Indonesian Journal of Electrical Engineering and Computer Science
Vol. 9, No. 3, March 2018, pp. 561~564
ISSN: 2502-4752, DOI: 10.11591/ijeecs.v9.i3.pp561-564

Load Balance: Energy Efficient Routing Protocol in Wireless Sensor Network

A. Mohamed Divan Masood[1], S.K. Muthusundar[2]
[1]Information Technology, AMET University, Chennaim, India
[2]Department of computer science, Sri Muthukumaran Institute of Technology, Chennai, India

Article Info

Article history:

Received Nov 21, 2017
Revised Jan 29, 2018
Accepted Feb 17, 2018

Keywords:

Data Traffic
Energy sufficient
Load Balancing
Wireless sensor network

ABSTRACT

Energy consumption is one of the major issue in Wireless Sensor Network (WSN) which reduces the lifetime of the network. In this developed work an Cluster based Energy Efficient Routing Protocol (CBEERP) , which is gathering the sensor hubs in the system into clusters, in this manner it productively decreased the flooding traffic during discover the routing. The proposed CBEERP will balance the Energy in the Group by using some second order nodes. The reinforcement High effective hubs replace the cluster head after the cluster reaches to its threshold energy level. This CBEERP will help the effectiveness and lifetime of the system.

Corresponding Author:

A. Mohamed Divan Masood,
Information Technology,
AMET University, Chennai,
India.

1. INTRODUCTION

IN RECENT years, the promise of large scale Wireless Sensor Network (WSN) applications has been seen as already achieved or just about to be realized. Sensor nodes almost function on battery. It is frequently difficult to revive or supplant the vitality exhausted hubs in light of the uninhabited condition of the objective zone. Most energy of the node is spent for transmission and gathering of the gained information, decreasing activity overhead for system setup becomes fundamental [1].

Normally sensor node energy was not enough to delivered date to sink. Hence, along with sensing the data of the node transmitted to intermediate sensor node until reached to sink [2]

In wireless Sensor network, the sensor nodes can be clubbed into small group (cluster). Each cluster has a leader node (cluster Head CH) to coordinate and control the nodes in the group. At random deployed sensor System requires a cluster formation protocol to partition the network into clusters. Cluster heads should also be selected based on the high efficient node among the group [3].

At first the sensor hubs are arbitrarily put in environment. Nodes are heterogeneous in nature with the diverse energy levels. Nodes with the higher energy are found among in the group and are make cluster head [4]. The remaining of the work section 2 proposed approach, section 3 result analysis and section4 conclusion of the work.

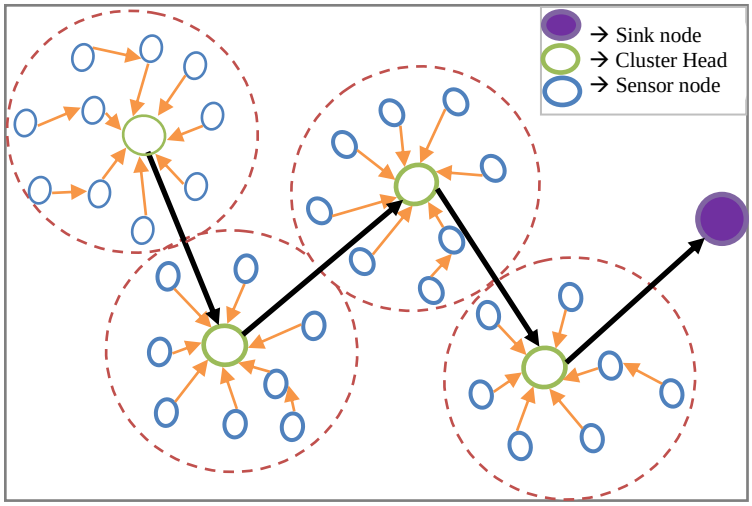

Figure 1. The cluster Structure

2. CLUSTER BASED ENERGY EFFICIENT ROUTING PROTOCOL (CBEERP)

CBEERP protocol the sensor nodes having unequal energy levels and processing power. All the nodes are in heterogeneous network with high initial energy but different level and unequal processing power Power saving mechanism for Ad-Hoc Network using 3G fast dormancy technology [6]. The selected cluster head (CH) according to their energy, processing power and location. Cluster Head defines its communication level in terms of Energy level to form cluster within the range the node comes as cluster Member. Cluster Head is maintaining cluster membership information in range of Performance analysis of black hole attacks in geographical routing MANET [7].

2.1. Initialization Phase

The picked of cluster head (CH) from the group based on their remaining energy, processing power and location. CH sends membership request message to all the hubs in its range and request to reply with their current property of nodes. The nodes with high residual energy and processing power will be identified and they are made become the backup nodes. Nodes which are not in the range of cluster head, will try to join the cluster by sending the message to the nearest cluster member Load balancing and QoS provisioning based on congestion prediction for GEO/LEO hybrid satellite networks [8]. Members are send data to CH in during allotted time period. After collecting data CH check if any repeated data available that be eliminated and remaining packet send to sink.

2.2. Re-clustering Phase

After some time if the CH residual energy cross the normal level, the CH will activate the backup node the CH will hand over its accountability to the backup node and will make the node the cluster head then existing cluster node act as cluster member of group.

3. PERFORMANCE ANALYSIS

During simulation time the events are traced by using the trace files. The performance of the network is evaluated by executing the trace files. The events are recorded into trace files while executing record procedure. The network parameters used in our simulation is described Table 1.

Table 1. Parameter

Parameter	Value
Simulator Tool	NS2
Antenna	Omni
Nodes count	50
Routing protocol	DSDV
Traffic model	CBR
Simulation Area	500×500

3.1. Packet Delivery Rate

The packet delivery rate is defined as the rate at which the destination received the data packets. The rate is calculated based on the number of data packets received per time.

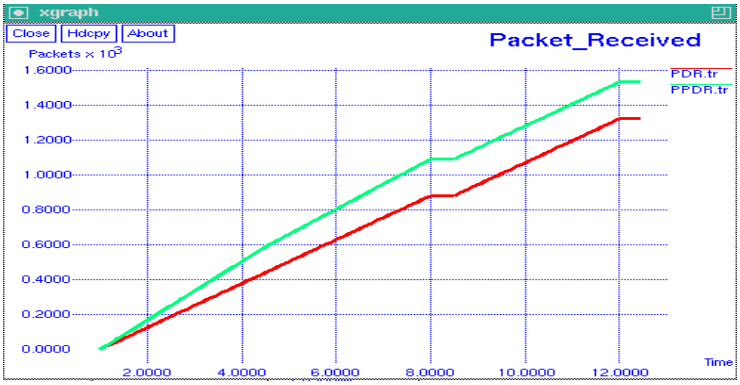

Figure 2. Packet Received of proposed scheme

3.2. Throughput Analysis

Then the throughput is calculated by number of packets received per unit time. The Throughput is calculated by using the following formula:

$$\boldsymbol{Throughput = no.of\ packet\ received/time}$$

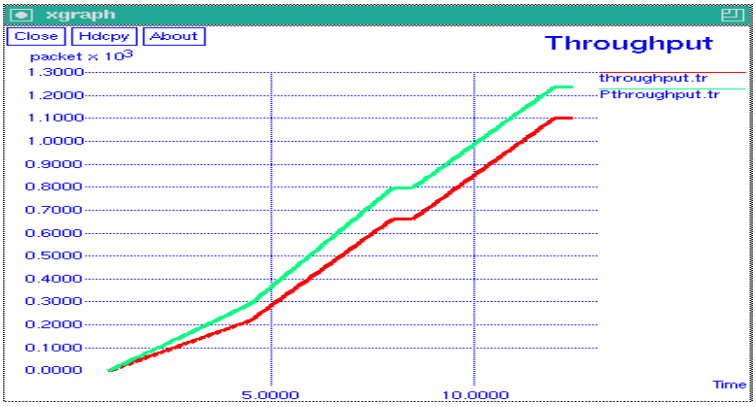

Figure 3. Throughput analysis of proposed scheme

4. RESULT AND DISCUSSION

This paper proposes the energy efficient routing protocol called tSEL. Our future work is to enhance the tSEL protocol by reducing the complexity of RSA algorithm without compromising the security and to make the protocol to defend many WSN attacks like Wormhole attack, Routing table poisoning and Resource Depletion attack.

5. CONCLUSION

Cluster based Energy Efficient Routing Protocol (CBEERP) for routing unknown nodes in a WNS is discussed. CBEERP for backup energy of node, Re-clustering, cluster head selection and cluster formation in wireless sensor network are proposed. The efficiency of the developed system is compared with the Existing clustering HEED algorithm with no of cyclic round and the dead nodes using the parameter like energy in each round per node.

REFERENCE

[1] M Carli, S Panzieri, F Pascucci. A joint routing and localization algorithm for emergency scenario, *Elsevier, Ad Hoc Networks*. 2014; 13.
[2] S S Iyengar, N Balakrishnan, G Elangovan, Neeta Trivedi. A Message-Efficient, *Distributed Clustering Algorithm for Wireless Sensor and Actor Networks IEEE*. 2006.
[3] Huafeng H, Jinchu C, Haigaug W, G Chuanshan. *Event based Trust Framework Model in Wireless Sensor Networks, IEEE International Conference on Networking*, Architecture and storage. 2008.
[4] Surender Soni, Vivek Katiyar, Narottam Chand. Clustering Algorithms for Heterogeneous Wireless Sensor Network: A Survey. *IJAER*. 2010; 1(2).
[5] T Mizuno, H Mineno, K Soga, T Takenaka, Y Terashima. *Integrated protocol for optimized link state routing and localization: OLSR-L*, Simulation Modelling Practice and Theory. 2011; (19); 1711–1722.
[6] Helen D, Arivazhagan D. Power saving mechanism for Ad-Hoc Network using 3G fast dormancy technology. *Indian Journal of Science and Technology*. 2014; 7(S6); 74-77.
[7] Shanthi H J, Anita E M. *Performance analysis of black hole attacks in geographical routing MANET*. 2014.
[8] H. Nishiyama, D. Kudoh, N. Kato and N. Kadowaki. *Load balancing and QoS provisioning based on congestion prediction for GEO/LEO hybrid satellite networks*. Proceedings of the IEEE, vol. 99, no.11, pp. 1998-2007, November 2011.