

Data Dissemination in Wireless Sensor Network

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Abstract: A large sensing and monitoring task spread over vast geographical region can now be accomplished by deploying large number of tiny low cost wireless sensor nodes which self-organize themselves to form a sensing network, known as wireless sensor network. Wireless sensor network consist of event sink and large number of sensor node. The sensor nodes are low cost, low power and multi functional devices. Sensor node are randomly distributed over a vast field to self organize a large scale sensor network. Data dissemination in wireless sensor network consumes lot of energy, various protocols or scheme has been proposed over decades to reduce the energy consumption of wireless sensor network. Various schemes are helpful to reduce the energy consumption of wireless sensor network by creating the virtual grid. Grid is constructed only when if there is no valid grid is present in sensor filed and if valid grid is present then be use the exiting grid which reduce the energy consumption of sensor node to create grid again and again if event is occurred. We follow the diagonal path in our scheme to send the query or data from sink to source or vice versa which reduce the energy consumption of data dissemination in wireless sensor network.

Keywords: Source, Sink, Sensor Node and Virtual Grid.

I. INTRODUCTION

Wireless Sensor Network (WSN) consists of randomly distributed sensors in the field to monitor the physical and environment condition such as temperature, pressure etc. The topology of wireless sensor network varies from simple to multi hop wireless mesh network. Typical wireless sensor network consist of sinks, event and source and sensor nodes are of low cost, low power and multi-functional devices which are random distributed over the vast filed and also have an property of self organizing themselves. When an event is occur in the sensor field source node generated data and make the announcement to the sink that subscribing the data and this whole process is known as data dissemination. Wireless sensor network fall in three major categories called periodic sensing, query sensing and event sensing. In periodic sensing monitoring is always done by the sensor which monitors physical environment and continuously reporting measurement to the sink. In event sensing sensor operate in an silent monitoring state and are programmed to notify about event, such as the presence of the object in intrusion detection. In query based sensor reacts to the queries of the sink by returning the corresponding measurement. The two type of grid construction is for data forwarding: low tier and higher tier. The local tier is within the local grid square cell of current location of sink and source and this made of dissemination nodes of grid. The application of wireless sensor network in area monitoring, landside monitoring, green house effect monitoring and etc. The wireless sensor network is close collaboration between user, hardware designer, application domain experts and software developers to implement the efficient systems.

Data Dissemination Protocol

Data dissemination: It basically measures the data to disseminate or send to sink.

Meta data dissemination: In this, only Meta data is disseminated while measured data remains stored in sensor node or source.

Sink location dissemination: In this the sink location is stored in sensor field. When node detects some event it first determines the location of sink and then information or measurement is sent to that location.

The protocols can also be classified depending on where the information is disseminated:

Single node: In this the disseminated information is stored in a particular node usually chosen in a deterministic or geographic way.

A node out of groups of node: In this the group of nodes is defined and the information is disseminated toward the node that is out of the group then the information is generally sent to the close to source.

A set of nodes: The information is transfer from node to node or replicated over a set of nodes.

Rendezvous Based Approach: In this type of protocol each node is aware of its location by the use of global positioning system. Generally in this protocol data is strongly correlated with the geographic location. After the sensor nodes are deployed, a virtual infrastructure is built over the physical network, such that its location is known and can be easily determine by the sensors and sink. TTDD, QDD, GHT, LOCATORS, RAILROAD, LBDD and XY come under this category.

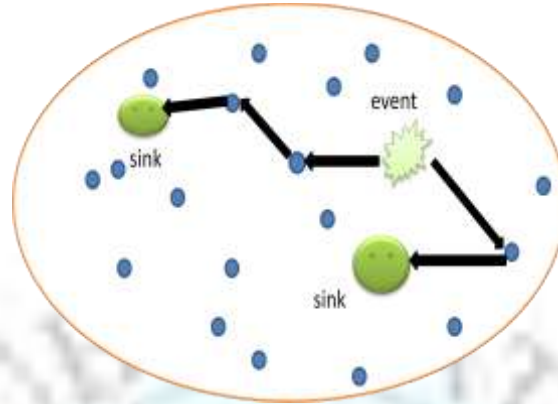


Figure 1: Wireless sensor network with source and sink

Backbone Based Approach

The second category of data dissemination protocols with mobile sinks is the back bone based virtual they use idea of self organizing scheme to build a virtual structure over the physical network to facilitate the process of data dissemination. Dynamic directed backbone (DDB) and Hierarchical cluster based data dissemination (HCDD) are comes under this category.

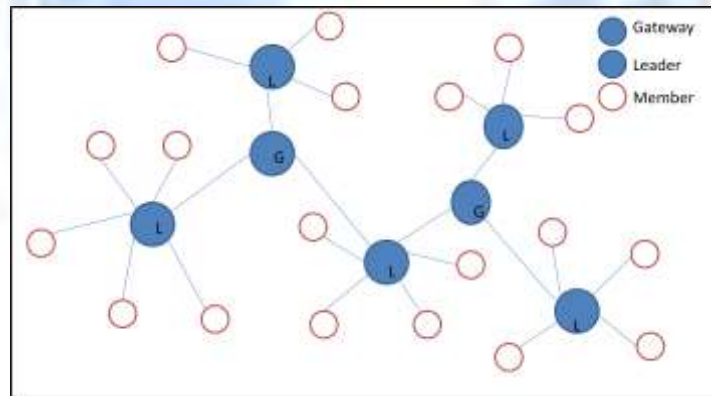


Figure 2: Backbone Based Data Dissemination Protocol

II. RELATED WORK

In TTDD source nodes are both location aware and stationary. The source has divided the grid of the cells and proactively builds grid structure throughout the sensor field that provide efficient data delivery to multiple mobile sink. Query from the sink to source traverses two tiers: higher tier and lower tier. Higher tier consists of dissemination node and lower store the current location of the sink. In TTDD when event is generated and sink needs a data, it forwards the query within a local area about cell size large to discover nearby dissemination nodes. In query forwarding sink specifies the maximum distance, and flooding stop when there is maximum distance away from sink when the query is forward to upstream to until it reaches to source nodes and upstream stores the location of its downward stream and then correspondingly data is send to the sink.

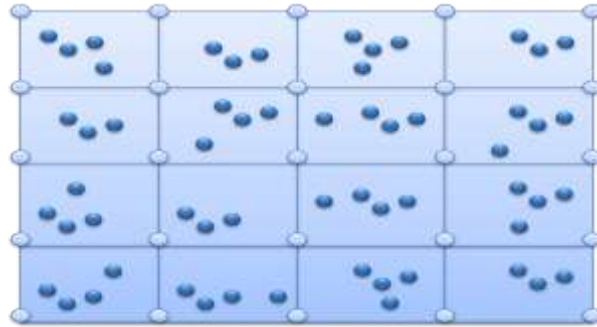


Figure 3: Grid structure in TTDD

In GBDD dual radio a mode is exploited to form the grid across the sensor field. The grid is constructed in the sensor field is done when sink is initiated in the sensor field if no valid grid is present in sensor field if the valid grid is present in the sensor field then it goes through the exiting grid and cell size is decided on the long and short range of the dual radio transmission range and ensure the continuous delivery of measurement or data from source node to sink by handling multiplicity of sink, source and event. Grid is constructed by keeping itself as one of the crossing point and two dimensional coordinates of the sink become the start point of the grid construction. The long radio transmission range and short radio transmission of dual radio is used to determine the cell size and the cell form the cluster with the one of the node at the corner is represented with the cluster head and low radio is used for handling the failure of the dissemination node and also in the selection of the dissemination node In GBDD the sensor once deploy and remain stationary and cannot can their position their own .The cell size is decided of sensor network is calculated with the help of high radio range as well low radio range.

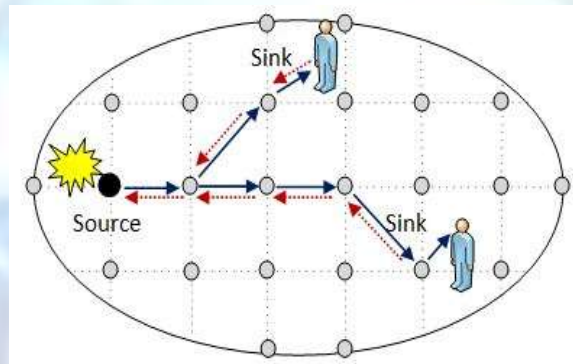


Figure 3 GBDD Design of Data Dissemination

EGDD consumes less energy consumption in grid construction by proposing the virtual infrastructure. Grid construction process is initiated when the source appearing in the sensor field when no valid grid is present if the source is appear during the valid grid period then it share existing grid and also this scheme provides a solution for calculating cell size of the grid and handling multiple sinks in wireless sensor network. In EGDD vast field is covered by a large of homogeneous sensor nodes which communicate with each other through radio signals each sensor node is aware of its own location. Sensor nodes are stationary and capable of storing some information regarding the neighboring node. Sink sends query packet to the source with source id of the corresponding source node and source nodes forward the data to the sink using the backward path followed by query packet from sink.

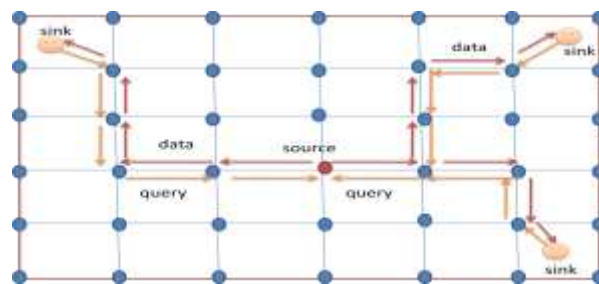


Figure 4: EGDD Design for Data Dissemination

III. CONCLUSION

Wireless sensor networks have been one of the most popular and widely used technologies in 21st century. WSNs have unique characteristics, for example, denser level of node deployment, higher unreliability of sensor nodes, and severe energy, computation, and storage constraints, which present many new challenges in the development and application of WSNs. These networks are widely used in variety of applications such as military applications, medical & healthcare, security & surveillance and environmental applications. The characteristics of sensor networks and requirements of different applications have a decisive impact on the network design objectives in terms of network capabilities and network performance. Most wireless sensor networks are application specific and have different application requirements. It is not necessary and actually impractical to implement all the design objectives in a single network. Instead, only part of these objectives should be considered in the design of a specific network in order to meet its application requirements.

IV. FUTURE WORK

In future, we plan to exploit proposed more energy efficient data dissemination in wireless sensor network and reduces the energy consumption up to large by using the diagonal approach for sending the query and data from sink to source or vice-versa which makes the data dissemination energy efficient in wireless sensor network.

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