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A Review on Data Aggregation and Data Dissemination Protocols in WSN

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Abstract - A WSN (Wireless Sensor Network) is basically made up of large number of low cost sensor nodes, which work together to carry out some real time sensing and monitoring tasks within a particular area. In WSN, data aggregation and data dissemination play very important role. Data Aggregation technique is used to increase the lifetime of network by collecting information in an energy efficient manner. Data Dissemination protocols are required to distribute the data and code between various sensor nodes and it provide periodic updates to sensor programs. In this paper, we discuss various types of data aggregation and data dissemination protocols used in WSN.

Keywords **- Wireless Sensor Network, Data Aggregation, Data Dissemination**.

1. Introducation

The wireless sensor network is ad-hoc network which consist of small light weighted wireless sensor nodes, deployed in huge numbers, to monitor the system or environment by the Measurement of physical parameters like Pressure, temperature, or relative Humidity.

A sensor node is made up of four components in WSN: a sensing unit, a processing unit, a communication unit, a power unit. Wireless sensor network have many applications like in military field surveillance, environment monitoring, health care, accident report, law enforcement and in home applications.

All nodes in this network are communicated with each other by using intermediate nodes. To reduce power consumption of sensor nodes this is the main task in WSN.

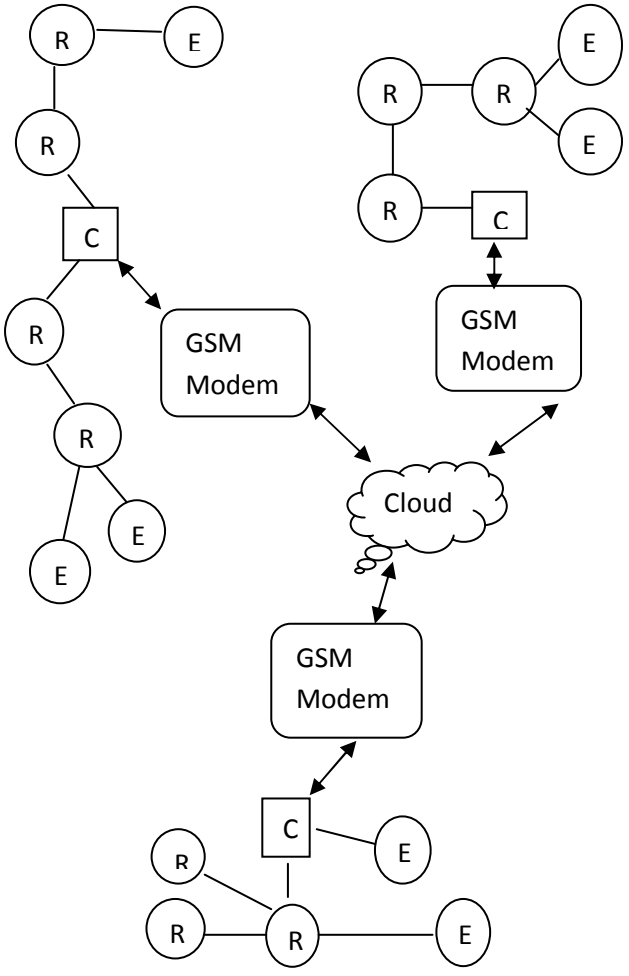

Fig.1 WSN

2. Data Aggregation

Data Aggregation is the process of one or more sensor nodes and detects the information result from the other sensor nodes. The aim of the data aggregation is removes data redundancy and improves the energy lifetime in wireless sensor network. Therefore reducing the number of data packets transmitted over the network because aggregation need less power as compare to multiple packets sending having same data.[1],[4]

2.1 Data Aggregation Approaches

Data aggregation is further divided into four basic approaches. a) Cluster based approach b) Tree based approach c) Multipath approach d) Hybrid approach.

a) Cluster Based Approach: Cluster Based Approach is defined as the hierarchical approach in which whole network is separated into various cluster. Each cluster has cluster heads and which is cluster choose from members. The main role of cluster head aggregate data received from cluster members locally and then transmits the result to base station. The cluster head can share information with the sink directly via long range transmissions or multi hopping using other cluster heads.[2],[1]

b) Tree Based Approach: The Tree Based Approach is actually defining aggregation concept which is used to make aggregation tree. This tree define as minimum spanning tree in which sink node act as root and source node act as leaves. Data start flowing from leave nodes up to root nodes. The main disadvantage of this approach is data packet loss at any level of tree which may cause failure whole network.

c) Multipath Approach: This approach is used to overcome the drawbacks of tree based approach. Accordingly to this approach each and every node could send data packets over multiple paths using multiple neighbors in aggregation tree. So a data packet sends from source to destination using multiple paths with the help of intermediate nodes. The example of this approach like ring topology. Overhead is the disadvantage of this approach.[1]

d) Hybrid Approach: The Hybrid Approach is the mixture of cluster based approach, multipath approach and tree based approach. This approach is mainly used for adaptively for optimal performance of their data aggregation.[3]

3. Data Dissemination

Data Dissemination is the process in which sensor nodes is collecting the data and communicate to the base station or any other interested node. The source node is generating the data and the information to be reported is known as event. Those nodes which are interested in event and seek information are known as sink. So in this whole process data are routed in sensor network. It is two steps process; in first step interested nodes are broadcast to their neighbor nodes in the network and in second step nodes after receiving the request nodes sends requesting data.[5],[7]

3.1 Data Dissemination Approach

There are many data dissemination methods or approaches which are following as:

a) Flooding: If the destination node is not receive the data packet or specified number of hops is not reached. Then each node broadcast the gathered data until the packet is reached to their destination node. The main advantage of flooding is not requires costly topology maintain or route discovery but it face several problems like implosion, overlap and resource blindness.[6]

b) Gossiping: The gossiping is the version of flooding approach .In this approach the packet is sent to a single neighbor chosen from neighbor table randomly instead of broadcasting each packet to the entire neighbor. This process can take long time from completion. Gossiping avoids the problem faced in flooding approach like implosion.[7]

c) SPIN: (Sensor Protocol for Information via Negotiation) this is the enhancement of flooding protocols based on data centric routing. Flooding has mainly three problems like: implosion, overlap and resource blindness. To overcome these problems the spin family protocols used three ways: ADV, REQ, DATA are used. The nodes which are interested in the event to transmit REQ message for DATA. After receiving REQ message source node sends DATA message to interested node. In this way data can reach to all interested node in entire network. This technique prevents the problems implosion, overlap and resource blindness which is faced by flooding.[7][8].

4. Conclusion

Wireless Sensor Network is the important in the field networking. A WSN is basically made up of number of several sensor nodes which work together. In this paper, we focus on existing various Data Dissemination and Data Aggregation approaches which is play very important role to increase the lifetime of network.

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