



# INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume3, Issue2)

## A Comparative Analysis Wireless Sensor Routing On Heterogeneity Cluster Using Pollination Optimization Technique

**Amandeep Kaur**

*M.Tech/System Software*

*Chandigarh Engineering College, Landra*

[chahalkauraman@gmail.com](mailto:chahalkauraman@gmail.com)

**Ms. Nafiza Man**

*Assistant Professor,*

*Chandigarh Engineering College, Landra*

[cem.cse.nafiza@gmail.com](mailto:cem.cse.nafiza@gmail.com)

---

**Abstract:** *The cluster-based routing protocols are most accepted to improve the network lifetime and to reduce the energy consumption of wireless sensor network. This paper presents the pollination based optimization algorithm also called OLEACH-C to improve the performance of LEACH-C protocol. The PBO algorithm is used for clustering in WSN. The node that has maximum remaining energy will be selected as a cluster head. If the two nodes having the same energy then cluster head will be selected on the basis of distance. The node that has a minimum distance from the base station will be selected as CH. We optimized cluster head optimization by flower pollination algorithm.*

**Keywords:** *FPA, CH, Optimization, Leach.*

---

### I. INTRODUCTION

Wireless Network systems are gathering popularity simply because which they offer low-cost solutions with regard to a range of request fields. The big request space connected with WSNs covers countrywide safety, security, army, healthcare, atmosphere keeping track of and the like. You will discover a couple of instances connected with WSNs, any 'homogeneous' sensor systems once the nodes in the sensor circle have the same amount of strength plus a 'heterogeneous' sensor systems each time a proportion in the node human population gives you far more strength in comparison with all of those other nodes in the very same circle.

Inside heterogeneous WSNs (HWSNs), quite a few affordable nodes perform realizing, though a couple of nodes acquiring fairly far more strength perform files selection, fusion along with transfer. And then, lifespan period along with trustworthiness in the circle may be improved by heterogeneity with WSNs. HWSNs are very much valuable with genuine deployments because they are far more near to real life circumstances [1].

A Wireless Sensor Network is a self-configuring network of small sensor nodes communicating among themselves using radio signals, and deployed in quantity to sense, monitor and understand the physical world. WSN provide a bridge between the real physical and virtual worlds. Allow the ability to observe the previously unobservable at a fine resolution over large spatiotemporal scales. Having a wide range of potential applications to industry, science, transportation, civil infrastructure, and security. Typically, wireless sensor node consists of sensing, computing, communication, actuation and power components. These components are integrated into a single or multiple boards and packages in few cubic inches. Low-power circuit and networking technologies, a sensor node powered by 2AA batteries and last up to three years with 1% low duty cycle working mode. After initial deployment sensor nodes are responsible for self-organizing an appropriate network structure often with multiple hop connections between sensor nodes. Location and positioning information can also be obtained by Global Positioning System or local positioning algorithm. The era of WSN's is highly anticipated in the near future [2].

### Enabling Technologies

#### 1.2.1 Hardware

The hardware basis of WSN's is driven by advances in several technologies. System on the chip is capable of integrating complete system on a single chip. Many researcher groups have been trying to integrate prototype sensor nodes onto a few chips Commercial RF circuit enables short distances wireless communication with extremely low power consumption.

#### 1.2.2 Collaborative Signal Processing

Collaborative Signal Processing algorithm is another technology for WSN. While raw data from the environment are collected by sensor nodes, only useful information is of importance. Raw data need to be processed locally at sensing nodes and processed data is sent back to the user. Signal processing is often required to perform a set of sensor nodes in proximity due to weak sensing and processing capability of each individual node. Information Fusion is an important topic for collaborative signal processing. Other techniques included are localization, synchronization, target tracking, boundary detection etc.

### 1.2.3 Wireless Networking

Besides Hardware and Collaborative Signal Processing the development of WSN's also relies on the wireless network. Design for wireless LAN's that consists of laptops. High power consumption and excessively high data rate of protocols are not suitable for WSN's. Routing technique in a wireless network is another important research direction for WSN's. The protocols are hardly applicable to WSN's due to their high power consumption [4].

## II. LITERATURE REVIEW

**In [5], Gaganpreet Kaur et al:** In this paper, they discuss the Deploying an Optimized Leach-C Protocol for Wireless Sensor Network. Wireless sensor network is built of several nodes (from a few to several hundred or even thousands), where each node is connected to one sensor. The main challenging task in this network is lifetime and energy consumption. The cluster-based routing protocols are most accepted to improve the network lifetime and to reduce the energy consumption of wireless sensor network. This paper presents the pollination based optimization algorithm also called OLEACH-C to improve the performance of LEACH-C protocol. The PBO algorithm is used for clustering in WSN. The node that has maximum remaining energy will be selected as a cluster head. If the two nodes having the same energy then cluster head will be selected on the basis of distance. The node that has a minimum distance from the base station will be selected as CH. The Simulations results show that the OLEACH-C protocol selects the best CHs that guarantee a routing optimization with the minimum energy consumption and minimum communication links` cost between nodes within each cluster and other energy efficient communication protocols for WSN routing protocol improve the energy consumption and network lifetimes.

**In [4] Katiyar V et al:** In this paper, they discuss a Survey on Clustering Algorithms for heterogeneous Wireless Sensor Network. This Paper described the impact of heterogeneity and study different clustering algorithms for heterogeneous WSNs highlighting their objectives, features, complexity, etc. To expand the lifetime of a sensor network by reducing energy utilization clustering technique is used. It can also increase network scalability. Most of them are based on clustering. They are classified according to energy efficiency and stability of the network. Finally, conclude the applications of heterogeneous wireless sensor networks are more suitable as compared to the homogeneous wireless sensor network and more enhancement of network lifetime is there.

**In [1] E Emary et al:** In this paper they discuss a Flower Pollination Optimization Algorithm for Wireless Sensor Network Lifetime Global Optimization. As wireless sensor networks still struggling to extend its lifetime, nodes` clustering and nomination, or selection of cluster head node are proposed as solution. LEACH protocol is one of the oldest remarkable clustering approaches that aim to cluster the network`s nodes and randomly elects a cluster head for each cluster. It selects cluster heads but it is not responsible for proper clustering formation. In this paper we use the Flower Pollination Optimization Algorithm (FPOA) to propose a WSN energy aware clustering formation model based on the intra-cluster distances. The objective is to achieve the global optimization for WSN lifetime. Simulation results and performance analysis show that applying flower pollination optimization on WSNs clustering is more efficient. It is effectively balance power utilization of each sensor node and hence extends WSN lifetime comparatively with the classical LEACH approach.

**In [8] M Bani Yassein et al:** In this paper they discuss a New Approach for Clustering in Wireless Sensors Networks Based on LEACH-C. LEACH-C is similar to LEACH protocol. In this, instead of nodes randomly self- selecting as a CH, the LEACH-C performs a centralized algorithm. The sink collects location data from the nodes and they broadcast its decision of which nodes are to act as CH. The overall performance Of the LEACH-C is better than LEACH. But once the energy cost of communicating with the sink becomes higher than the energy cost for cluster formation, LEACH-C no longer provides good performance. Sinks may be located far from the network in most WSN applications.

**In [3] Fayeze W. Zaki et al:** In this paper they discuss a Multi-level stable and energy-efficient clustering protocol in heterogeneous wireless sensor networks. Classical clustering protocols in wireless sensor networks (WSNs) assume that all nodes are equipped with the same amount of energy. As a result, they cannot take full advantage of the presence of node heterogeneity. In this study, a stable and energy-efficient clustering (SEEC) protocol for heterogeneous WSNs is proposed. In addition, the extension to multi-level of SEEC is presented. It depends on the network structure that is divided into clusters. Each cluster has a powerful advanced node and some normal nodes deployed randomly in this cluster. In the multi-level architectures, more powerful super nodes are assigned to cover distant sensing areas. Each type of nodes has its role in the sensing, aggregation or transmission to the base station. At each level of heterogeneity, the optimum number of powerful nodes that achieves the minimum energy consumption of the network is obtained. The performance of the proposed protocol is compared by existing homogeneous and heterogeneous protocols. Simulation results show that the proposed protocol provides a longer stability period, more energy efficiency and higher average throughput than the existing protocols.

**In [2] Neeraj Kumar et al:** In this paper, they discuss cluster-based data aggregation architecture in WSN for structural health monitoring. Wireless Communications and Mobile Computing. In the effective use of Structural Health Monitoring (SHM), overwhelming data provision has another big problem. Data aggregation condenses raw data into useful information and reduces redundant data transmissions. Clustering is used in which the cluster is made while combining the sensor node and with the help of cluster head the data is transmitted to the base station and it enhances the efficiency and prolongs the lifetime of wireless sensor network. Thus, significant energy and data storage have saved, and tasks can be completed more efficiently.

**In [7] Vidya KS et al:** In this paper they discuss the Enhanced distributed Energy Efficient Clustering Scheme for heterogeneous Networks. This Paper described the enhanced distributed energy efficient clustering scheme for heterogeneous networks. It contains three types of sensor nodes in order to improve the stability of the wireless sensor network and to make longer the

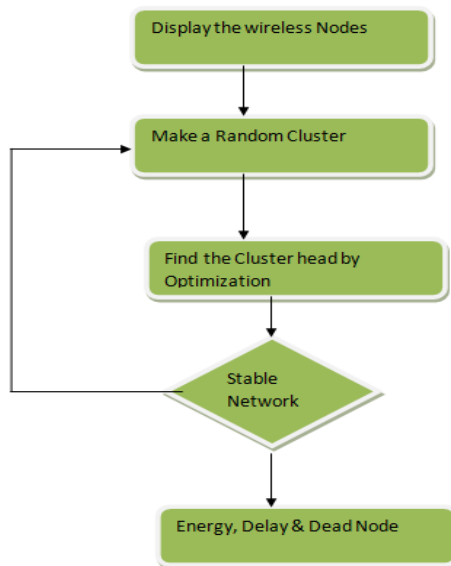
network lifetime. Sensor nodes are introduced that have extra energy as compared to NNs and ANs. So, the heterogeneity and energy level of the entire network is increased. The result shows that the performance of EDEEC is better as compared to SEP.

### III. OBJECTIVES

1. To study the heterogeneity protocol for energy efficiency in wireless sensor network.
2. To enhance the label of heterogeneity and clustering formation using pollination based optimization technique.
3. To perform the comparative analysis of proposed technique with another existing approach.

### IV. METHODOLOGY

- Step1: Display the wireless nodes.  
 Step2: Make a random cluster in a wireless node.  
 Step3: Find the cluster head by optimization.  
 Step4: Then we find network is stable or not. If the network is stable then the cluster is next process otherwise it retransmits to the make a random cluster.  
 Step5: When the network is stable energy, Delay, and Dead nodes are find out.



### V.RESULT

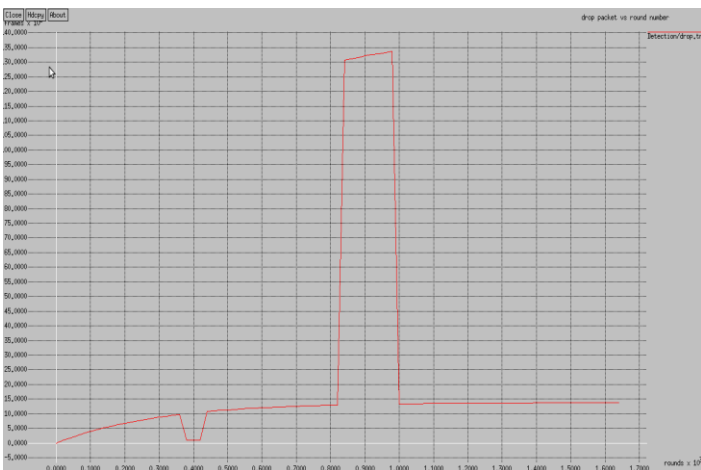


Fig. 1 Drop packet vs. round number

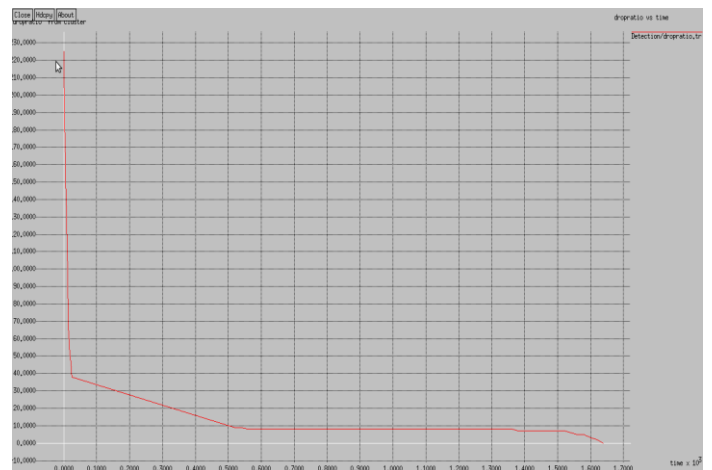


Fig. 2. Dropation vs. time

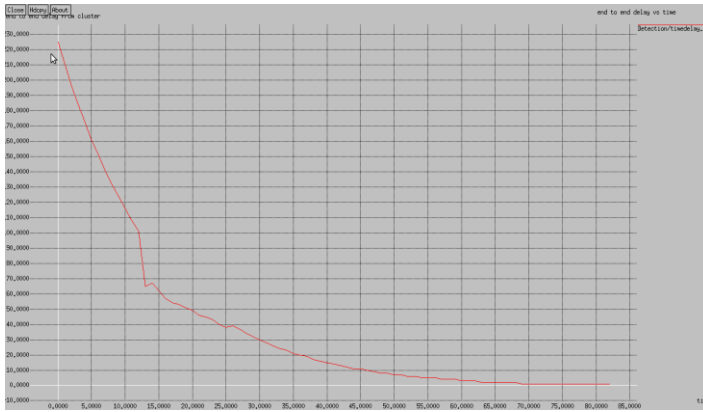


Fig. 3. End to end delay vs time

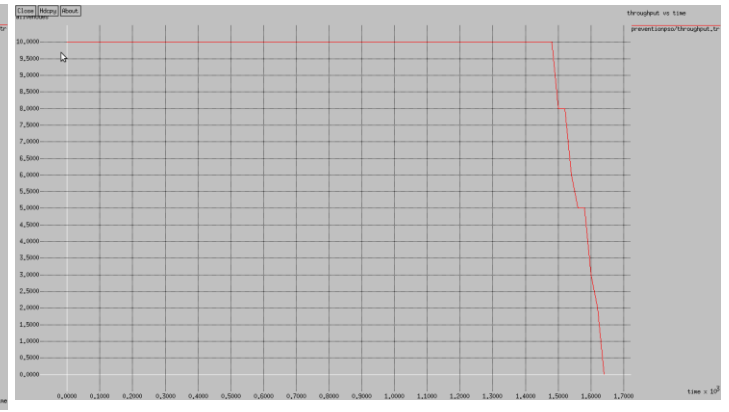


Fig.4. Throughput vs. time

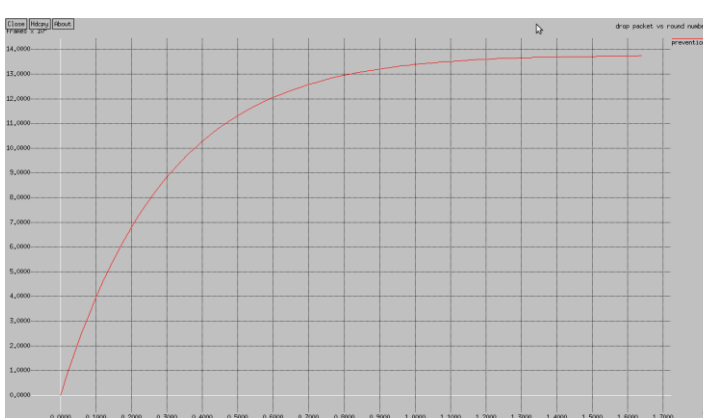


Fig. 5 Drop packet vs. round number

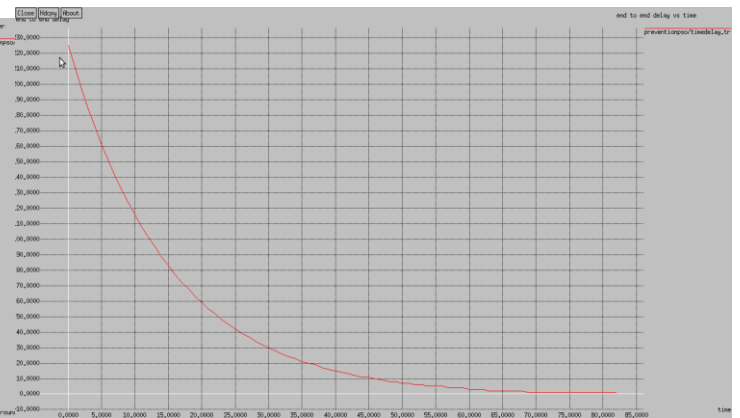


Fig. 6. End to end delay

### CONCLUSION

In this paper, we optimized cluster head optimization by flower pollination algorithm. A Wireless Sensor Network is a self-configuring network of small sensor nodes communicating among themselves using radio signals, and deployed in quantity to sense, monitor and understand the physical world. The cluster-based routing protocols are most accepted to improve the network lifetime and to reduce the energy consumption of wireless sensor network. This paper presents the pollination based optimization algorithm also called OLEACH-C to improve the performance of LEACH-C protocol. The PBO algorithm is used for clustering in WSN. The node that has maximum remaining energy will be selected as a cluster head. If the two nodes having the same energy then cluster head will be selected on the basis of distance.

### REFERENCES

- [1] Marwa Sharawi, E. Emary, Imane Aly Saroit, Hesham El-Mahdy, "Flower Pollination Optimization Algorithm for Wireless Sensor Network Lifetime Global Optimization", (IJSCE) ISSN: 2231-2307, Volume-4, Issue-3, July 2014.
- [2] Neeraj Kumar Mishra, Vikram Jain, Sandeep Sahu Survey on Recent Clustering Algorithms in Wireless Sensor Networks, International Journal of Scientific and Research Publications, Volume 3, Issue 4, ISSN 2250-3153, April 2013.
- [3] Fifi Farouk1, Rawya Rizk1, Fayez W. Zaki, "Multi-level stable and energy-efficient clustering protocol in heterogeneous wireless sensor networks", IET Wirel. Sens. Syst., Vol. 4, Iss. 4, pp. 159–169, 2014.
- [4] Katiyar, V., Chand, N., Soni, S. 'A survey on clustering algorithms for heterogeneous wireless sensor networks', Int. J. Adv. Netw. Appl., 2011, 2, (4), pp. 745–754.
- [5] Gaganpreet Kaur, Dr. Dheerendra Singh, Sukhpreet Kaur, Pollination Based Optimization for Feature Reduction at Feature level Fusion of Speech & Signature Biometrics, Reliability, Infocom Technologies and Optimization (ICRITO) (Trends and Future Directions), 2014 3rd International Conference on. IEEE, 2014.
- [6] Amrinder Kaur, Sunil Saini, "Simulation of Low Energy Adaptive Clustering Hierarchy Protocol for Wireless Sensor Network" July 2013.
- [7] Vidya K S, Arun Anoop et al. "Lifetime Enhanced Cluster-Based Routing in Wireless Sensor Networks Computer Science", International Journal of Engineering Science Invention, ISSN (Online): 2319 – 6734, ISSN (Print): 2319 – 6726 www.ijesi.org Volume 2 Issue 7 June. 2011 PP.69-72.
- [8] Improvement on LEACH Protocol of Wireless Sensor Network (VLEACH) M. Bani Yassein, A. Al-zou'bi, Y. Khamayseh, W. Mardini