

International Journal of Computer Science and Mobile Computing



A Monthly Journal of Computer Science and Information Technology

ISSN 2320-088X

IJCSMC, Vol. 3, Issue. 4, April 2014, pg.70 – 73

REVIEW ARTICLE

To Enhance Reliability of Dynamic Clustering Using Self Learning Technique: A Review

Shivani Garg

Chandigarh Group of Colleges, Landran
shivani.garg53@gmail.com

Abstract— The wireless sensor network is one of the types of Ad hoc network. Any sensor node can join or leave the network when they want i.e. self-configuring in nature. There is no central controller is present in wireless sensor network. Wireless sensor nodes are responsible for data routing in the network. Wireless sensor network is used to monitor the environmental conditions like, pressure, temperature and humidity etc. Wireless sensor network is deployed in the far places like forests, deserts etc. Wireless Sensor nodes are very small in size and have limited resources. In such far places it is very difficult to recharge or replace the battery of the sensor nodes. In such conditions, we focus to reduce the battery consumption of the sensor nodes. In our work, a new technique is proposed to reduce battery utilization. Our new proposed technique will be based on the dynamic clustering using neural network. Before data transmission sensor nodes form the cluster dynamically using the neural network.

Keywords— Dynamic Clustering, Neural Network, Energy, Clustering

I. INTRODUCTION

Wireless sensor network (WSN) is a small light weighted wireless nodes network which is extremely spread and deployed in large numbers. Wireless sensor networks supervise the system or environment by measuring physical parameters such as humidity, pressure and temperature etc. [1]. An economic approach of the wireless sensor network is achieved for the deployment of the control devices and distributed monitors and avoids the expensive wired system. In other words, wireless sensor network is a computer network. It is composed of a large number of sensor nodes and these nodes are skilled of sensing environment around them. Sensor nodes are types of devices which are capable of storing, gathering, sensing and transmitting information. Without install wireless sensor network, sensor nodes can be deployed anywhere. Wireless Sensor Network is a self-healing and self-organizing. Self-healing networks is that network which allows nodes to reconfigure their link associations and find other pathways around powered-down nodes or failed nodes. Self-organizing allows a network automatically join new node without the need for manual interference. The gathered information can be retrieved. WSN is a decentralized systems and peer-to-peer communication is takes place between two nodes. The existing infrastructure is not required to deploy the wireless sensor networks. In WSN, nodes can be easily add and removed as required. By doing this, there can be changes in network topology, network tree and updating path may occur. The sink may be connected to the outside world through internet where the information can be utilized within time constraints [2]. Sensors nodes are based

upon a battery with limited lifetime [3]. The architecture and protocol of sensor networks can be easily scale up to any number of sensor nodes. So the battery lifetime of the nodes can be extended by reducing the amount of communication and caching the useful data for each sensor either in its local store or in the neighborhood nodes can prolong the network lifetime. Artificial neural network is collection of interconnecting of artificial neurons. This network may either be used to gain understanding of biological neuron or to solve artificial intelligence problems without creating any model [4]. Biological neural networks are made up of real biological neurons that are connected or functionally related in nervous system. Neural network is that network which is aggravated from human brain. The brain is complex, parallel computer and nonlinear in nature. It has ability to arrange its constituent's structure known as neurons so that to perform complex computations [5]. It is an adaptive in nature that changes its structure on the basis of internal and external structure information that flows through the networks. In our work, we are using neural network technique for dynamic clustering. Network topology can be altered or configuring according to the network conditions

In this paper, in section 2 Literature Review will be written. In section 3, dynamic clustering will be written. In section 4, Neural network will be presented. New proposed technique will be presented in section 5. In the last section 6 we have written future work and conclusion.

II. LITERATURE REVIEW

Kiran Maraiya et.al, "Application based Study on Wireless Sensor Network" has described overview of wireless sensor network and how it is different from traditional network. They also discussed about the design challenges and key features of the protocol used in this network. What is the different network topologies used in the network, what are the different types of its applications, types of its constrain and protocol stack architecture all are studied in this paper [6].

Amir Akhavan Kharazian et.al, "Adaptive clustering in Wireless Sensor network has discussed in this paper how to increase network life time with low energy nodes. This paper presents an algorithm, first it has consider to the nodes with low energy and these nodes determines which nodes become cluster-head, The cluster head selection based on the weighting of the neighboring nodes that the weights were calculated based on the energy residual and distance between nodes. Then it shows Simulation for 100 nodes had showed better performance than two well-known protocols, LEACH and LEACH-C. In all cases, the proposed algorithm show better performance than LEACH and it has result almostlike LEACH-C. LEACH-C is a centralized algorithm and the proposed algorithm is distributed algorithm without need any global information [7].

Narottam Chand, "Cooperative Data Caching in WSN" has presented cooperative caching scheme ZCS to improve performance the performance of wireless sensor networks. In this scheme, in a zone nodes share their data which shows limited nodes problems and limited query latency at a node to prolong lifetime of wireless sensor networks. a cache discovery process, distance based admission control, consistency check and utility based cache replacement policy is include by ZCS scheme. To improve hit ratio replacement policy is also used [8].

Xu Li et.al "Sink Mobility in Wireless Sensor Networks" has explained in this paper about to collect information from sensor field for analyzing and processing at pre-defined field. They also exploited mobility in sink to reduce and balance energy consumption. They also discussed about energy hole problem and models and its assumptions [9].

Chee-Yee Chong et.al, "Sensor Networks" has presented MEMS technology and low-cost manufacturing, more reliable communication, wireless have resulted in small, inexpensive, and powerful sensors with embedded processing and wireless networking capability. These wireless sensor networks are used in many applications from home appliances to environmental monitoring. Concept of DNS was also introduced in this paper [10].

III. DYNAMIC CLUSTERING

Dynamic clustering is an energy efficient algorithm. Energy consumption of the network can be decreased by using clustering algorithms. The energy consumption of wireless nodes is depends upon the distance of transmission, optimal routing protocols and amount of data to be transmitted. In cluster based wireless sensor networks, cluster heads (CH) meets these requirements 1) same adjoining sensors are grouped into a cluster. 2) Resources of high energy 3) Network should be distributed. Low Energy Adaptive Clustering Hierarchy (LEACH) gives a simple distributed clustering scheme for evenly distributing energy dissipation[15].Probability function is used to rotate the position of the CHs. Optimal energy dissipation is not considered by LEACH at each round. CHs are never distributed in LEACH [15]. Cluster member nodes leads low level hierarchal, CH leads high level and cluster formation leads two level hierarchies. The sensor nodes transmit its data to CH nodes periodically.Ch nodes aggregate that data and send to base station either directly, through intermediate or through some other CH nodes.CH nodes spend a lot of energy at higher rates to send data to higher distance or same distance. A periodically re-elect new CH is the solution to balance the energy consumption among the nodes in each cluster. Single hop

intra-cluster and Multi-hop Intercluster is its example. Base station received data from sensor nodes and which is further accessed by end users. CH is the sink for cluster nodes and BS is sinking for CH [14]. Clustering of nodes shows that network is more stable and efficient. Clustering of nodes is based upon least distance and higher energy by knowing location. Clustering reduces traffic network and increase performance. Through other cluster heads CH forward data to sensor nodes [14].

IV. NEURAL NETWORK

Artificial neural network is composition of interconnecting of neurons. Artificial neural networks can be used to gain considerate of biological neuron and to solve artificially intelligence problems without creating any model [4]. Biological neural networks are made up of real biological neurons that are connected or functionally related in nervous system. Neural network has been motivated from brain of human. The brain is complex, parallel computer and nonlinear system. It has ability to arrange its constituent's structure known as neurons to perform complex computations. It is an adaptive in nature so that changes its structure based on internal and external information that is flows through the networks. It resembles with brain in two aspects:

1. The knowledge of the network is acquired from environment.
2. Synaptic weights are used to store and adjust the acquired knowledge.

V. NEW PROPOSED TECHNIQUE

The size of the sensor node is very small and resource, battery power is also limited. Wireless sensor network is deployed in the far places like forest, deserts, oceans etc. In such places it is very difficult to recharge or replace the battery of the sensor nodes. Our main focus is to save the battery life. In this paper, we are proposing a new technique to save the battery life through dynamic clustering approach. The nodes in the sensor network can arrange themselves in the clusters dynamically using neural network. The neural network is the type of network which will learn from the past experiences and respond according to the situation. In our technique when any node wants to transmit data to the other node secure and reliable route will be established between the sender and receiver. The intermediate nodes will arrange them themselves into a clusters in such a way that minimum energy will consumed while routing the data from sender to the receiver.

VI. FUTURE WORK AND CONCLUSION

In this paper, we conclude that limited battery life of the sensor node is major challenge of the sensor network. The new technique proposed in this paper will use the concept of neural network for dynamic clustering. The simulation results show that dynamic clustering is the efficient approach to reduce the battery consumption. In our future work, we implement this technique and compare the results of the new proposed technique with the previous once.

REFERENCES

- [1] C. García Izquierdo, F. Bertigli, R. Benyon, D. del Campo, M. Dobre, V. Fericola, D. Hudoklin, E. Grudniewicz, M. Heinonen, P. Klason, C. Holstein-Rathlou, J. Johansson, H. Kaykısızlı, G. Lopardo, C. Melvad, J. Merrison, K. Migala, A. Piccato, G. Roggero2, P. Spazzini, A. Szymka-Grzebyk, S. Ruiz, A. Merlone,"2010
- [2] Sudhanshu Pant Naveen Chauhan Prashant Kumar," Effective Cache based Policies in Wireless Sensor Networks", International Journal of Computer Applications (0975 – 8887), Volume 11– No.10, December 2010
- [3] Narottam Chand," Cooperative Data Caching in WSN", World Academy of Science, Engineering and Technology 63 2012
- [4] Michael J.Cavaretta , "Neural Network",2010
- [5] Guoqiang Peter Zhang," Neural Networks for Classification: A Survey", IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART C: APPLICATIONS AND REVIEWS, VOL. 30, NO. 4, NOVEMBER 2000
- [6] Kiran Maraiya, Kamal Kant, Nitin Gupta," Application based Study on Wireless Sensor Network", International Journal of Computer Applications (0975 – 8887) Volume 21– No.8, May 2011

- [7] Amir Akhavan Kharazian, Kamal Jamshidi and Mohammad Reza Khayyambashi,” Adaptive Clustering in wireless sensor network: considering nodes with lowest energy”, International Journal of Ad hoc, Sensor & Ubiquitous Computing (IJASUC) Vol.3, No.2, April 2012
- [8] Narottam Chand, “Cooperative Data Caching in WSN”, World Academy of Science, Engineering and Technology 63 2012
- [9] Xu Li, Amiya Nayak, and Ivan Stojmenovic,” Sink Mobility in Wireless Sensor Networks”,2003
- [10] Chee-yee-chong, Srikanta P Kumar, Sensor Networks: Evolution, Opportunities, and Challenges”, PROCEEDINGS OF THE IEEE, VOL. 91, NO. 8, AUGUST 2003