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Performance analysis for qualitative evaluation with comparative study for designing energy efficient algorithm for wireless sensor networks for enhancing lifetime of leach protocol using dynamic simulation as variation in channel probing for opportunistic power saving mechanism for power evaluation and estimation optimization as latest trend used in electronics and communication engineering

Abstract

Here we are going to analyze and study various energy efficient techniques to save power during operation of wireless sensor networks and find out Performance Analysis for Qualitative Evaluation with Comparative Study for Designing Energy Efficient Algorithm for Wireless Sensor Networks for Enhancing lifetime of LEACH Protocol using Dynamic Simulation as Variation in Channel Probing for Opportunistic Power Saving Mechanism for Power Evaluation and Estimation optimization as latest trend used in Electronics and Communication Engineering.

Keywords: LEACH protocol, wireless sensor networks, channel probing, WSN

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Introduction

Wireless sensor systems

i. Wireless sensor networks and distributed systems, have been expanding rapidly in recent years.

ii. The WSN is built of "nodes" from a few to several hundreds or even thousands, such sensor network node has typically several parts:

   a) Radio transceiver with an internal antenna

   b) Electronic circuit for interfacing with the sensors

iii. Wireless Sensor Nodes (WSN) has become very popular technology in the recent past years. It can be implemented in WSN system to increase the communication distance between the nodes.

iv. Energy efficiency is a main objective in the design of MAC protocols for wireless sensor networks.

v. A wireless sensor network (WSN) is a wireless network consisting of spatially distributed autonomous devices.[1,2]

vi. We know that Target coverage problem is one of the important problems in wireless sensor network in which each target should be covered by at least one sensor.

vii. One sensor can be able to cover active at a time while others in sleep mode, sensors batteries can be utilized in efficient way.

viii. Sensors can be easily organized into different groups called sensor cover in such a way that each cover can monitor all the targets for a fixed duration.

ix. Research on wireless sensor networks (WSNs) has led to the widespread adoption of software-defined WSNs (SDWSNs), which can be easily reconfigured into even after deployment.

x. Here we can propose an energy-efficient routing algorithm for SDWSNs. In this algorithm, to make the network to be functional, control nodes are selected to assign different tasks dynamically.

xi. Wireless Sensor Networks and Applications aims to provide a reference tool for the increasing number of scientists who depend upon reliable sensor networks.

xii. The selection of control nodes is formulated as an NP-hard problem, taking into consideration of the residual energy of the nodes and the transmission distance.

xiii. An intelligent and smart Wireless Sensor Network system can gather and process a large amount of data from the beginning of the monitoring and manage air quality, the conditions of traffic, to weather situations (Figure 1).

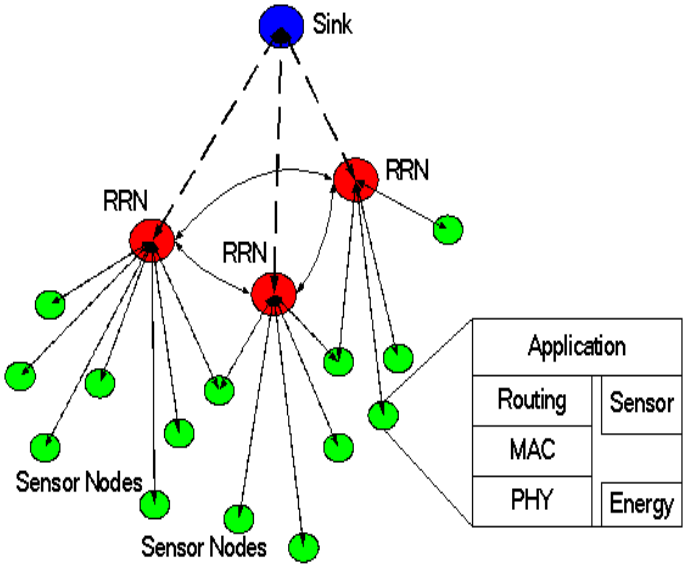

Figure 1 Application sensor nodes.

Application sensor nodes

Wireless sensor networks (WSNs) consists energy-constrained sensor nodes that are deployed in network area.

i. Routing is being done so as to improve the lifetime of network.

ii. Number of these sensor nodes collaborates to form wireless sensor networks.

iii. Consists of tens to thousands of such nodes that communicate through wireless channels for information sharing

iv. Optimal route selection, route maintenance etc. to compete with user expectations and better network performance.

Leach protocol

In LEACH:

I. Nodes organize themselves into local clusters, with one node acting as the cluster-head.

II. (Low Energy Adaptive Clustering Hierarchy) is a hierarchical--based routing protocol which uses random rotation of the nodes required to be the cluster-heads to evenly distribute energy consumption in the network.[3–5]

III. The steps we will follow are as follow

i. Coverage area from user

ii. Initial parameters for the network in which parameters such as nodes

iii. Nodes will be declare as half dead node, dead node and alive nodes will be find

iv. Analyze the effectiveness of nodes (Figure 2).

IV. LEACH protocol in extending the lifetime for energy-constrained wireless sensor networks.

V. Residual energy of the nodes is considered during selection of cluster-head.

VI. Node is chosen from cluster-heads to become the relay node between base station and other cluster-heads as shown in Figure 1.

VII. LEACH-R protocol could balance network energy consumption and extend the network life cycle more effectively (Figure 3).

VIII. Wireless Sensor Networks would be of great use in future mission applications.

IX. Basically how does it works has been explained above with its advantages and disadvantages.

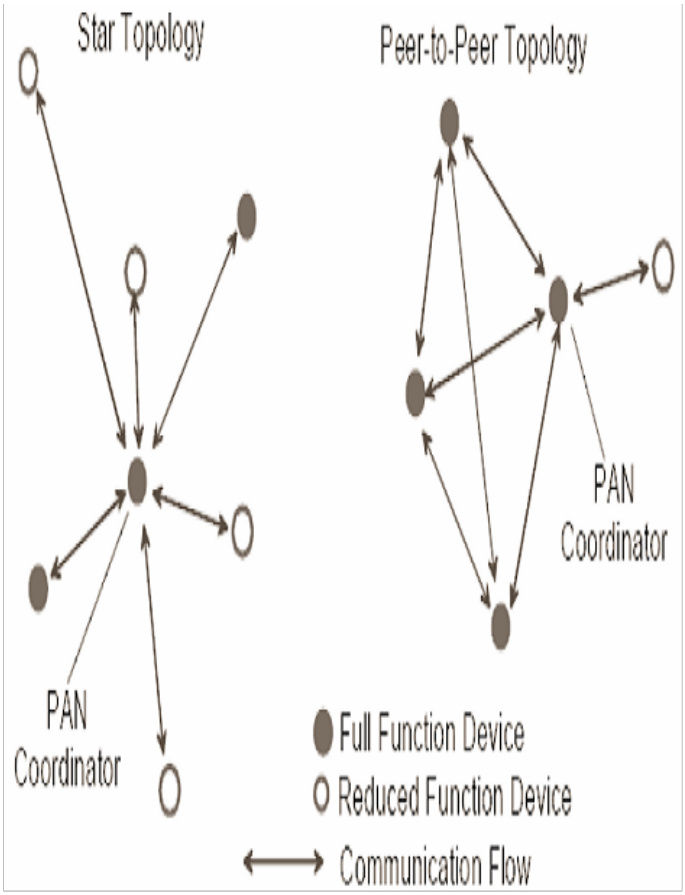

Figure 2 Star and peer topology.

Experimental setup (Table 1)

Detailed description with different values of E_{mp}

Case 1: when we set the value of E_{mp}=0.00000025pj/bit/m^4, Its graphical representation is given below in Figure 4

The savings in energy increases as the density of sensors in the network increases. Consumption is minimum with increase in density of sensors. Energy constrained sensors communicate to high powered base station in their cluster. The sensor density can have a large spatial variation and small time variation (Table 2).

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Table 1 Simulation control values

S. No.	Name of parameters	Minimum value	Maximum value
1	Wireless Sensor Network Topology C	-	-
2	Number Of Cluster Head Per Round (CLUSTERHS)	0	3
3	Number Of Dead Nodes Per Round (DEAD)	0	98
4	Data Aggregation Energy (EDA)	5	5
5	Energy dissipated Per Bit to Run The Receiver Circuit (ERX)	5	5
6	Energy dissipated Per Bit to Run The Transmitter Circuit (ETX)	5	5
7	Free Space Transmit Amplifier (Efs)	2.1	1
8	Multipath Transmit Amplifier (Emp)	0.5	2.1
9	Initial Energy(Eo)	1	1
10	Infinity	1	1
11	Packet Send To Base Station Per Round (PACKET_TO_ BS)	0	3
12	Packet Send To Cluster Head Per Round (PACKET_TO_ CH)	0	97
13	S	-	-
14	No. of slots	1.81	1.81
15	X	14.8877	45.6425
16	XR	1.1681	99.685
17	Y	71.3796	89.9713
18	YR	1.9257	97.4803
19	Probability	27	27
20	C	0.0013	0.0013
21	CLUSTER	2	2
22	Counter For Cluster Head (COUNTCHS)	1	1
23	COUNT PACKET LENGTH	200	200
24	dead	100	100
25	Distance Between Sender And Receiver	103.7	103.7
26	Distance Broad	141.4	141.4

Table Continued..

S. No.	Name of parameters	Minimum value	Maximum value
27	Total Energy Consumed	6.9	6.9
28	FLAG_FIRST_DEAD	0	0
29	Level Of I Node (I)	27	27
30	MIN_DISTANCE(min_dis)	1	1
31	MIN_DISTANCE_CLUSTER (min_dis_cluster)	1	1
32	Number Of Sensors (n)	100	100
33	Cluster With Probability (P)	0.05	0.05
34	Packet Length	6400	6400
35	packets_TO_BS	0	0
36	packets_TO_CH	0	0
37	R	27	27
38	Counter For Cluster Head Per Round (rcountCHs)	4	4
39	Maximum Number Of Rounds (rmax)	9999	9999
40	Sink	-	-
41	Temperature	35.937	35.937
42	temp_rand	0.026	0.026
43	X Coordinate Of Sink (X)	1	27
44	Number of Nodes in X dimension (Xm)	100	100
45	Y Coordinate Of Sink (Y)	5	185
46	Number of Nodes in Y dimension (Ym)	100	100

Table 2 Energy dissipation

Operation	Energy dissipated
Transmitter/Receiver Electronics	Eelect=50nJ/bit
Data Aggregation	EDA=5nJ/Bit/Report
Transmit Amplifier If d to BS<=do	Efs=10pj/bit/m2
Transmit Amplifier If d to BS>=do	Emp=.0013pj/bit/m4

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Figure 3 Wireless sensor network deployed.

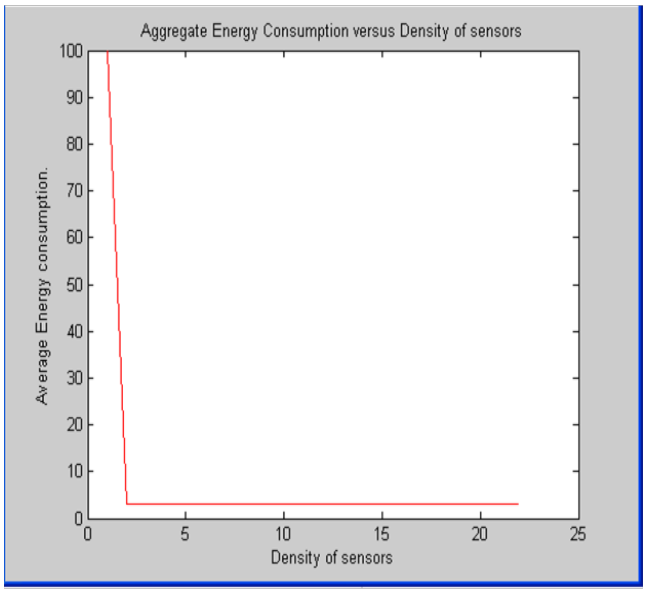

Figure 4 Aggregate energy consumption versus density of sensors (E_{mp}=0.00000025pj/bit/m^4).

Conclusion

i. Used for the collection of data for monitoring of environmental information as the monitoring of the temperature.

ii. Sensors may be required to collect data for short periods, most of the time the sensor node will be asleep thus conserving power.

iii. Sensor nodes must remain awake thus consuming their precious limited power.

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

References

1. Pottie G. *Wireless Sensor Networks*. Information Theory Workshop, Ireland; 1998.
2. Vieira MAM, Da Silva DC, Coelho CN, et al. *Survey on Wireless Sensor Network Devices*. Portugal: Emerging technologies and factory automation (ETFA03); 2003.
3. Zhang X, Wicker SB. How to distribute sensors in a random field? 3rd International Symposium on Information Processing in Sensor Networks (IPSN '04), USA; 2004.
4. Ganesan D, Krishnamachari B, Woo A, et al. *Complex Behavior at Scale: An Experimental Study of Low-Power Wireless Sensor Networks*. CiteSeer, USA: Technical Report UCLACSD-TR 02-0013; 2002.
5. Chao Gui, Prasant Mohapatra. Virtual Patrol: A new power conservation design for surveillance using sensor networks. 4th international conference on information processing in sensor networks (IPSN '05), USA; 2005.

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