

Parent Cluster Head with XML usage in Wireless Network

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ABSTRACT

This paper proposes a new design of an efficient cluster head in wireless sensor head which is based on nested cluster head (sub cluster head). In Wireless Networks; cluster head is the key technology where nodes transmit the information to the base station. The energy consumption in a wireless network can be reduced by allowing only some nodes to communicate with the base station. One way to support efficient communication between sensors is to organize the network into several groups, called clusters, with each cluster electing one node as the head of cluster. To support scalability, nodes are often grouped into disjoint and mostly non-overlapping clusters. In nested cluster head approach instead of sensor nodes sends the data to cluster heads directly, each node sends data to sub cluster head and master node (master cluster head) sends the data to the base station. A cluster head can send and receive the message to their respective sub- cluster head and vice versa. This approach is used to save power consumption of cluster head. This paper deals about the frame work for energy conservation of a Wireless sensor network. The frame work is developed such a way that the nodes are to be clustered, electing the cluster head, performing intra cluster transmission and from the cluster head the information is transmitted to the base station.

Keywords: *Wireless Sensor network, clustering, energy, cluster head.*

1. INTRODUCTION

A **wireless sensor network** (WSN) consists of spatially distributed autonomous sensors to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants. The base station serves as a gateway for each sensor node to send data to another network (Figure 1). Thus it can be an interface to interact with the network, to extract and transfer information to the sensor nodes. Unlike sensor nodes, base stations are many times more

powerful and have an AC power supply, high communication bandwidth, and larger processing power and storage facilities.

The energy consumption in a WSN can be reduced by allowing only some nodes to communicate with the base station. These nodes called cluster-heads [3][5][7] collect the data sent by each node in that cluster, compressing it and then transmitting the aggregated data to the base station [7]. The model is suitable considering the amount of redundancy found in WSNs; direct transmissions the base station will consume large amount of transmit power from each node.

Main goal: The amount of redundancy found in WSNs; direct transmissions the base station will consume large amount of transmit power from each node. In nested cluster head approach, instead of sensor nodes sending the data to the cluster-heads directly, each node sends it to its sub cluster. We want to save power consumption of cluster heads by this architecture because cluster head will communicate with all the sub cluster head nodes directly. There is no sharing of information between different branches of the sensor network we give a new solution which makes use of the mobile agent [2][4] to traverse the wireless sensor network. While traversing the sub cluster nodes, the agent collects the sensed data and node information. All the information including the inner framework of agents is described in the XML form. The article also illustrates the XML schema use to confine the XML files. The data fusion is carried out by two agents meeting in a node. The merging process is a communication process between two agents. It is also a procedure that makes use of XML processing.

2. CLUSTER-BASED APPROACH

In the cluster-based approach, only some of the nodes in the network are allowed to transmit and receive information from the base station, which is located at a large distance from the sensor nodes [1]. The key issue

here is that, this allows sensor nodes to sense and transmit the information to the cluster-heads directly, instead of routing it through its immediate neighbors. Also, since communication energy is proportional to the square of the distance, having all nodes to transmit its sensed data individually to the base station, exhausts the energy of each node drastically and hence the lifetime operation of the network gets significantly reduced. As a consequence it does not serve the purpose with which WSNs are designed for, namely network should be operational for a long period of time.

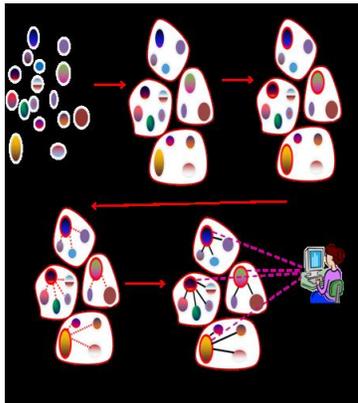


Fig. 2

3. MOTIVATION

The wireless network topology must be approached from a point of view different from that of a wired technology. In wireless sensor network (WSN), the definition of network technology is derived from the physical neighborhood and transmission power. Much of the related research in WSN is in the area of being mobile and battery powered. Many literatures are concentrated on finding solution at various levels of the communication protocol, including being extremely energy efficient. Energy efficiency is often gained by accepting a reduction in network performance [1]. Low- energy adaptive clustering hierarchy (LEACH) [13] is a new communication protocol that tries to distribute the energy load evenly among the network nodes by randomly rotating the cluster head among the sensors. Sensor protocols for information via negotiation (SPIN) [14] are a unique set of protocols for energy efficient communication among wireless sensors.

4. NESTED CLUSTER HEAD

In the Nested cluster head approach, instead of sensor nodes sending the data to the cluster-heads directly, each node sends it to its parent. The base station selects some of the sensor nodes to be its children. The election criterion is based on factors like concentration of nodes in a given area and its closeness to immediate neighbors. Other nodes in the network associate with the child nodes, as selected by the base station, on the basis of the received signal strength.

Thus in this approach the number of long distance transmissions is reduced by having the nodes to send their data to their parent and in turn to the base station. This hierarchical approach with the base station as the root node (as shown in Figure 3) generates a spanning tree for the network. Only the immediate children of the base station are required to make the high energy transmission, after collecting and compressing the data received from its offspring.

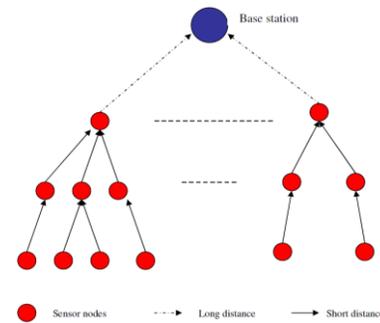


Fig. 3

Next Fig 4 shows an cluster having own sub cluster. In sub cluster, sub cluster head collects the information from its normal node and sends to the master cluster head. This is figure shows the fault node (Passive node).

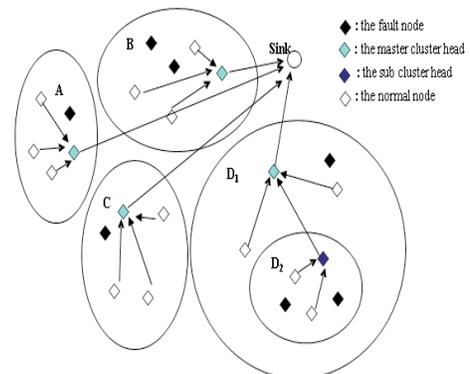


Fig. 4 Master Cluster and sub cluster head

5. MESSAGE PASSING BETWEEN OUTER AND INNER CLUSTER HEAD

A mechanism is passing the message between cluster head and sub cluster head. By this message passing, cluster head and sub cluster head can communicate and share the information about the transfer data. Message passing is same as IPC (InterProcess Communication) between processes. In process communication, one process can *send* and *receive* message to another process same thing in outer and inner cluster head.

6. XML SCHEMA FOR MOBILE AGENT

XML is platform independent language which used to represent the data. In heterogeneous WSN, cluster head having different type environment then if one cluster head wants to transfer the information to the another cluster head, then both cluster heads may be using different environment, there should be common language for communication. XML is used for represent the data of mobile agent inner framework[4]. For example the sensor specific schema depicts some critical information that composes of the mobile agent itself: sensor identity, sensor type, and sensed value. The sensor identity uniquely defines the sensor node by which the agent passes. The sensor type defines the varieties of types of the sensors. To describe a mobile agent that works in a sensor network, it is also necessary to create some agent descriptive schema including agent identity, agent task, and life cycle. The Path specific schema defines traversed nodes, node power consumption, initial node, end node. The traversed nodes are a list which records every node that the agent has passed through during its journey toward the end node.

7. CONCLUSION

This paper mainly deals about the frame work for energy conservation of Wireless Sensor Network. The frame work involves the steps which represents the different activities that are performed to conserve the energy of wireless sensor networks. Different protocols and algorithms are to be proposed to optimize the energy in the sensor network.

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