International Journal of Scientific Research in Computer Science and Engineering
Vol.5, Issue.2, pp.33-35, April (2017)

Review Paper

E-ISSN: 2320-7639

Energy Constrained Routing Algorithm for Wireless Networks

K. Kaushik[1*], B. Bhushan[2], R. Sharma[3]

[1]Departmnet of CSE, HMR Institute of Technology & Management, Delhi, INDIA
[2] Department of Computer Science and Engineering, Birla Institute of Technology, Mesra, India
[3] Departmnet of CSE, HMR Institute of Technology & Management, Delhi, INDIA

**Corresponding Author: keshavkaushik96@gmail.com*

Available online at: www.isroset.org

Received 12th Jan 2016, Revised 18th Feb 2016, Accepted 20th Mar 2016, Online 30th Apr 2017

Abstract—The aim of following paper is to introduce an Energy Constrained Routing algorithm for wireless network to enhance the performance of network. The following schemes PECE there are two stages cluster formation and stable data transfer. In stage one we used an energy saving clustering routing algorithm based on degree of the nodes, left energy and relative distance between nodes. Whereas in stage two where we used BCO (Bee Colony Optimization). On these basis of considering a precise definition of the route from source node to sink node. This algorithm helps in reducing energy consumption and increases the survival time.

Index Terms—Wireless Network, SI, Algorithm, Agents

I. INTRODUCTION

A Wireless Network (WN) Consist of huge amount of low-power and low-cost Computational Nodes. These Computational nodes are positioned in specific environment and shape a WN by organizing them. For organization of nodes artificial intelligence is used. This technology has been used widely in medical, Area Monitoring, water quality monitoring, air pollution monitoring, pressure monitoring, earth sensing and other fields. These computational nodes can be installed easily, but for proper functioning, nodes require power supply in form of battery and also it is difficult to exchange battery, so how to make nodes lasting the question takes us to an hot research area in WSN [1,2].

Routing protocol in WN is responsible for deciding the path for data transfer in network layer. Packets containing data from source node is forwarded to landing node by multi hop communication on route. The efficiency of routing protocol analyses the time of survival of an WN and the value of consumption of energy when SN are transmitting data [3]. To achieve these following characteristics of a computational node in a WN are energy constrain, frequent changes in network topology, random deployment and self organization, use of a hierarchal routing algorithm depending on the method of clustering is more efficient than simple routing algorithm in which clustering is not involved [4].The objective of Clustering algorithm to divide computational nodes present in WN into different clusters. A cluster includes a captain nodes known as cluster head and other nodes are team members which helps in communicating with captain node for the purpose of fusing and processing the information. The clustering algorithm is responsible to choose a cluster node who can survive more this means it should have minimal energy consumption.

SI (Swarm Intelligence) algorithm is an artificial intelligence algorithm based on the behaviour of social insects in a self organizing and decentralized system [5]. For the purpose of network area optimization bee and ant colony optimization is used popularly [6, 7].

Any problem can be solved by SI by a collective action of anonymous representative which can communicate with all members in networking environment in respect to find general solution for an given problem. The algorithm of SI is designed by analyzing the behaviour of collective insects which is present in self organizing & decentralized manner .

In this paper we are providing an review on efficient algorithmic cluster routing method depending on predictive energy utilization efficiency for WN in following paper. The paper also provides the formation stages for efficient algorithm. The first stage is cluster formation stage the aim of this stage is to provide energy efficient algorithm for cluster selection. Then the second stage is stable data transfer stage this stage provides the data transfer strategy based on end to end delay and routing path.

II. ALGORITHM FOR APPROACH

The BCO is a type of inherited SI optimization model, which helps in achieving lower energy consumption & labour employment using multi-agent model. The ACO model basically depends on behaviour of insects for searching food. Insects discover the shortest distance between source & colony. While in BCO ad opts two natural behaviour in process of copulation and scrabble. Copulation behaviour is used as a efficient SI optimization technology whereas the scrabble behaviour is the behaviour of bees for finding food this approach aims for searching quality food source. There are three kinds of bees which takes part in food optimization are scouts, foragers and worker bees.

A. Scouts

These are used to analyze all possible routes and guide scrabble through a swing dance indicating discovery of food.

B. Spectator

These are used to evaluate and discover sources of food and also employ the work bees to the position at which they are currently located.

C. Hire Bee

Hire bee gather at the source of food by following spectator bees. After completing its task the hire bee can work as scouts bees.

Karaboga defined clustering in multidimensional data as a method of recognizing swarm or natural grouping. This was motivated by scrable behaviour based on ABC (Artificial Bee Colony). To calculate cluster centre sum of squares of ecludiean distance from each node.

$$J(x,y) = \sum_{i=1}^{N} \sum_{j=1}^{K} x_{ij} |W_i - Z_j|^2$$

HERE:-
Xij is the correlated weight of mode Wi and cluster J.
Wi is the position of ith mode.
Zj is the centre of jth cluster.
Centre of jth Cluster can be found using following equation.

$$z_j = \frac{1}{N_j} \sum_{i=1}^{N} xijwi$$

Here Nj represents numbers of nodes in jth cluster
The value of Wi and cluster. Its value is 1 or 0

By taking optimal sum o the Euclidean Distance between instance Wi and Zj in X-dimensional Space and adjust for further proceeding each solution Zi is a D-dimensional vector.
After computing group continues to repeat cycles. A recruited bee analyzes the discovered location in its memory depending on visual information and also tests its fitness value of the new recognized food solution. If the fitness value of the new food source is higher then it will forget the previous location.

III. DESIGN OF ALGORITHM

The WN model is assumed as:-

- Let us consider whole SN have equal energy and doesn't change its position after deployment of nodes.
- SN are distributed Randomly with distinctive ID code in the WN.
- Location of computational nodes is unknown in the WN, to learn the location of the SN present in WN no positioning algorithm is required.
- The transmit ion power and approximated distance between rNode and sNode by using RSSI (Receive Signal Strength indication).

A. Energy Consumtion

The following algorithm depends on energy consumption in wireless sensor network.The energy consumption of Sdata

$$E_t(k,d) = \begin{cases} E_{elec} \cdot k + e_{fs} \cdot k \cdot d^2, d < d_0 \\ E_{elec} \cdot k + \varepsilon_{mp} \cdot k \cdot d^2, d \geq d_0 \end{cases}$$

$$d_0 = \sqrt{\varepsilon_{fs}{}^2 / \varepsilon_{mp}}$$

The energy consumed by receiving data.

B. Algorithm Design

After the completion of process of building cluster the captain nodee creates TDMA based on amount of member nodes present in WN guides the computational nodes for the timeslot of transmitting the data. The member nodes are authorized to send packet during the timeslot provided. The nodes remain in dormant state if not sending data.
The discovery of path can be done using bee agent. The process of communication can utilize the power of all computational nodes alongwith the route. If finest route from sNode (Source Node) to Designated node depends on the count of hops without taking into consideration of energy of the battery node. When overloaded nodes doesn't work the unfair substitution of traffic can lead to WN Partitioning. Therefore efficient routing protocol and

fault tolerant should consider route information of consumption of energy before choosing path of transmission.

- Remaining energy of each node if less then predetermined value the route cannot be selected for transmission of packets
- The total energy consumption of path nodes to route packets on path which consumes lower energy

C. *Cluster Formation*

Information broadcasting stage broadcast its ID information to outside in WN.
Role Determining state each nodes calculates its regular time. This nodes selects exiting time and member nodes.

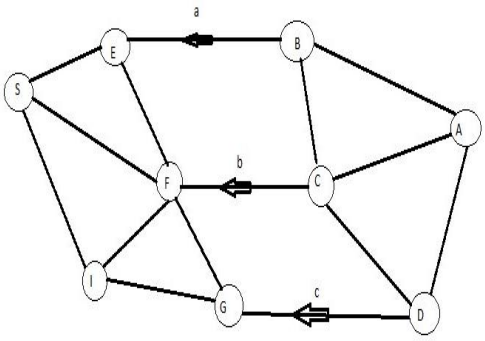

Fig.1. Path identification by bee agent

Let A be starting node and S be the sink node here a and b are the shortest path and algorithm will choose an path consuming lower energy.

IV. CONCLUSION

We have showed an efficient routing algorithm depending upon PCCE for WN in the paper. The algorithms consist of two parts standard data transfer and cluster formation. In first method optimally elected nodes which have more nodes then neighboring computational nodes and shorter relative distance. This method also helps in reducing cost of communication between member and head nodes. The energy consumption is based on hops and propagation delay. This shows that why this efficient algorithm routing is essential for the WN to enhance communication capability of an Wireless network.

REFERENCES

[1] DG Zhang, "*Design and implementation of embedded un-interruptible power supply system (EUPSS) for web based mobile application*", Enterprise Information System, Vol.6, Issue.4, pp.473–489, 2012.

[2] D. Zhang, K. Zheng, T. Zhang, X. Wang, "*A novel multicast routing method with minimum transmission for WSN of cloud computing service*", Soft Computing, Vol.19, Issue.7, pp.1817–1827, 2015.

[3] GQ Zheng., "*The research process of MAC protocol of WSN*". Acta Automatic Sinica, Vol.4, Issue.3, pp. 305–316, 2008.

[4] A. Rana, M. Bala, Varsha , "*Review Paper on MSEEC: Energy Efficient Clustering Protocol in HWSN*", International Journal of Computer Sciences and Engineering, Vol.4, Issue.5, pp.71-75, 2016.

[5] J Kennedy, "*Particle swarm optimization*", Proceeding of IEEE International Conference Neural Networks, Vol.4, Issue.1, pp.1942–1947, 1995.

[6] GG Llinas, "*Network and QoS-based selection of complementary services*", IEEE Transcation Services Computer, Vol.8, Issue.1, pp.79–91, 2015.

[7] DG Zhang, "*A new approach and system for attentive mobile learning based on seamless migration*", Applied Intelligence, Vol.36, Issue.1, pp.75–89, 2012.

[8] S. Stanislava, "*Cluster head election techniques for coverage preservation in wireless sensor networks*", Ad-Hoc Network, Vol.5, Issue.7, pp.955–972, 2009

[9] H. javedan, G. Shahmohammadi, "*Presenting a Method for Efficient Energy Consumption in Wireless Sensor Networks Using the Topology control and Fuzzy Systems*", International Journal of Computer Sciences and Engineering, Vol.4, Issue.2, pp.1-12, 2016.

[10] DG Zhang, "*Novel Quick Start (QS) Method for Optimization of TCP*", Wireless Networks, Vol.22, Issue.1, pp 211–222, 2016.

[11] Uruj Fatma Siddiqui, Raj Gaurang Tiwari and Pankaj Kumar, "*A Review of Improvement on LEACH Protocol in Wireless Sensor Network*", International Journal of Computer Sciences and Engineering, Vol.3, Issue.8, pp.26-31, 2015.

[12] S Lindsey, "*PEGASIS: power efficient gathering in sensor information systems*", *IEEE Aerospace Conference*, China, pp.1152–1130, 2002.

