International Journal of Inventive Engineering and Sciences (IJIES)
ISSN: 2319–9598, Volume-5 Issue-3, March 2019

Performance Analysis of Energy Efficient S- Leach under Data Compression Technique to Improve Network Life Time by Using Ns-2.35

M. Devaraju, A. V. Narasimha Rao,

ABSTRACT: Wireless Sensor Networks (WSN) have increased expanding consideration from both the examination network and genuine clients. The productive utilization of the energy source in a sensor node is a vital foundation to delay the valuable existence of the wireless sensor network. Wireless sensor systems have investigated numerous new protocols planned explicitly for sensor systems where the thought of power is vital. The best significance, given the various leveled directing conventions reliant on bunching, has better flexibility. Since the sensor hubs are for the most part battery-worked gadgets, the basic viewpoints that must be tended to are the means by which to decrease the power utilization of the nodes, with the goal that the system's network life can be stretched out to sensible times. There are a few protocols of hierarchical routing of low power utilization, among which is the acclaimed LEACH protocols, we copy LEACH in NS2 and explore the execution of LEACH similar to vitality, execution and system life.

Key words: LEACH, Drain, various leveled directing calculations, gathering, Wireless sensor systems

I. INTRODUCTION

Wireless Sensors Networks (WSN) are a lot of hundreds or thousands of micro sensor nodes that have location abilities, set up wireless correspondence with one another, and perform handling and preparing tasks. The critical prerequisites [1] of a WSN are:

(1) Use of countless sensors
(2) Connection of stationary sensors
(3) Low power utilization
(4) Self-association limit
(5) Collaborative preparing of signs, and (6) querying ability.

A portion of the vital application spaces of WSN are listed below.

Military condition, Catastrophe the board Living space checking Restorative and social insurance, Mechanical fields, home systems. Organic, radiological, atomic, touchy material and so forth.

The sensor nodes are furnished with little batteries, frequently key, with constrained power limits. They can be executed physically or they can be dropped indiscriminately. They are self configuration, which contains at least one sensor, with incorporated wireless correspondences and data handling segments and a constrained power source.

The utilization of wireless sensor systems expands step by step, however the issue of power confinements wins since the battery life is constrained. To spare the energy dissemination brought about by correspondence in remote sensor systems, it is important to program the condition of the sensors, change the transmission run between the detection nodes, use data routing techniques and efficient data routing and keep away from the treatment of undesirable information. When all is said in done, routing in WSNs [2] can be partitioned into level, hierarchical, and locationbased routing, contingent upon the structure of the system. Hierarchical routing is a notable method with uncommon focal points identified hierarchy system protocol (LEACH) for sensor with adaptability and efficient correspondence. Drain, PEGASIS, TEEN [3] and APTEEN utilize this procedure to course. In the hierarchical engineering, higher-power nodes can be utilized to process and send data, while low-power nodes can be utilized to perform identification in the region of the objective. Location based routing routings, for example, MECN sensor nodes [4] are tended to by methods for their areas. The separation between neighboring nodes can be assessed based on the powers of the approaching sign. The general directions of the neighboring nodes can be acquired by trading said data between neighbors. The low power versatile clustering hierarchy (LEACH) is a cluster based routing. In this archive, Segment **2** will present the S-LEACH routing in detail, Location **3** spread the reenactment of the LEACH routing and Segment **4** demonstrate the reproduction investigation by shifting the level of gathering heads in the system in every recreation of the LEACH routing . The execution is dissected as far as valuable life, control dispersal and system execution and Section **5** finishes up this record.

II. LEACH ROUTING

W. R. Heinzelman et al. 5 [69] proposes a low power versatile clustering systems, which limits power dissemination in sensor systems. It is a well known various leveled steering algorithm for sensor arranges that makes gatherings of sensor nodes as per the power of the intensity that is appeared in figure 1. 5% of the complete number of hubs turns into the leader of the group that goes about as a router to the sink. The power utilization is lower since the transmission may be done per bunch head. The merging and aggregation of data are local to the cluster.

Revised Version Manuscript Received on 20 March 2019.

M. Devaraju , Associate Professor, Dept. of ECE, Mahaveer Institute of Science and Technology, Hyderabad, INDIA,

Dr. A.V.Narasimha Rao, Professor, Dept. of ECE, Chaitanya Bharathi Institute of Technology, Hyderabad, INDIA,

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

The cluster heads change randomly over time to balance the dissipation of energy from the nodes.

The node chooses a random number between 0 and 1. The node becomes a group header for the current round if the number is less than the next threshold:

Ţ(N) is the thresh hold number

P= the desired percentage of cluster heads

R=current round

G= set of nodes that not been cluster heads in the last 1p rounds set up phase: amid this stage, every node chooses whether or not to become cluster head (CH) for the current round. This choice depends on the decision of an arbitrary number somewhere in the range of 0 and 1, if the number is not exactly a limit T (n), the node will turn into a beginning point for the current round. The cluster header node builds up TDMA programming and transmits it to every one of the nodes in its group, finishing the configuration phase, which is then trailed by a steady state operation. Stationary state stage: the steady state activity [4] is separated into tables, where the nodes send their information to the leader of the group at most once per frame amid their assigned space appeared in figure 2. It is accepted that the nodes dependably have information to send, they send it during the transmission time relegated to the leader of the group. This transmission utilizes a minimum amount of energy (picked dependent on the intensity got from the gathering head declaration). The radio of every node that isn't a cluster head can turn off until the hub dispenses the transmission time, therefore limiting the scattering of vitality in these hubs. The group head hub must keep its recipient on to get all information from the hubs in the bunch. At the point when every one of the information has been gotten, the principle bunch hub performs flag preparing capacities to pack the information into a solitary flag. For instance, if the information is sound or seismic signs, the gathering head hub can produce the individual signs to create a composite flag. This composite flag is sent to the base station. Since the base station is far away, this is a high-vitality transmission.

III. SIMULATION OF LEACH PROTOCOL

To simulate the LEACH protocol, the NS2 extension of MIT is used for the LEACH simulator [7] [8]. The models that were used for channel propagation and energy dissipation are described below:

3.1 Channel propagation model

In the wireless channel, the propagation of electromagnetic waves can be modeled as a function of the power law of the distance between the transmitter and the receiver. The free space model that considered the direct line of sight and the model of propagation in the two-beam terrain that also considered the signal reflected in the ground was considered depending on the distance between the transmitter and the receiver. If the distance is greater than crossover, the two-ray terrain propagation model is used. The crossing is defined as follows.

IV. SIMULATION ANALYSIS

4.1 Simulation Parameters

We simulated the routing protocol based on the LEACH cluster of MIT through NS 2.27 [9]. By varying the cluster head percentage in the MIT LEACH configuration file, the performance of the network was analyzed in terms of lifetime of the sensor network, the performance achieved and the total power consumption of the sensor network . For the experiment, the percentage of group heads 2, 3, 4, 5, 6, 7 and 8 of the total number of sensor nodes is taken. For the simulation experiment, the following parameter was used:

4.2 Results of the simulation

The results of the simulation are shown in Table 2, which shows the useful life, energy and performance of the different ones. of clusters or cluster heads in the sensor network, here 5% of the heads of total network nodes are more energy efficient and also the performance is good compared to others. Figures 5, 6 and 7 show the simulation graphs for the percentage of cluster heads versus the average life, performance and power dissipation respectively

4.3 Assumption / Limitations of LEACH

While LEACH can increase network life, there are still several problems with the assumptions used in this protocol. LEACH [9] assumes a homogeneous distribution of sensor nodes in the given area. This scenario is not very realistic. LEACH assumes that all nodes can transmit with sufficient power to reach the BS if necessary and that each node has computing power to support different MAC protocols. Therefore, it is not applicable to networks deployed in large regions. It also assumes that the nodes always have data to send and the nodes located close to each other have correlated data. It is not obvious how the number of predetermined group heads [CH (p)] will be distributed evenly throughout the network. Therefore, there is a possibility that the elected CHs concentrate on one part of the network. Therefore, some nodes will not have any CH in their vicinity.

V. CONCLUSION

LEACH is energy efficient for the sensor network. When varying the different no. From the head / group groups in the network, network performance changed in terms of lifetime, performance, and average power dissipation. From the above results, we conclude that if the clusters in the network or the cluster heads in the network are below or above 5 percent of the total, no. of nodes, the

Performance of LEACH will be energy efficient.

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

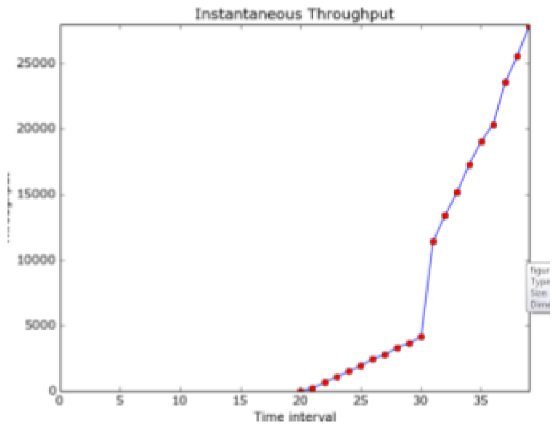


Figure: 1

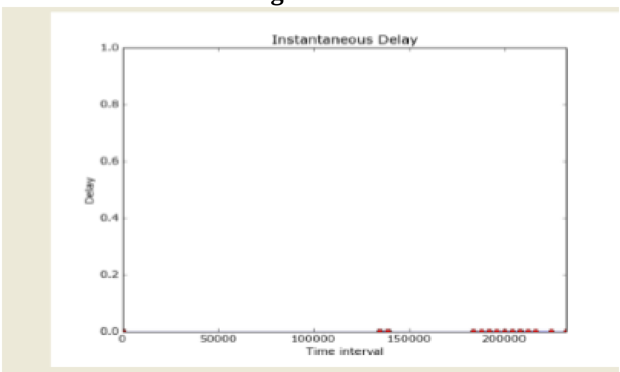


Figure: 2

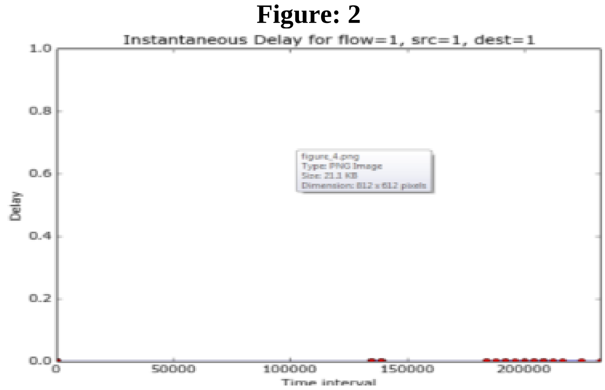


Figure : 3

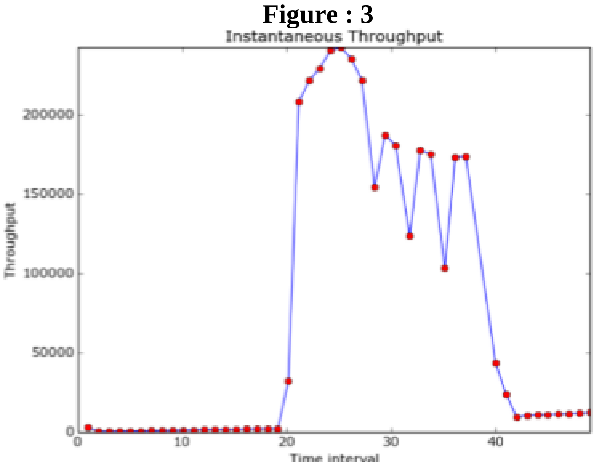


Figure: 4

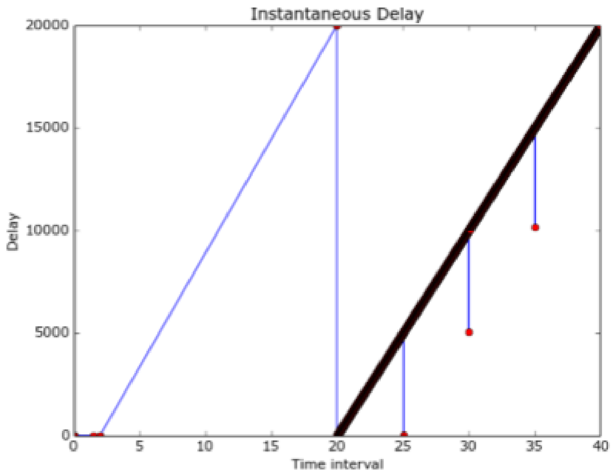


Figure: 5

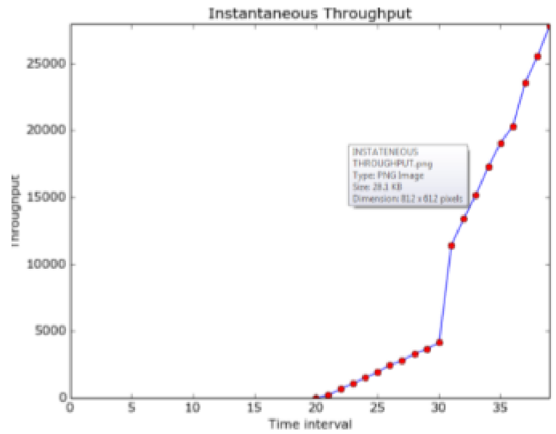


Figure: 6

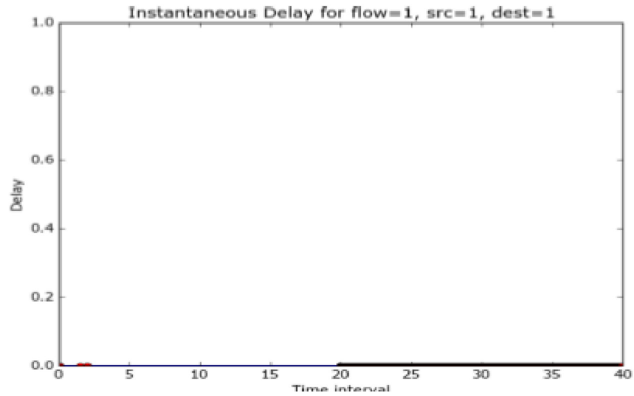


Figure: 7

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

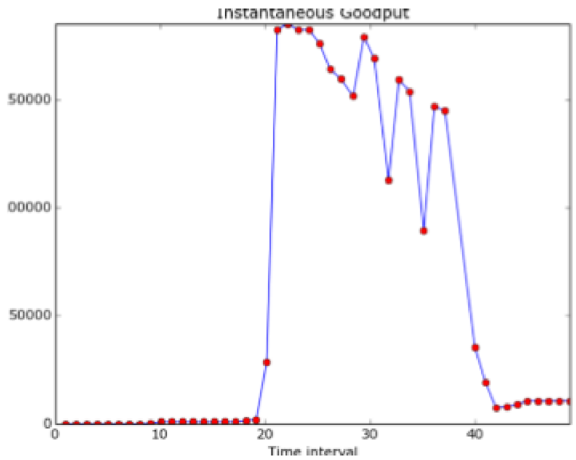


Figure: 8

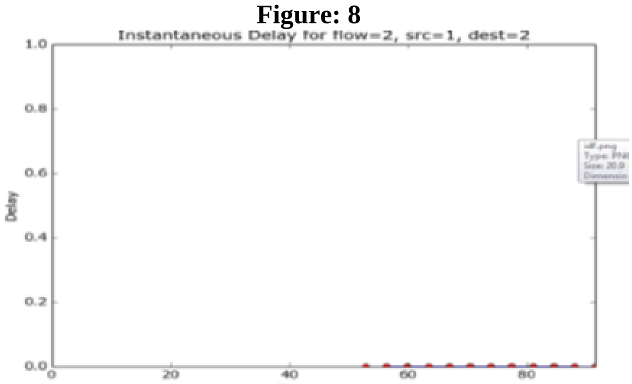


Figure: 9

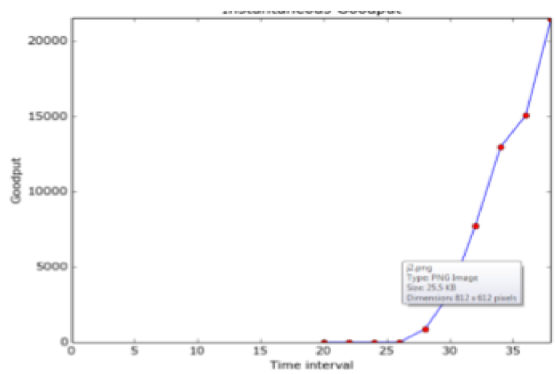


Figure: 10

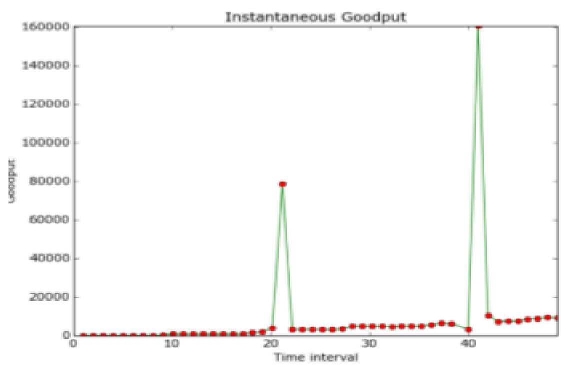


Figure: 11

```
--Average throughput--
```

```
startTime:   20
stopTime:    40
receivedPkts:  34796
avgTput[kbps]:  11222.8
```

```
--Average throughput for particular
flow--
Warning: no packets were received,
simulation may be too short
```

```
srcNode:   2
destNode:   2
startTime:   1000000
stopTime:   0
receivedPkts:   0
avgTput[kbps]:   -0
```

```
--Instantaneous throughput—
```

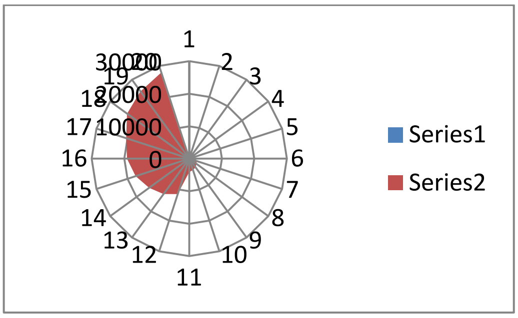
Table : 1

20	0
21.005	213.333
22.01	642.133
23.015	1070.93
24.02	1499.73
25.02	1922.12
26.0205	2441.83
27.0208	2781.07
28.025	3312.34
29.03	3650.13
30.03	4131.75
31.0301	11411.1
32.0302	13393.4
33.0302	15190.6
34.0309	17276.9
35.031	19061.8
36.0314	20331.2
37.032	23575.3
38.0321	25540.1
39.0322	27867.7

```
--Average goodput--
```


Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

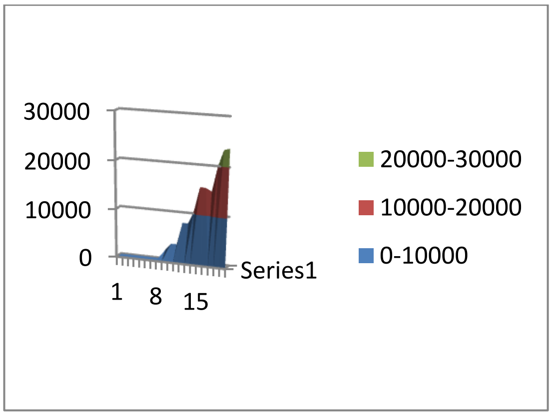
Average Goodput[kbps] = 0.00
StartTime=100.00StopTime=116.00



--Average goodput--
Average Goodput[kbps] = 0.00
StartTime=100.00 StopTime=116.00

Table : 2

20	0
21.005	0
22.01	0
23.015	0
24.02	0
25.02	0
26.0205	0
27.0208	0
28.025	1824.27
29.03	3200
30.03	3240
31.0301	7791.32
32.0302	7807.3
33.0302	10575.8
34.0309	15461.1
35.031	15390.2
36.0314	14794.1
37.032	19915.5
38.0321	23271.7
239.0322	23636



Average Residual Energy

Average residual energy :-
0.000000

Residual Energy for particular node
Residual energy of node 1 is :
0.000000
--Average Delay--
avgDelay[ms] overall: 18351.7

--Average delay for particular flow--
avgDelay[ms] overall: 0
--Average jitter for particular flow--
######################################
##############################

Warning: no packets were received, simulation may be too short

######################################
##############################

avgJitter1[ms]: 0

avgJitter2[ms]: 0

avgJitter3[ms]: 0

avgJitter4[ms]: 0

Packet Delivery Ratio
GeneratedPackets = 9

ReceivedPackets = 34796

Packet Delivery Ratio = 386622

Total Dropped Packets = 0

--Average throughput--
Warning: no packets were received, simulation may be too short

startTime: 1000000

stopTime: 0

receivedPkts: 0

avgTput[kbps]: -0

--Average throughput for particular flow--
Warning: no packets were received, simulation may be too short

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

```
         srcNode:  1

        destNode:  1

       startTime:  1000000

        stopTime:  0

    receivedPkts:  0

   avgTput[kbps]:  -0

---------------------

--Average Delay--
 avgDelay[ms] overall:  0

--Average delay for particular flow--
 avgDelay[ms] overall:  0

Packet Delivery Ratio
GeneratedPackets = 1

ReceivedPackets = 0

Packet Delivery Ratio = 0

Total Dropped Packets = 0
```

REFERENCES

1. Nitaigour P. Mahalik, "Sensor Networks and Configuration: Fundamentals, Standards, Platforms, and Applications", Chapter 1, 7 and Spinger, 2007.
2. Jamal N. Al-Karaki, Ahmed E. Kamal. "Steering Procedures In WirelessSensor Networks: A Survey", IEEE Wireless Communications,December 2004.
3. A. Manjeshwar and D. Agrawal, "High schooler: a directing convention for improved proficiency in remote sensor systems", In Proceedings fifteenth International Parallel and Distributed Processing Symposium, pp. 2009– 2015. 23– 27 April 2001.
4. V. Rodoplu, T.H. Ming, "Least vitality portable remote systems", IEEE Journal of Selected Areas in Communications, Vol. 17, No. 8, pp. 1333-1344, 1999.
5. W. R. Heinzelman, A. Chandrakasan, and H. Balakrishnan, "Vitality Efficient Communication Convention for Wireless Micro Sensor Networks", Proceedings of IEEE HICSS, Jan 2000.
6. P.T.V. Bhuvaneswari and V.Vaidehi, "Enhancement techniques incorporated in LEACH- A Survey", Indian Journal of Science and TechnologyVol.2 No 5 (May 2009)
7. Liu Lintao Yang Ping, " Routing Protocols Simulation Based on NS2", Ship Electronic Engineering [J], 2008.4 Vo.l 28 No. 4:132-134
8. Lan Tien Nguyen, Xavier Defago, Razvan Beuran, Yoichi Shinoda, "An Energy Efficient Routing Scheme for Mobile Wireless Sensor Networks", IEEE ISWCS 2008.