

A Review on Improve Network Lifetime Using H-HEED Protocol

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Abstract: In the beginning the development of wireless sensors was driven by military applications but the introduction of civilian wireless sensor systems has greatly diversified application domain which has further boosted research efforts in the field of wireless sensor networks. The protocols implemented in the sensor network i.e. H-HEED protocol which should be energy aware and simple enough to be implemented in the low-end type of hardware and software of many WSN applications. WSNs H-HEED protocol may be deployed outdoors in large sensor fields to detect the spread of wild fires. The other functionality of H-HEED protocol is: One is the periodic collection of data from other members the cluster and aggregates it. Second, is forwarding the aggregated data toward the base station.

Keywords: WSN, HEED, LEACH, H-HEED, DDR.

I. INTRODUCTION

Wireless Sensor Network (WSN) technology enables design and implementation of novel; intriguing applications that can be used to address numerous industrial, environmental, societal and economical challenges and thus, the importance and potential of WSNs are constantly growing.

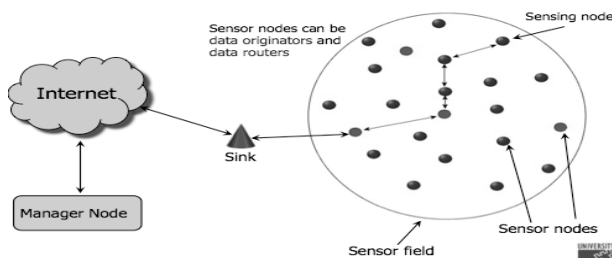


Fig. 1 Sensor Networks

A sensor node (as shown in the Fig. 1) is generally defined as a cheap and small piece of hardware, which consists of four main units:

- One or more sensors that detect physical phenomena. Common sensors monitor scalar values of temperature, pressure, humidity, light intensity, etc.
- The sensor is coupled with a data processing unit. The latter controls sensing, application logic and network transfer. It receives data from the sensors as well as it can filter (e.g. thresholding), compress or correlate data from a series of measurement. The network structure, the communication process and the power management of the node are also organized by the processing unit.
- The data's wireless transmission is provided by a communication interface.
- For every operational electronic system an energy source is needed.

Nodes in Wireless Sensor Networks (WSNs) sense data, find routes, and forward sensing data to a sink or BS that is usually far away from the data source. Since sensors

usually have a small size, low-battery capacity, non-renewable power supply, limited processing ability, small buffer capacity, and a low-powered radio, WSNs pose new challenges to both industrial and academic communities [13]. A general approach employed in data gathering and data aggregation is to construct a spanning tree which is rooted at the sink and connects all sensor nodes in the network [7]. If one node fails, the topology will be reorganized into a new topology. Tree maintenance is usually an energy-demanding operation [13]. A centralized system would mean that some of the sensors would need to communicate over long distances that lead to even more energy depletion. Hence, it would be a good idea to process locally as much information as possible in order to minimize the total number of bits transmitted.

II. HIERARCHICAL NETWORK ROUTING

This network routing is the type of network structure and protocols that come under this category is collecting and delivering the data to the Sink or Base Station. The number of protocols are using in this routing like LEACH (Low-Energy Adaptive Clustering Hierarchy) and HEED protocol. HEED protocol adopts a hierarchical design where the network is organized into clusters. Each cluster is managed by a cluster-head, which performs several tasks. In this we are choosing the H-HEED protocol and this is because of more advantages as compares to LEACH and HEED protocols. The comparison is shown in Table I.

TABLE I COMPARATIVE STUDY OF HIERARCHICAL NETWORK ROUTING

Protocol	Mobility	Position Awareness	Power Usage	Multi Path
LEACH	Fixed	No	Maximum	No
HEED	Fixed/ Dynamic	No	Maximum	Yes
H-HEED	Dynamic	Yes	Maximum	Yes

III. LITERATURE SURVEY

Harneet Kaur and Ajay K. Sharma discuss about the H-HEED protocol this protocol is basically used in heterogeneous wireless sensor network. H-HEED protocol is used to prolong the network lifetime. The impact of heterogeneity in terms of node energy in wireless sensor network have been mentioned [14].

Piyush Charan, Rajeev Paulus, Mukesh Kumar demonstrates the cross-layer optimization across different protocol layers in wireless sensor network. It also describe about different networks. Cross layer design can improve network performance [17].

S. Karthikeyan and S. Jayashri proposed about the different level networks and also tell about the clustering approach. In the proposed system is to make the protocol efficient in terms of energy, which has been achieved using the concept of secondary cluster head formation and the open shortest path first algorithm [16].

Vikash Kumar Singh, Sujata Ghatak, Lekhika Chettri, Biswaraj Sen discuss about Binary Exponential Back-Off Approach which tells how much time should be spent for waiting when the carrier is busy, waiting after collision or loss of packets. MAC algorithms have also been applied to overcome these issues. This is the mostly used algorithm in order to select the random amount for the duration of waiting time in the network [18].

Nabil Ali Alrajeh, Shaullah, Jaime Lloret, Jonathan Loopresented about different possibilities to enable energy harvesting in wireless sensor network. In this way, the lifetime of sustainable WSN can be increased to a great extent to achieve all goals of sensors deployment. In this paper, author presented in detail a secure routing protocol for wireless sensor network, which is based on cross layer design and energy harvesting technique [15].

Ravi Kishore Kodali, Naveen Kumar Aravapalli discussed Two-Level, Three-Level and Four-Level LEACH protocols. These Levels enhances energy efficiency and the lifetime of the network. The Time Division Multiplexing approach had deployed in the LEACH protocol for experimental purposed and increase the network throughput [5].

A. Ahmad, K. Latif, N. Javaid, Z. A. Khan, U. Qasimdescribed Clustered organization of nodes. Nodes are divided into clusters, with one of them serving as Cluster head in each cluster. Each cluster head has direct link to any of the nodes in its cluster. Source node forwards the message to its cluster head (CH), which then initiates by forwarding the message to all of them. More precisely, the message is sent to all neighbouring CHs which in turn forward it to their neighbouring CHs [9].

IV. PROBLEM STATEMENT

In the proposed work We created a WSN Cluster based network and arrange the sensor nodes in that manner, where graph $G(V,E)$, in which V is the set of all the nodes in the network and E consists of edges presented in the graph. An edge $e = (u,v)$, $e \in E$ exists if the Euclidean distance between node u and v is smaller than r , where r is the radius of the coverage of nodes and assumed all links

in the graph is bidirectional, and the graph is in a connected state. Given a node i , time t is recorded since it receives the broadcasted message for the first time, and $t = 0$. Here, the above said approach has been applied on the DDR technique and assumed that the performance of the network may be as good as earlier work.

V. METHODOLOGY USED

The following steps are describing to clarify the flowchart as shown in fig. 2:

1. Sensor Network has been deploying in the large network area and that sense the sensor nodes through sensing elements.
2. Dijkstra Algorithm is deploying in network to find the shortest path so that sensor node need node depend every time on base station.
3. Sensor nodes may communicates to each other via different frequency parameters and these sensor node may not communicate on single frequency so H-HEED protocol is deploying on the sensor area for ease to communicates.
4. If the group of node is in cluster or group manner then DDR technique is working on the cluster-sensor based network.
5. Packet sending and receiving both starts when all the nodes is arrange and communicates in cluster based network.
6. When the acknowledgment received from the receiver side then finally disconnection of link.

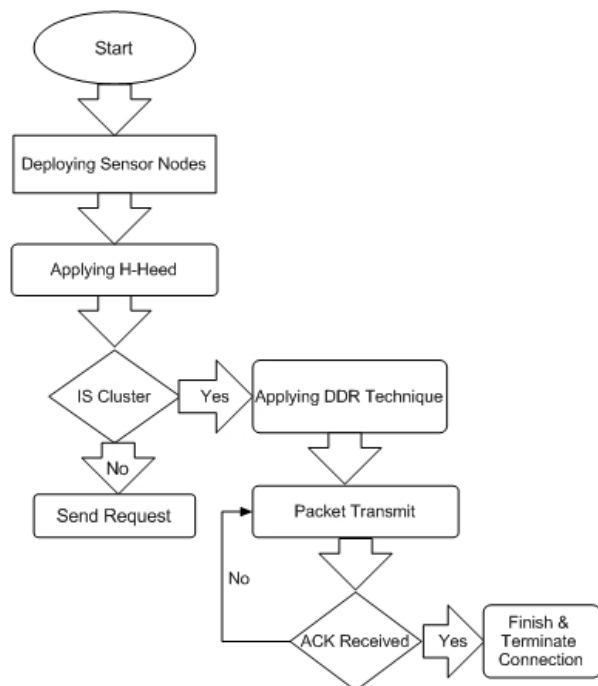


Fig. 2Flowchart of Proposed Work

VI. CONCLUSION

In this paper, H-HEED is a protocol designed to distribute data from a source node by constant injection of packets into the network at relatively low speed which allows

nodes that experience data loss to recover missing data from their neighbours. It ensures that all data segments are delivered to the intended destinations with minimum especial requirements on the nature of the lower layers. Sensor nodes that use DDR technique are notified to decrease their frequency of reporting if the reliability level at the sink node is above the minimum.

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