## Original Research Paper

## Engineering

# A Survey On Energy Consumption Reduction And Improve The Lifetime In WSN

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**ABSTRACT**

Energy is a factor in wireless sensor network (WSN) which we can`t ignore. One principal method for saving vitality is wise arrangement of sensor hubs i.e. sensor nodes inside the system region with the goal that vitality stream stays adjusted all throughput i.e. efficiency of system. The network lifetime is a crucial performance to assess information gathering wireless sensor networks (WSNs) where battery-controlled sensor hubs occasionally sense nature and forward gathered examples to a sink hub. In this paper, we propose a logical model to get the whole system lifetime from system introduction until it is totally impaired. In particular, we hypothetically estimate the traffic load, energy consumption, and lifetime of sensor nodes during the entire network lifetime. This paper focus on deigning of network based on different parameters, used to minimize the energy consumption and increasing lifetime of network, and an explanation about location based routing protocol.

**KEYWORDS** | Energy, wireless sensor networks, hole evolution, lifetime, multi-hop

## INTRODUCTION:

Structure of a wireless sensor network has a set of sensing devices whose work is to collect data from a sensor broadcast area. Sensor nodes show their performance based on computation capability, memory space, communication bandwidth, etc. The notability of Wireless Sensor Networks has increased tremendously due to the wide potential of the sensor networks to connect the physical and illusive world. It is difficult to work in a network if energy is finished. That is why reducing energy consumption is must.

Furthermore improving the operational lifetime of a sensor network is essential. So in designing WSN, lifetime is fragile issue so we need to be careful about it. These sensor nodes sense the data in allocated bandwidth and periodically send that sense resulting data to the sink. In the field of wireless sensor network geographic routing protocol is considered as good tool for the finder and

researcher where node gets the location based on position [1].

The nodes near to the sink need to transfer the data packets from other nodes; they exhaust their energy quickly, leading to an energy hole around the sink. So that complete wireless sensor network fail to transmit data packet.

### Basic requirements to be follow in WSN:

- Scalability- WSN must be capable of easily expanded or if there is any demand.
- Stability- WSN must have value on trust and stable to provide the output.
- Sensibleness- WSN should react quickly in the desired condition in a positive way.
- Power efficiency- WSN must be power efficient.

### LITERATURE SURVEY:

Objective of this survey paper is study on complete information of wireless sensor networks. In this they report an overview of variety of technologies in WSN, standards used by it, its application in various areas, characteristics of network design, and development. Besides this some odd applications are mentioned in WSNs in particular, which are based on environmental monitoring, based on that they mentioned design strategies, they also studied a real time implementation. Possible evolutions and trends are shown. This force to study IEEE 802.15.4 technology, which empower

many applications of WSNs [2]. This leads to give the motivation to work on WSN which is widely spreading in information gathering. In this paper they have presented the significant characteristics of the wireless sensor network which will help the researchers and industry to design a functional WSN with maximum throughput using minimum resources with a low cost. Some of them are low cost, energy efficient, computational power, security and privacy etc. [3]. This helps to design WSN easily by understanding the concepts of characteristics of architecture.

In this paper, they have given the explanation about routing protocols used in wireless sensor network. Furthermore they discussed routing challenges and design issues in WSN which are crucial parameters. Protocol stack of WSN is shown so that to understand the connectivity of network. After discussion on different routing protocols they come to the solution that, they can't say any particular protocol is better than other. Only can compare these protocols with respect to some parameters. The efficient protocol provided the most optimized solution but still holds some major drawbacks [4]. This information is lead to design suitable network to overcome the problems in WSN. Every protocol has its importance in respective areas according to its functionality.

This review paper focuses on existing WSN simulation frameworks that could be integrated with real-time hardware prototypes. They discussed about how data collection process can get affected by various factors. Furthermore variety of simulation framework is presented [5]. Various such simulation frameworks are analyzed and compared, and based on that a suitable simulation environment we can select according to our requirement.

In this paper, Probabilistic and Non-Probabilistic Clustering Approaches are studied. They have instructed about the problem of network dis-connectivity due to cluster head failures in wireless sensor networks and they have tried to find a solution for that. They have introduced an energy-efficient, fault tolerant energy optimized protocol for wireless sensor network to recognize faults and perform appropriate measures so as to get rid from failures. They try to maintain the connectivity of the network and the fidelity of data transfer even when a node in the network runs out of energy [6]. This study will useful in maintain the network connectivity by knowing failure of cluster head.

In this paper, a node location model and radio channel module of wireless sensor networks and its implementation in MATLAB are presented. They discussed about the algorithm module and performance analysis module. With this model, the performance of localization algorithms can be tested better. Further work will be focused on how to improve the accuracy of this model, including protocol module and energy module [7]. With the help of this paper we can get the idea of what could be the essential location of nodes in WSN.

In this paper they have studied the two most important parts of data communication in sensor networks- query processing, data aggregation and realized how communication in sensor networks is different from other wireless networks. Here they have used LEACH protocol for routing and data aggregation. Efficient data collection not only improve lifetime of network but also reduces energy consumption. Their simulation result shows that when data is transferred to sink by using multi-hop manner the energy consumption is low as compared to direct transmission to sink [8]. Wireless sensor networks are energy constrained network. This to study how to minimize energy consumption in WSN.

In this paper, for data transmission in WSN they used location based routing protocol i.e. geographic routing protocol. They presented detailed explanation about geographic routing protocols and their applications in several areas where we need data collection. They shows that better results can get over non geographic routing protocol and it can save lot of energy and improve lifetime of network [9]. This paper gives the motivation to use location based routing protocols in large WSN.

### OBJECTIVES
- To develop an analytic model to estimate the traffic load, energy consumption, and lifetime of sensor nodes in a data-gathering WSN.
- In this designing of network is based on clustering of whole network by using geographic routing protocol for data transmission.
- To propose a system which efficiently balance the energy consumption and prolong the network lifetime.

### PROPOSED METHODOLOGY AND DISCUSSION:
At first stage the complete network is partitioned into a number of small groups which are nothing but clusters. These clusters have their own base station to get the data from surrounded nodes. These base stations will be high in energy. Position of the main sink node will be at the centre. to get the data from other base stations from clusters.

Designing of the network is based on some important parameters so that we can increase the network lifetime. List of the parameters are channel type for transmission, number of nodes in area, transmission range of node, type of antenna, initial energy, and packet size. We can use these terms to minimize energy consumption in the network and at the same time lifetime will increase.

Then the next step is to get the details of how much energy is carrying by WSN and what is the status of node by using the geographic routing algorithm. After calculating the traffic of the system and the node energy consumption the various parameter analysis is done and the final output of the system can show.
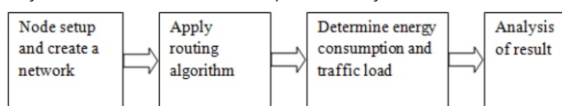


**Fig. 1 Flow of a work**

### CONCLUSION:
In this survey paper, we introduced a model which is based on some design metrics which can be use to maximize the entire network lifetime and decreasing the utility of energy in Wireless sensor networks (WSNs). These sensors are capable of sense the data, can compute, and can wirelessly communicate. They can widely use in many applications such as in smart cities, military surveillance, environmental parameters monitoring, construction, at farm, and other wide applications.

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