically used ZTR routing protocol. The ZTR routing protocol faced a problem of multiple flat branch scenario for the processing of information. In ZTR routing protocol some basic problem occurred during the selection of communication node. The process of communication composed with multiple nodes.

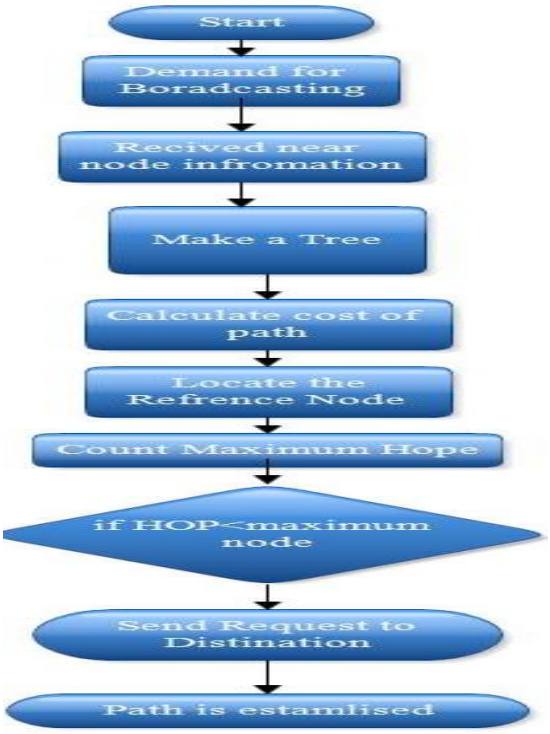

Figure 2: Show the improved proposed model of STR protocol.

V. RESULT ANALYSIS

Different performance metrics are used to check the performance of proposed model in various network environments. In our experiment we have selected throughput and packet drop to check the performance of wireless sensor proposed model protocols against denial of service attack.

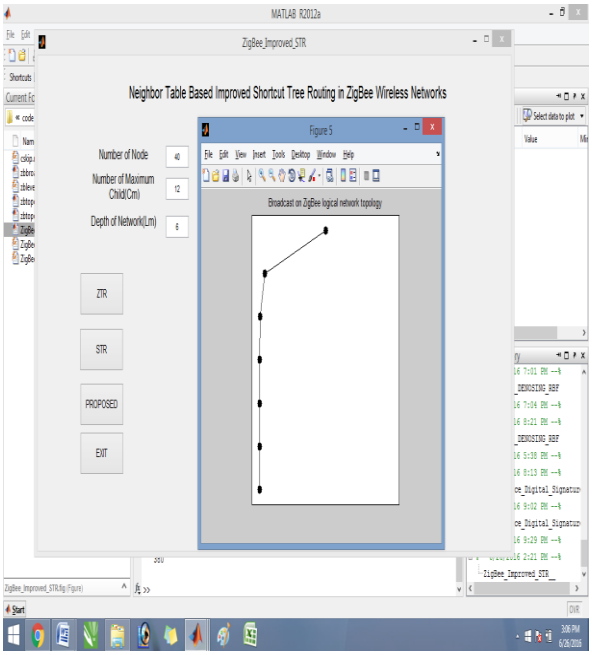

Figure 3: Shows that simulation scenario of 40 nodes for the performance evaluation of ZTR, STR and Proposed.

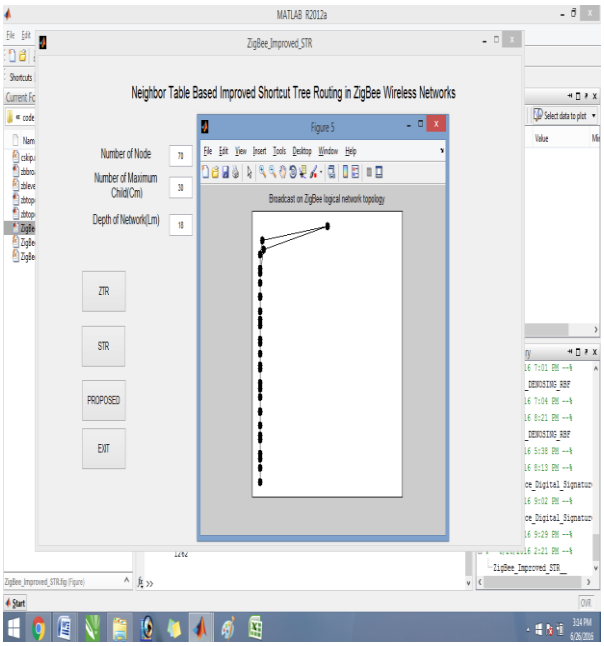

Figure 4: Shows that simulation scenario of 70 nodes for the performance evaluation of ZTR, STR and Proposed.

Table 1: Shows the comparative evaluation of ZTR method and Node Value.

Node value	PDR	Routing overhead	End to end delay	Hop count
10	0.0137	300	0.6678	41
20	0.0635	200	0.4852	127

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40	0.1900	200	0.6694	380
70	0.6310	200	0.0105	1262
90	1.9260	100	0.5472	1926
100	2.5040	100	1.1851	2504

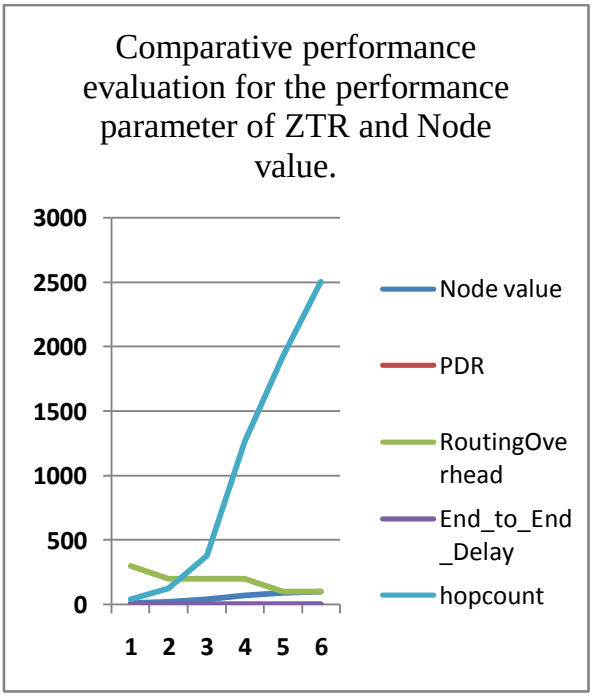

Figure 5: Shows the comparative performance graph of ZTR method with input of node value, number of maximum child and depth of network.

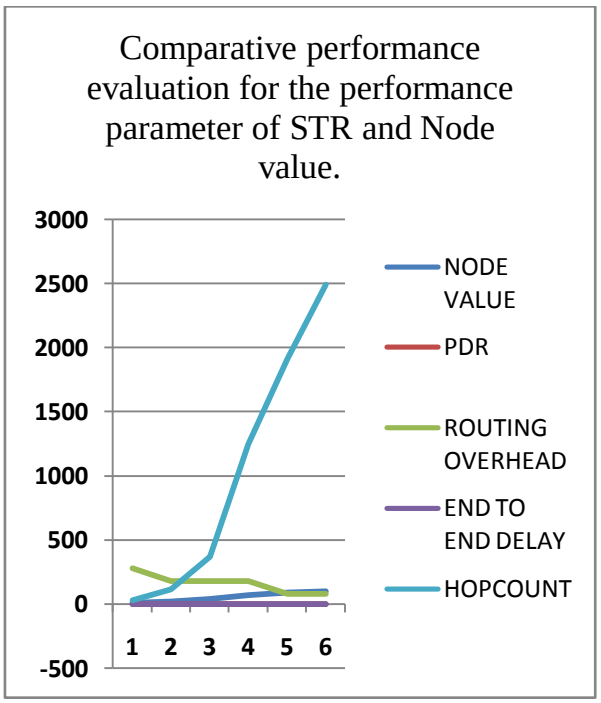

Figure 6: Shows the comparative performance graph of STR method with input of node value, number of maximum child and depth of network.

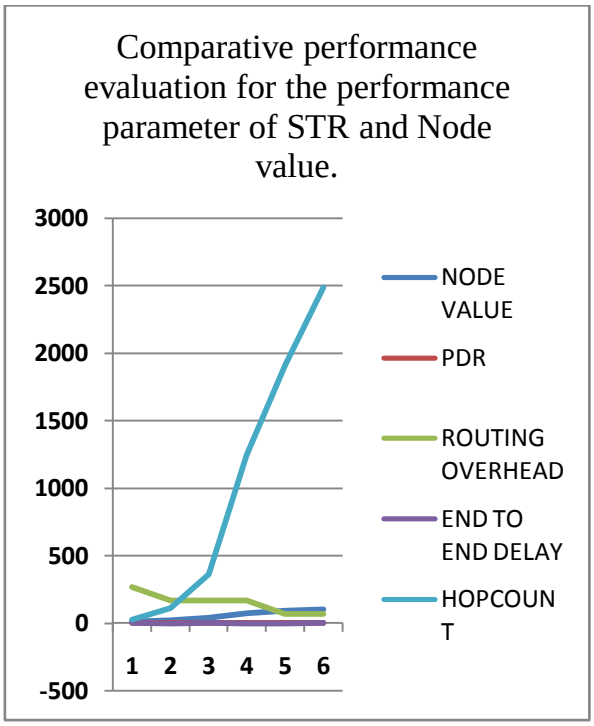

Figure 7: Shows the comparative performance graph of proposed method with input of node value, number of maximum child and depth of network.

VI. CONCLUSION& FUTURE SCOPE

This paper provides minimization of energy consumption and minimization of routing cost for ZigBee wireless sensor network in concern of power consumption and life time of network. The proposed models give a better energy utilization factor for wireless sensor network. The proposed model ISTR implies in two section one is reference node and another node as Tree. The node end request for communication for next node in installed location of tree node. The diversity of network and service oriented traffic in wireless ZigBee sensor network further explored our research work in term of calculation of power node assignment, for the process as base node for controlling a message request of all mobile sensor node in communicating network.

ISTR is a hybrid model of very famous reference node model and STR protocol for energy saving and minimum route cost for communication in wireless sensor network. Basically ISTR work as a route filter, because in modern trend traffic apply by the flooding a power that power is consumed by sensor node. The diversity of network and service oriented traffic in wireless ZigBee sensor network further explored our research work in term of calculation of power node assignment, for the process as base node for controlling a message request of all mobile sensor node in communicating network. The filtration process used huge amount of power for the process of selection, now need some extra memory segment for the process of reference node. Now exploding of this works and optimized the

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process of reference node allocation and reduces the capacity of memory for the expanding of power allocation.

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