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Reconfiguration Of Sensor Networks For Fast Data Collection Using Ars

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***Abstract*: Fast data can be collected over a tree based topology. For that purpose, a technique is explored and called as converge cast. Converge cast is a collection of data from a set of sensors towards a common sink over a tree based topology. By combining clustering and tree construction we can improve the efficiency. Incorporating these needs a protocol named Tree-Clustered Data Gathering Protocol (TCDGP) is developed. This Protocol maintains wireless sensor network integrity. This protocol can reduce the power dissipation in large sensor networks. When sink is far away from sensor field, TCDGP has the most data gathering rounds.**

Keywords: Convergecast, Cluster, Sink, CH

I. INTRODUCTION

A Wireless Sensor Network (WSN) is a wireless network consisting of different distributed sensors to monitor physical or environmental conditions such as temperature, sound, vibration, pressure, motion or pollutants at different locations. These sensors are low cost nodes which could either have a fixed location or randomly deployed to monitor the environment. The data flows from one node to the other special nodes called base stations sometimes also called as sinks. A base station links the sensor network with another network through a gateway node to disseminate the data.

A wireless sensor network (WSN) consists of sensor nodes capable of collecting information from the environment and communicating with each other. The collected data will be delivered to one or more sinks. After receiving the data, sink aggregates the data and convey the data to the external network through the internet or satellite network. The sensor nodes are expected to operate with batteries. It is impossible to replace the batteries of the sensor nodes.

In a large sensor network there are many numbers of nodes. To send one data from one node to another node till it reach sink it need more power. So to reduce the power dissipation and to make it more efficient a protocol called TCDGP is introduced.

II. RELATED WORK

Wireless Sensor Network can gather information from a hundreds of sensors and send that data to a sink or a base station. Transmission of data is very simple but it cause one problem in spending the energy in transmitting the data. To overcome these problems there are many routing methods (Akkaya and Younis, 2005; Cheng and jia, 2005)

Diffusion based-It's a flood like method to get the information.

Cluster based-In this nodes divide into several clusters and CH will send the data to the sink.

Chain based-Here nodes form a long chain and the leader node will send the data.

Tree based-Here a tree is formed and data sends through the tree path to the root node and finally root node will send the data to the sink.

1. Leach

In (Heinzelman et al, 2000) authors proposed a Low Energy Adaptive Clustering Hierarchy (LEACH) protocol. A large number of sensor nodes are divided into several clusters. And a cluster head is selected. Each CH gathered the data from different sensor nodes and aggregate it and send directly to the sink. After sink received all the data, one round has ended. There are 2 phases in this: setup phase and steady phase.

2. Pegasis

PEGASIS is based on the chain–based protocol and it differs from LEACH. All sensor nodes form a chain. The nodes select a chain head. The 2 end points of the chain started to send the data to the chain head. After chain head (Lindsey et al, 2002) receives the data it aggregates it and transmit the data directly to the sink.

3. Treepsi

In (Sohrabi et al., 2000), the authors proposed a Tree based Efficient Protocol for Sensor Information (TREEPSI).In this before the transmission phase the network select a node as the root node. Transmissions start after the tree is built. And each data is sending to their parents till it reaches the root node. After the aggregation of all the data in the root it sends the data to the sink.

All these methods have some more problems. So a new routing method is introduced to overcome all

these. That is called as TCDGP protocol. This is the combination of cluster based and tree based.

III. PROBLEM DESCRIPTION

Fast data can be collected from a wireless sensor network organized as tree. For this purpose, it uses the technique called as converge cast. Scheduling transmissions using multiple frequencies is more efficient. Multichannel scheduling can be used to eliminate most of the interference. Wireless sensor network is a collection of sensor nodes in a network. Converge cast is a collection of data from a set of sensors towards a common sink. There are two types of data collection.

(i)Aggregated converge cast
(ii)Raw-Data converge cast

The different nodes are communicated by sending signals to a sink node based on a single frequency. Using single frequencies increases collision and interference. Instead of this, multiple frequency is more efficient so that different can communicate at a time. To avoid the interference multi channel scheduling is used.

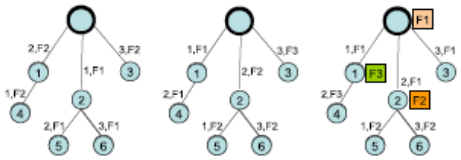


Figure (a) Link Level (b) Cluster Level (c) Node Level

Time Division Multiple Access (TDMA) is better fit for fast data collection, since they can eliminate collisions and retransmissions and provide guarantee. The main problem arise is, it can't be used in large sensor network. Since, it has many numbers of nodes. And power consumption is high. And also the time consumption is high.

IV. OBJECTIVES AND OVERVIEW OF THE PROPOSED WORK

A. *Objectives*

In large sensor network there are many numbers of nodes. The data is transferred from one node to another till it reaches up to the sink. The data is send to another node using the aggregated converge cast. It means the data is aggregated at each node by its data and the received data and then send to another upper level node. So the power consumption is high. To reduce the power dissipation here a TCDGP protocol is used

B. Overview of the Proposed Work

The existing system of tree structure is modified with clustering features added to it. The tree structure provides means of fast data collection but it does not achieve maximum efficiency. The clustering can improve the energy efficiency to an extent. Thus by combining the tree and clustering concepts we get a fast data collection mechanism with improved efficiency and power also can be reduced. The proposed protocol used here is Tree-Clustered Data Gathering Protocol (TCDGP).The TCDGP reduces the power dissipation to a great extend.

There are two steps in the deployment phases, which are cluster establishment and tree set up. After the data aggregation, the proposed protocol will judge the threshold value of remnant energy.

IV.1 Cluster Establishment

The sink will obtain the information with location and remnant power. First it finds the distance between the nodes. Then it computes power consumption for each node. By these it then determines which nodes will be the cluster heads. Sink computes the distance between the cluster head and sensor node. The node will compare the distance with each CH. It is the root node for the tree in the cluster. As the CH confirms its members then establish tree path.

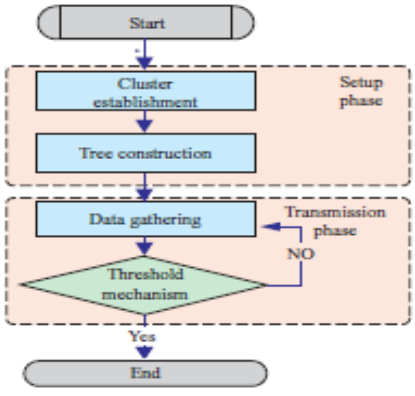
IV.2 Constructing a Cluster Based Tree

The sink will collect the information that each CH has labeled and there by compute the tree path. Prim's algorithm is used to compute the tree path.

IV.3 Data Gathering

Every tip node transmits its data to the upper level nodes. These upper level nodes then fuse their data and received data and then send to the next level node. This process continues until all the data reach the sink node.

The following shows the flow chart of the Tree Clustered Data Gathering Protocol. At first Cluster will be established and then the tree will be constructed. After the tree construction the data will be gathered.



V. SIMULATION RESULTS

In this paper the simulation tool used is NS2. In my simulation 100 sensor nodes are randomly used into a sensor field of 100-100. And the sink is located at (50,300).5J is the initial energy at each sensor node. The optimal performance is obtained for the number of cluster heads. So the packet size was 2000 bits per message. And the sensor node fuses a 2000 bits message at a cost of 5nJ/bit/message and the constant threshold value is $t > 25$ s. The simulation parameters can be seen in below.

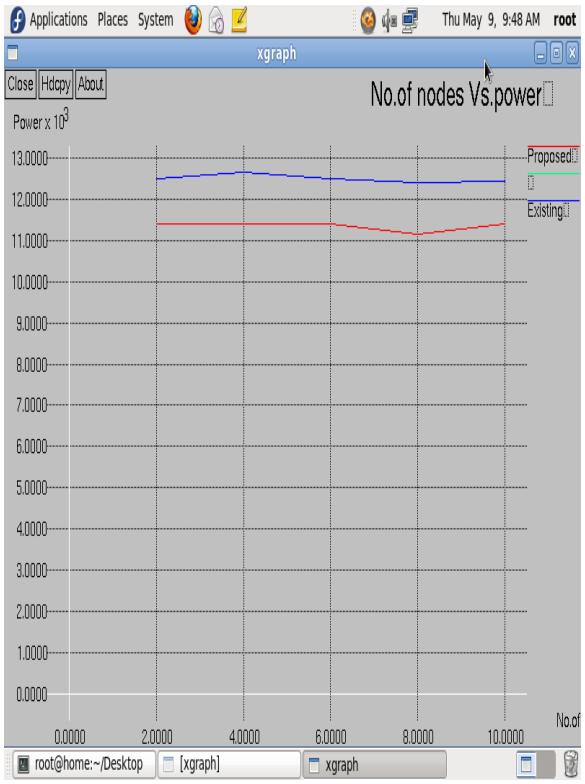
Number of nodes	50, 100, and 200
Nodes placement	randomly
Sink location	(50, 300), (50, 400)
Sensed field	100 m · 100 m
Packet size	2000 bits
Initial energy	0.25J, 0.5 J, 1J
Fusion cost	5 nJ/bit
Radio dissipation	50 nJ/bit

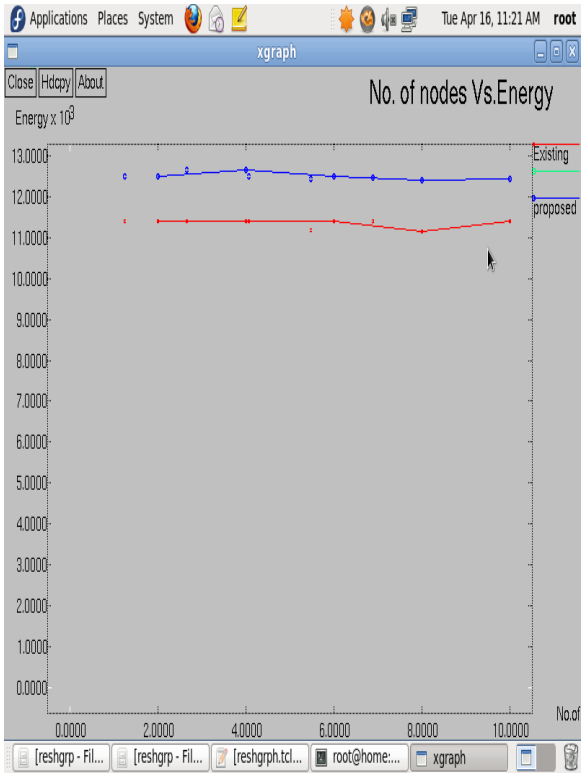
VI. CONCLUSION

The TCDGP has several advantages in WSNs for data gathering. The energy efficiency in the tree-based protocol is better than that in the cluster-based and chain–based protocols. To reduce power dissipation, we propose a novel TCDGP to combine cluster-based and tree-based protocols. A sink can obtain location and energy information about all sensor nodes. The threshold mechanism plays an important role in the TCDGP. It protects the root node from a slow death because each node has a chance to be the root.

VII. RESULT

Following shows two graphs based on power and energy. Both graph versus number of nodes. In the graph power versus number of nodes, as the power consumption in the existing system is higher than the proposed system. This is because of the number of nodes in the proposed system is higher than the existing system. In the next graph it shows the energy versus number of nodes. Efficiency of energy is higher in proposed system than in the existing system.





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