

Data Gathering In Wireless Sensor Networks

Elementrix Classes

INTRODUCTION

Data Gathering in Wireless Sensor Networks (WSNs) refers to the process of collecting and aggregating data from individual sensor nodes and transmitting it to a central node for further processing or storage.

- ❑ The **objective** of the data gathering problem is to transmit the sensed data from each sensor node to a BS.

The goal of algorithm which implement data gathering is

1. maximize the lifetime of network
2. Minimum energy should be consumed
3. The transmission occur with minimum delay

Direct Transmission

- ❑ All sensor nodes transmit their data directly to the BS.
- ❑ It cost expensive when the sensor nodes are very far from the BS.
- ❑ Nodes must take turns while transmitting to the BS to avoid collision, so the media access delay is also large.

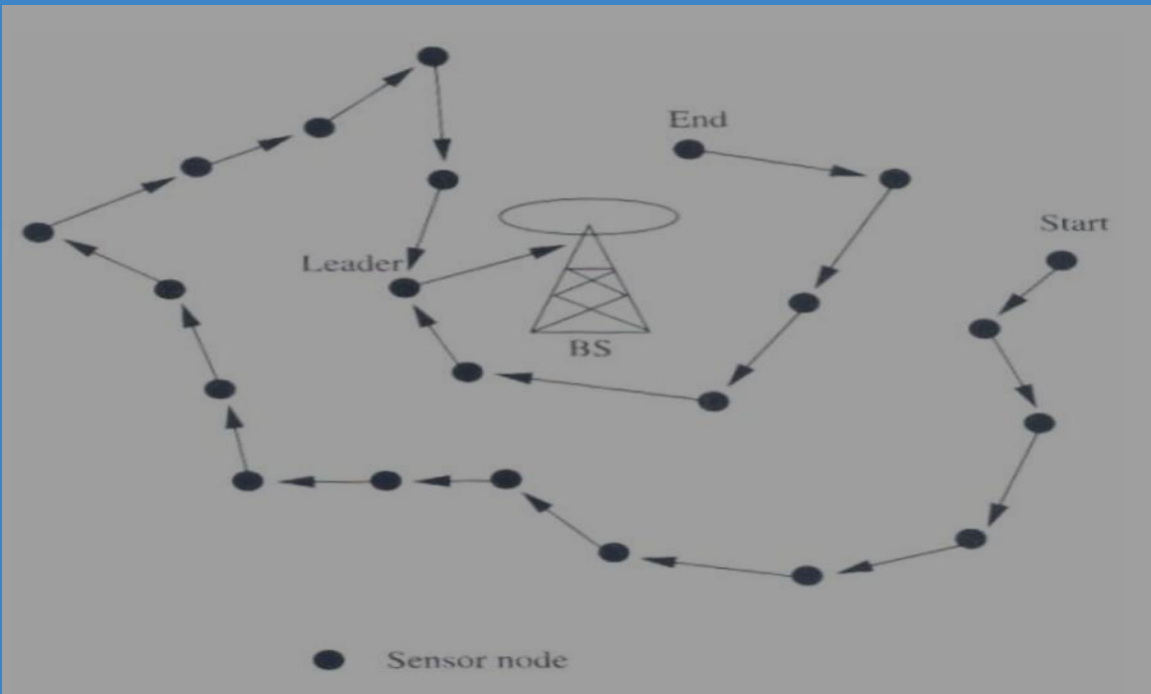
(PEGASIS) Power-Efficient Gathering for Sensor Information Systems

- ❑ PEGASIS based on the assumption that all sensor nodes know the location of every other node.
- ❑ Any node has the required transmission range to reach the BS in one hop, when it is selected as a leader.

The **goal of PEGASIS** are as following:

1. Minimize the distance over which each node transmit
2. Minimize the broadcasting overhead
3. Minimize the number of messages that need to be sent to the BS
4. Distribute the energy consumption equally across all nodes

- ❑ To construct a chain of sensor nodes, starting from the node farthest from the BS. At each step, the nearest neighbour which has not been visited is added to the chain.
- ❑ It is reconstructed when nodes die out.

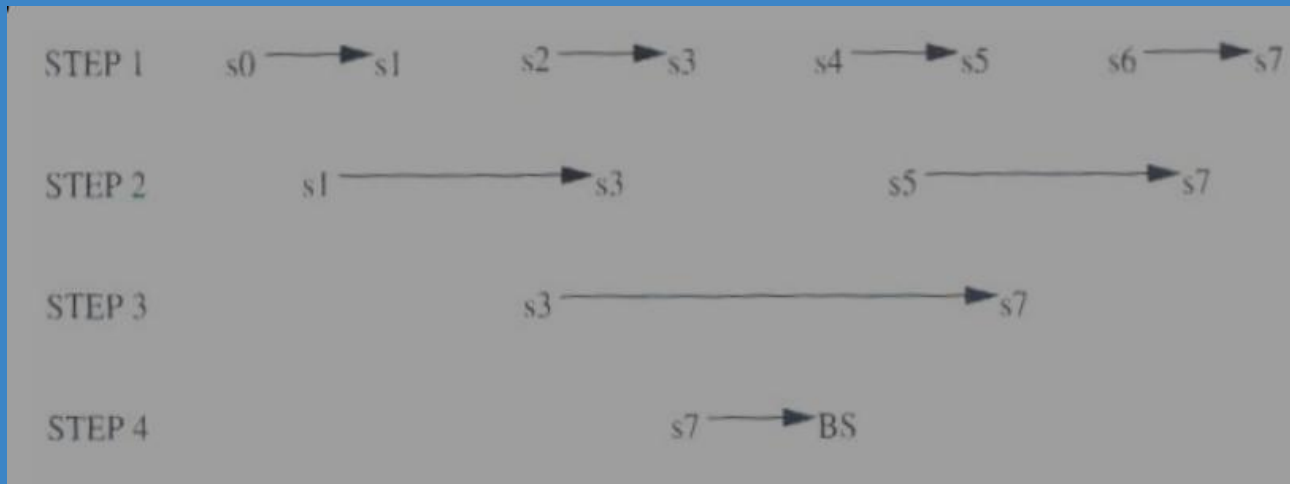


- ❑ At every node, data fusion or aggregation is carried out.
- ❑ A node which is designated as the leader finally transmits one message to the BS.
- ❑ Leadership is transferred in sequential order.

Binary Scheme

This is a chain-based scheme like PEGASIS, which classifies nodes into different levels.

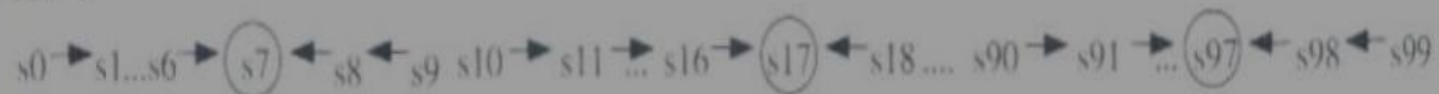
This scheme is possible when nodes communicate using CDMA, so that transmissions of each level can take place simultaneously.



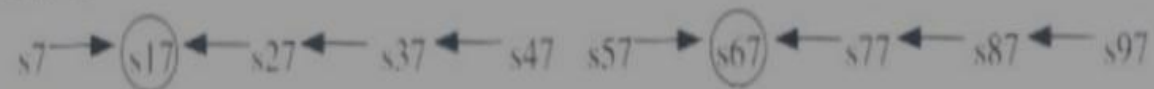
Chain-Based Three-Level Scheme

- ❑ For non-CDMA sensor nodes
- ❑ The chain is divided into a number of groups to space out simultaneous transmissions in order to minimize interference.
- ❑ Within a group, nodes transmit data to the group leader, and the leader fusion the data, and become the member to the next level. In the second level, all nodes are divided into two groups.
- ❑ In the third level, consists of a message exchange between one node from each group of the second level.
- ❑ Finally, the leader transmit a single message to the BS.

STEP 1



STEP 2



STEP 3



STEP 4



पढ़िए और पढ़ाइये

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