Leach based routing protocol in wireless sensor networks

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ABSTRACT

The main purpose of wireless sensor networks to manage conventional systems is to adjust the vitality of systems and extend the entire life of the system. The wireless sensor networks have limited energy to micro sensor nodes. When such nodes lose their force absolutely, verbal altercation stops. Wireless sensor networks have the least effort and mandatory sensor hubs with a large degree of control. A sensor hub detects information in numerous applications on wireless sensor networks and transmits it to the sink through solitary or multi-jump routes. A hierarchal-based routing protocol is mainly used in the field of energy consumption. LEACH is also clustering based routing protocol. The main aim of this research is to create a number of rules to offer better and reliable network services for wireless sensors through stable networks with nodes with long service life. Reliable is a durable and better performance platform. In this paper, we are implementing a new algorithm based on soft and hard thresholding for 2-tier cluster head formation. First, the energy efficient routing protocol is studied and analyzed. Then we use new thresholding technology algorithms. It will help in improving the network life time. And also works on alive nodes, throughput etc.

Keywords— WSN (Wireless Sensor Network), LEACH, Clustering protocol

1. INTRODUCTION

There are numerous sensing nodes in the wireless sensor network that can the intellect, compute and support ultimate results. When the sensor senses and collects the records throughout the environment, the statistical processing part is carried out by means of the accumulated data in ADC under the sensing element, then the converted data form is approved by means of the process able and communicable elements in the Base Station. A piece sensor node is generally a small transceiver, low cost and multipurpose sensing nodes that can sensor and constructs the information.[5] Network sensing nodes interact both with the base station and with other surrounding nodes. Applications for the arms control, for example, monitoring the battlefield, monitoring the health of machines, and traffic management have intrinsically motivated wireless sensor network development. In that every node works on energy, the battery is ended and all nodes are stopped.[8] Many protocols like LEACH, PEGASIS, SPIN, GEAR etc. were therefore implemented to reduce energy consumption. However, all of these LEACHs are best selected for less energy, because they work with the clustering procedure. [9] In this cluster the cluster head is formed as one collects data of all other nodes, and then sends entire collected data to the base station. For less energy use, some new technology is sometimes added to this protocol as the improved version or new LEACH protocol methods. [7]

2. IMPROVED LEACH

In this paper, the clustering mechanism in the LEACH routing protocol is studied and analyzed, making this the first clustered wireless sensor routing protocol. One of LEACH's problems lies in the fact that new clusters are restored across the entire network, while the differences in energy use between different clusters are not taken into account. In order to address the above problem, the paper offers a better LEACH protocol. Each cluster head decides after clusters have been set up, whether to select a new cluster head based on its energy consumption under the improved LEACH protocol. [6]The node with more latent energy will become the new cluster head. Those less charged clusters can therefore frequently prevent the energy consumption from selecting a cluster head. It can also avoid the overloading of the head node in the cluster failing at the same time. Improved LEACH protocol effectively extends the life of the network and improves energy efficiency effectively. [10]

3. LITERATURE REVIEW

Jie Chen et. al. [1]: This paper proposes a novel clustering algorithm (I-LEACH), which selects cluster heads according to the residual power of the node and the distance with others

cluster heads, based upon the analysis of the LEACH routing algorithm. Moreover, by combiningthe single hop and multi-hop method, the cluster sends data to the basic station to save the energy of its Cluster Copes.

Liu Re and Wang Xiu-Ping et.al. [2]: A large number of small, self-contained devices with computational, sensing and Wireless communication capabilities are included in Wireless sensor networks. LEACH is a conventional protocol based on clusters in the network of wireless sensors. In this paper, we propose an improved LEACH-WQ routing algorithm, based on the LEACH protocol, which covers the selection of cluster heads, multi-hop routing and the construction of pathways. This results in a constant and almost optimal number of cluster heads.

Mohamed Lehsaini and HerveGuyennet et.al. [3]: Failure to achieve energy depletion, environmental risks, hardware failure, communication link errors etc occurred in wireless sensor networks. Such failures could prevent them from performing their duties. In addition, most of the protocols for the routing system are ideally designed for LEACH. Therefore, when nodes do not work, their performance degrades. In this, two enhanced versions of Leach are proposed to become a protocol for defect tolerance. In this the first version of a LEACH clustered architecture with two cluster heads: one is main (CHP) and the second is secondary (CHs). The second is primary. It indicates using the checkpoint technology in the second version

Mohamed Elshrkawey and SamihaM.Elsherifet. al. [4]: Minimal power devices are composed of Wireless Sensor Networks (WSN) distributed in remote areas. Cluster sensors are arranged. A vital node called a Cluster Head (CH) is defined by each cluster. The sensed data is collected by each CH from its sensor nodes to be sent to a base station. Batteries which cannot be replaced have been used in the deployment of sensors. WSN has important concerns about energy consumption. In order to reduce energy demand and extend network life, we are proposing an improved approach. The energy balance between all sensor nodes was increased in clusters to minimize the dissipation of energy during network communications. The better method is based on a selection method for the cluster head. An improved TDMA timetable has also been put in place. Finally, the approach to the development shows progress on network lifespan, number of cluster heads, energy consumption and number of packets transferred to BS in comparison with LEACH and other related protocols. WSN has reduced its energy consumption to approximately 60% and extended the network life cycle by 73% compared to LEACH.

4. PROPOSED METHODOLOGY

The methodology provides an understanding of the implementation of a novel algorithm on the basis of hard and soft thresholding. Below are a few steps that are concluded, as of now, to solve our main problem.

(a) Initialize number of nodes, energy, and location of the base station for the network
(b) For constructing the chain, start broadcasting of message beginning from the BS(base station) to all the nodes to get information of network like the distance of all other nodes from the BS, distance among other nodes, ids etc.
(c) Find the node that is farthest from the base station using a bubble sort method and start constructing a chain from that node.

(d) Measure the distance between the alive nodes and then adjoin them to the end node. Similarly, do for other nodes also.
(e) Repeat this procedure to construct the chain for all the nodes.
(f) After this selecting the node that will communicate to the base station from the constructed chain using2 tier cluster formation by using hard and soft thresholding.
(g) Hard threshold attempts to minimize the transactions by allowing them to communicate with the sensed node only when it is in the range to transmit.
(h) Soft thresholding tries to minimize the transmission by eliminating those transmissions that have little change in the sensed node.
(i) This node will transmit the data to the BS.

5. RESULTS AND DISCUSSION

Alive nodes: Alive nodes represents the number of nodes alive at a particular round. It can be calculated by subtracting a number of dead nodes from the total number of sensor nodes. Alive nodes can be calculated as:

$$Alive\ nodes = total\ number\ of\ sensor\ nodes - number\ of\ dead\ nodes$$
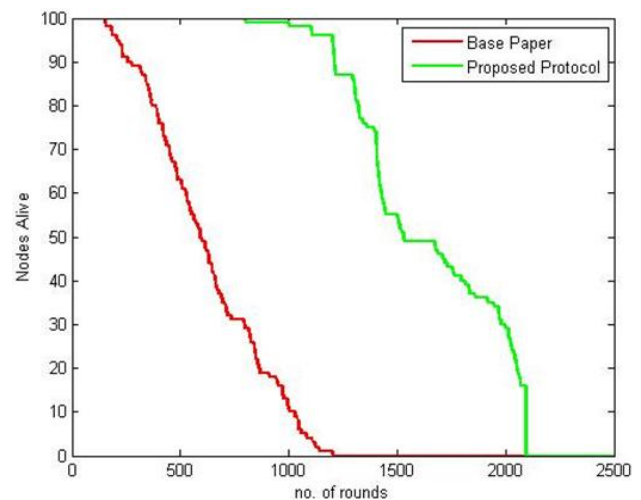

Fig. 1: Alive nodes

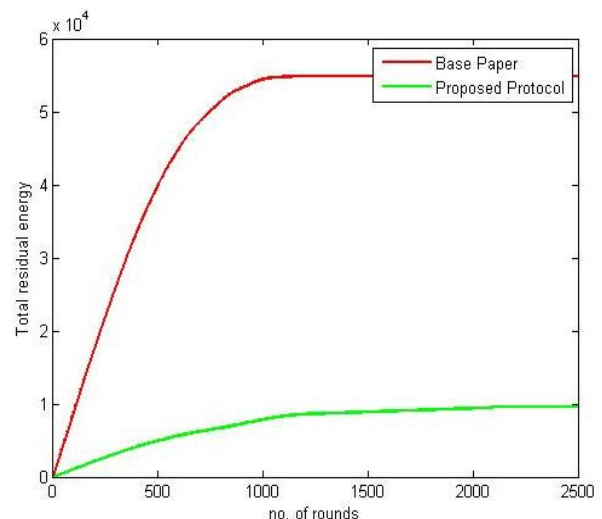**Total residual energy:** in this comparison of total residual energy of base approach and proposed work.

Fig. 2: Total residual energy

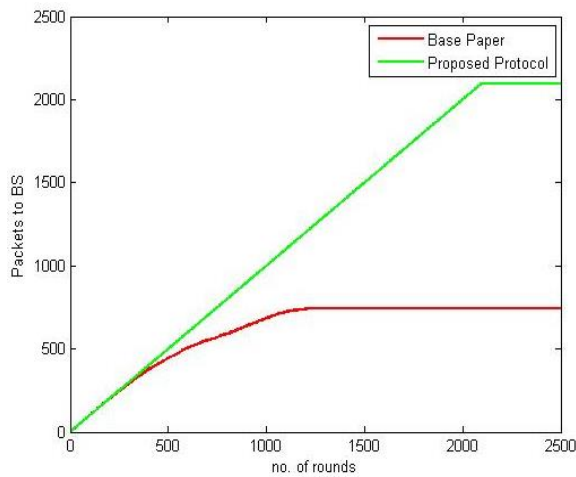**Throughput:** in this comparison of throughput of both the base approach and proposed work.

Fig. 3: Throughput

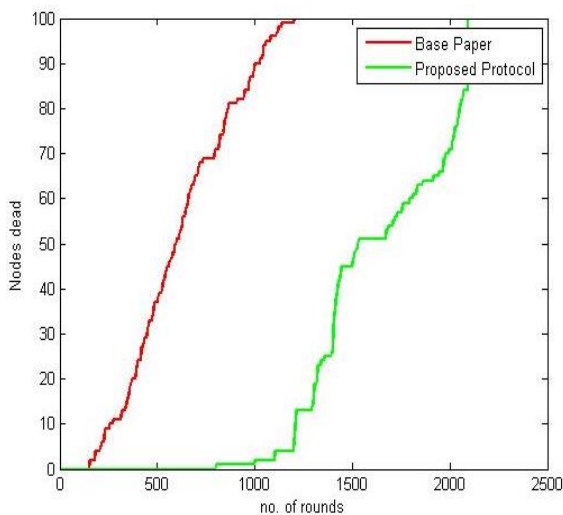**Dead nodes:** in this comparison of dead nodes are shown in base approach and proposed methodology.

Fig. 4: Dead Nodes

6. CONCLUSION AND FUTURE SCOPE

This work is aimed at minimizing the use and lifecycle of energy within the WSN. In addition, the WSN's output is expected to increase because of a drop in network energy consumption. This improves network stability and extends network life.

7. REFERENCES

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