

# A Progressive Report on Performance Improvement on LEACH Protocol for Wireless Sensor Network

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**Abstract:** Wireless sensor network is a special type of network which is the most interesting area for researcher's. It consist of sensor nodes that are interconnected to forming a network which is called a wireless sensor network. But these nodes are battery operated and recharging a sensor nodes battery is impossible to overcome this issue a LEACH protocol was proposed which is a first hierarchical routing protocol for wireless sensor network. Many studies have been proposed on clustering protocols for various applications in wireless sensor networks (WSN). The main objective of the clustering algorithm is to minimize the energy consumption, deployment of nodes innetwork. These LEACH is a widespread protocol in wireless sensor network to reduce the energy dissipation of wireless sensor system. In normal LEACH, we found there are still some limitation. In this paper, we proposed a LEACH algorithm which is modified LEACH.

**Keywords:** wireless sensor network, LEACH, cluster head

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## 1. INTRODUCTION

Wireless sensor network is composed of thousands of inexpensive miniature devices capable of computation, communication, and sensing and these sensor nodes form a network it's a self-configuring network of small sensor nodes which communicate among themselves using a radio signals and that are deployed in a network to sense, monitor and understand the physical world. Wireless sensor network (WSN) provides a bridge between the real and virtual worlds. And it have a wide range of potential applications to industry, medical, science, civil infrastructure, and security. Wireless sensor networks consists of protocols and algorithms with self-organizing capabilities. Wireless sensor network are in great demand from the recent years, as now a days we have seen a mobilesphones, laptops, mobiles, PDAs etc. wireless sensor networks consists of thousands of tiny sensor nodes. To monitor physical or environmental conditions such as temperature, pressure, sound, humidity etc. the main features which are monitored in a sensor network are moisture, heaviness, directionof wind, temperature, speed, intensity. Routing strategies and security issues are a great research challenge now a days in WSN but in this paper we will emphasize on the routing protocol. A no of routing protocol have been proposed for WSN the most well-known are hierarchical protocols LEACH hierarchical protocol is defined to reduce energy consumption by aggregating data and to reduce the based routing inorder to minimize energy consumption. In this paper we proposed a new leach protocol for lifetime improvement of sensor network

## 2. RELATED WORK

### A. Leach protocol:

LEACH is a vigor-effective verbal exchange protocol, which employs a hierarchical clustering. In LEACH, nodes arrange themselves into clusters utilizing an allotted algorithm. Periodically both the cluster membership and the cluster-head (CH) alternate to preserve power. Once the clusters are fashioned, the CH node create TDMA agenda. The CH collects and aggregates know-how from sensors in it's possess cluster and passes on expertise to the BS. The usage of clusters for transmitting data to the bottom station leverages the advantages of small transmit distances for most nodes, requiring only a few nodes to transmit a long way distances to the bottom station. LEACH outperforms classical clustering algorithms by using utilizing adaptive clusters and rotating cluster-heads, permitting the energy requirements of the system to be disbursed amongst all the sensors. LEACH is equipped to participate in local computation in each cluster to lower the amount of knowledge that need to be transmitted to the base station. In this approach it realizes a gigantic discount in power dissipation, as computation is less expensive than conversation.

### B. Radio energy dissipation model

The following radio vigor dissipation mannequin is used by the LEACH protocol as well as via the proposed method on this model, the transmitter dissipates vigor to run the radio electronics and the vigor amplifier, and the receiver dissipates vigor to run the radio electronics.

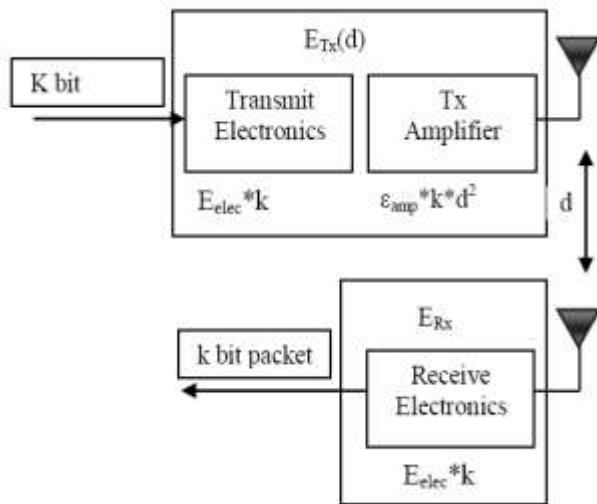


Fig. 1: Radio energy dissipation model

**C. System model**

There are several assumptions that are considered in LEACH protocol, so we will also focus on these assumption in our proposed technique.

- (1) The bottom station (sink node) is placed some distance away from the sensing subject.
- (2) Nodes are region-mindful, i.e.geared up with GPS competent antennae.
- (3) The communicate channel is symmetric.
- (4) Nodes are left unattended after deployment. So, battery re-charge will not be possible.

**3. OUR EXTENSION PROPOSED NEW LEACH**

The target of this section is to suggest the elevated routing technique that's used to kind most appropriate clustering and choice of cluster heads, which reduces common power consumption and increase the network lifetime through balancing load of community amongst all energetic participant sensor nodes. We considered the fashioned variation of LEACH protocol and we evaluated the probability to better exploit the mechanism already offered within the common LEACH keeping the same traits of the fashioned protocol. In this proposed procedure every nodes have a capability to turn out to be a cluster head by way of assigning a random value to each and every sensor nodes and that worth when put next with the brink value and by using the comparison decides the cluster head after which all the traditional sensor nodes sends knowledge to the cluster head and cluster head ship information to the bottom station We conducted simulation with MATLAB and we got a large development in vigor consumption and lifetime development than current approach.

**Performance: Parameters**

- MATLAB Simulator
- 100-node random network

$E_{amp} = 0.0013 \text{ p J/bit/m}^2$   
 $E_{elec} = 50\text{nJ/bit}$   
 Sensor nodes initial energy  $E_0 = 0.5 \text{ j}$   
 $r_{max} = 6000$

**4. SIMULATION:**

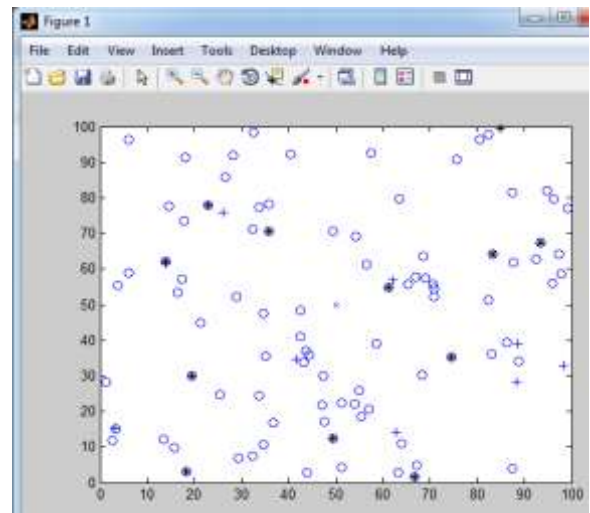


Fig2.Nodes in network with running rounds

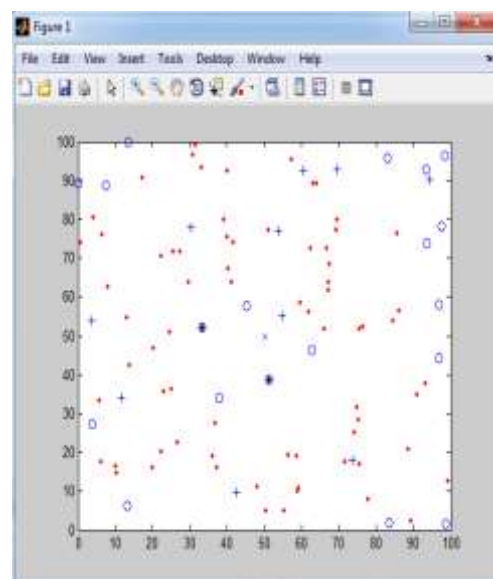


Fig3. Live and dead nodes in the network

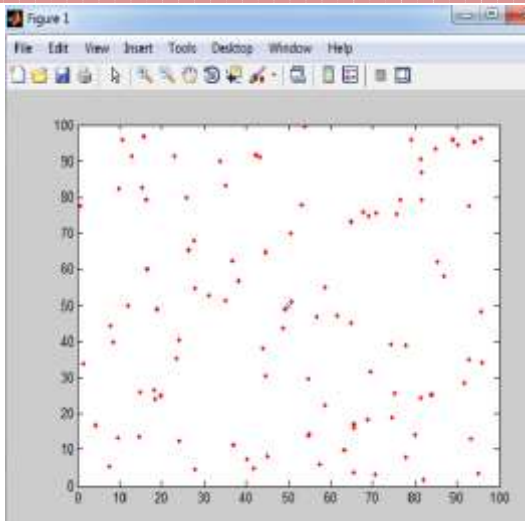


Fig4. All nodes dead in the network

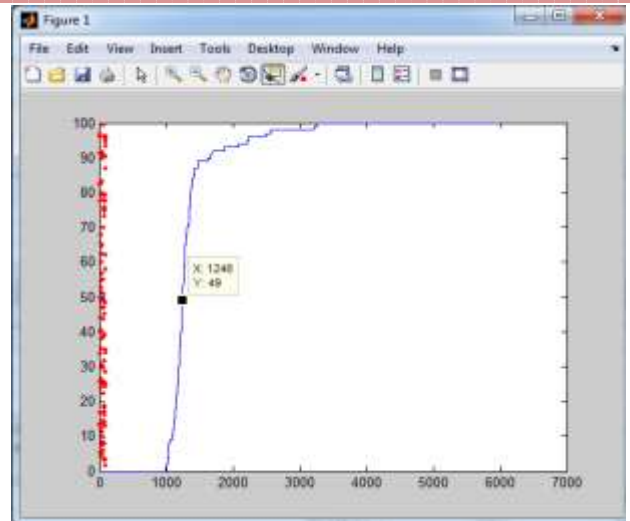


Fig 6 . 50% node dead

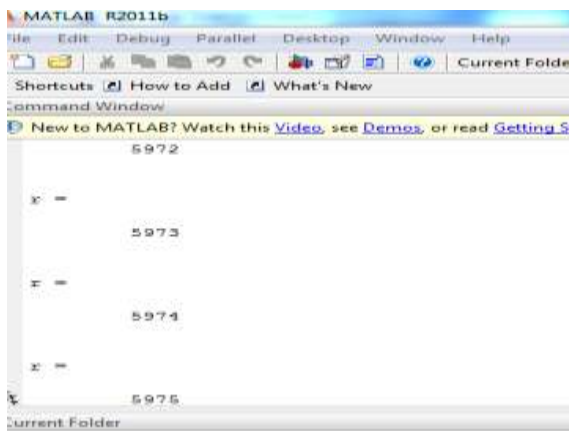


Fig5. First node dead

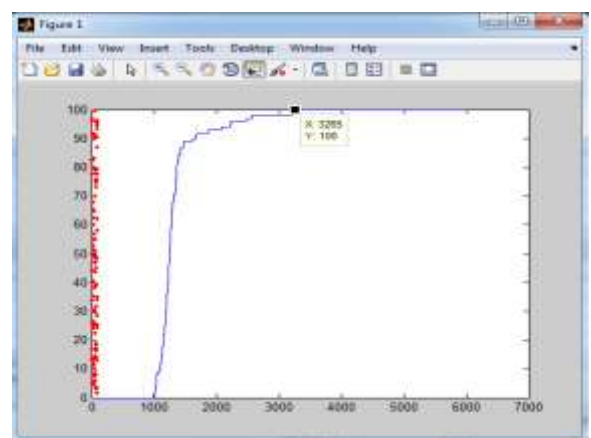
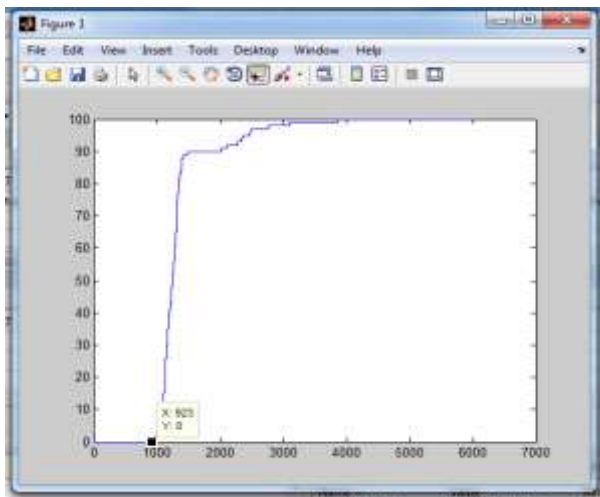


Fig 7. 100% node dead



CLUSTERHS						
CLUSTERHS <1x6001 double>						
	1	2	3	4	5	6
1	6	11	10	9	12	1
2						
3						

Fig8. of clusterheads /round

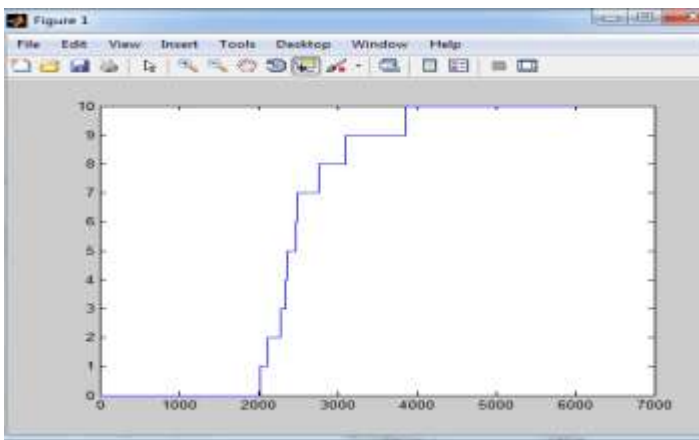
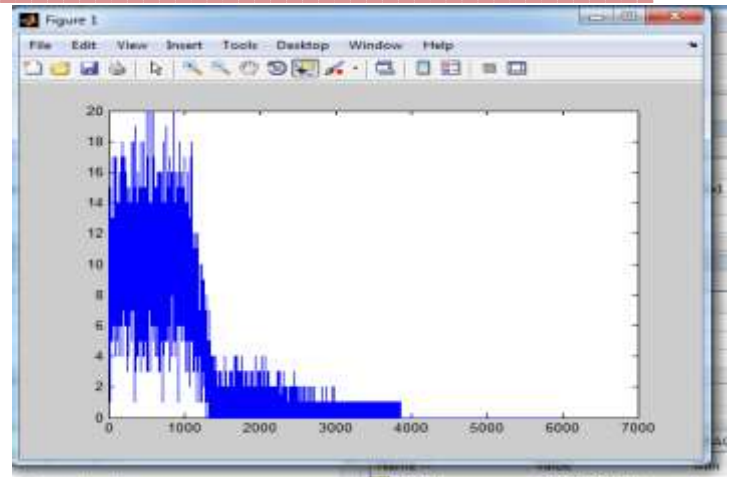


Fig 9.Number of dead advanced node /round

PACKETS_TO_BS						
PACKETS_TO_BS <1x6001 double>						
	1	2	3	4	5	6
1	3	9	14	8	10	5
2						
3						

Fig 11. No of packets send to base station /round

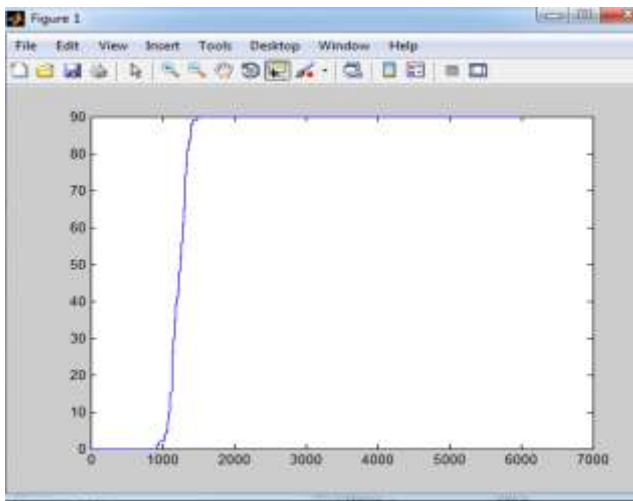
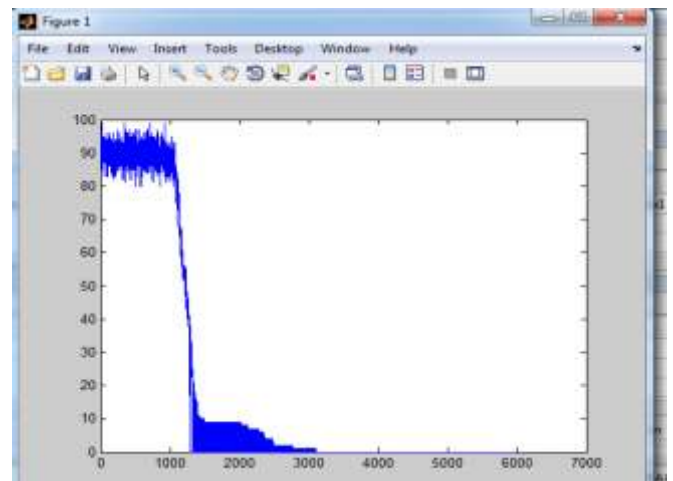


Fig.10 No of dead normal node/round



	1	2	3	4	5	6
1	97	91	86	92	90	
2						
3						

Fig 12.No of packets send to cluster head /round

**5. COMPARISON**

	Enhanced & modified leach(1)	Multi local leach (2)	Proposed leach
First node dead at round	160	465	923

Table 1. Output comparison

**6. CONCLUSION**

The purpose is to expand the community lifetime by way of expand the circular no of first node dies in the network, is increase to a few degree in proposed leach the primary node dies at round no 923 and the final node dies at round no 3265 which how’s the network works long time than a further existing leach protocol. And maximizes the community lifetime.

**REFERENCES:**

[1] Volume 5, Issue 7, July 2015 ISSN: 2277 128X International Journal of Advanced Research in Computer Science and Software Engineering Research Paper Available online at [www.ijarcsse.com](http://www.ijarcsse.com) Analysis and Enhancement of Modified LEACH Algorithm for Wireless Sensor Network 1Shruti Nagpal, 2Rohit Bathla, 3Shalini Chopra 1M Tech Student , 2, 3Assistant Professor 1, 3 Deptt. Of CSE, GRIMT Radaur, Kurukshetra University, Kurukshetra, Haryana, India 2Deptt. Of CSE, JMIT Radaur , Kurukshetra University, Kurukshetra, Haryana, India

[2] The Implementation of Multi-Local LEACH Routing Algorithm Based on Wireless Sensor Networks Qingpu Guo1, Jun Li2 1 Henan University of Economics and Law, Zhengzhou, China Email: [gqp@hnufe.edu.cn](mailto:gqp@hnufe.edu.cn) 2 North China University of Water Resources and Electric Power Email: [lj@ncwu.edu.cn](mailto:lj@ncwu.edu.cn) Proceedings of the Third International Symposium on Computer Science and Computational Technology(ISCST ’10) *Jiaozuo, P. R. China, 14-15, August 2010, pp. 215-218*

[3] Int. J. Advanced Networking and Applications Volume: 05 Issue: 01 Pages:1825-1829 (2013) ISSN : 0975-0290 1825 Heterogeneous LEACH Protocol for Wireless Sensor Networks Nishi Sharma Department of Computer Science,

Rajasthan Technical University Email: [nishi.engg@gmail.com](mailto:nishi.engg@gmail.com) Vandna Verma Department of Computer Science, Banasthali Vidhyapith

[4] EEHC: Energy efficient heterogeneous clustered scheme for wireless sensor networks Dilip Kumar a,\*, Trilok C. Aseri b,1, R.B. Patel [www.elsevier.com/locate/comcom](http://www.elsevier.com/locate/comcom)

[5] Energy-Efficient Communication Protocol for Wireless Microsensor Networks Wendi Rabiner Heinzelman, Anantha Chandrakasan, and Hari Balakrishnan *Massachusetts Institute of Technology Cambridge, MA 02139* [fwendi](mailto:fwendi@mit.edu), [anantha](mailto:anantha@mit.edu), [harig@mit.edu](mailto:harig@mit.edu)

[6] The Implementation of Multi-Local LEACH Routing Algorithm Based on Wireless Sensor Networks Qingpu Guo1, Jun Li2 1 Henan University of Economics and Law, Zhengzhou, China

[7] A Comparative Study on Cluster Routing Based on leach in wireless sensor network Kiran Jadav1, Dhara Vadher2 1Kiran Jadav, *Computer Department, Darshan Engineering College, Gujrat, India* 2Dhara Vadher, *Computer Department, Darshan Engineering College, Gujrat, India*

[8] T-LEACH: The method of threshold-based clusterhead replacement for wireless sensor networks Jiman Hong & Joongjin Kook & Sangjun Lee & Dongseop Kwon & Sangho Yi

[9] Energy Efficient, Fault Tolerant Routing LEACH (EF-LEACH) Protocol for Wireless Sensor Networks Hla Yin Min, and Win Zaw