

# **A Survey Paper on Energy Efficient Routing Technique on WSN**

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## **ABSTRACT**

Wireless Sensor network is an important area of research while working or discussing about the different communication medium today. Some important parameters need to be concern while performing a routing algorithm or strategy in between the multiple nodes. A maximum utilization of resources need to concern while we can maximize the lifetime of a network routing nodes. In this paper we are going to survey about the various protocols which are already used by different techniques in WSN. We need to evaluate packet delivery ration using all algorithms. This survey paper compare and monitor the performance of wireless sensor network algorithms, based on different parameters such as network lifetime, energy consumption, delay, packet delivery ratio and drop ratio etc. Thus upon discussing different issues we can conclude the problems associated with techniques and the best possible solution to put our efforts to solve existing issues. Upon discussing various issues and authors specification we have come up with the working on process execution time and to work on TC packet modification procedure.

## **KEYWORDS:**

Wireless Sensor Network, Energy Routing, OLSR, PDR.

## **1. INTRODUCTION**

Wireless Sensor network consist of several thousand or more tiny immobile sensors, also called nodes that are densely deployed in the service area on an ad-hoc basis to sense and transmit regularly some defined characteristics of the surrounding environment. An associated base station collects the information forwarded by the wireless sensor on a data- centric basis. Sensor networks can be seen as an extreme form of ad-hoc networking with very low power devices[4]. WSNs have very limited computing capabilities change their topology quite frequently as per the need of a particular application, and are prone to failures. Main research topics are: routing of data within the sensor network, management of the nodes fault tolerance/reliability, low-power design, and medium access control[6]

1.1 Application of WSN- Wireless Sensor Netwo has follow applications-

1. Environmental control in office buildings.

This is the purpose to design a routing strategy for large scale building utilization which consume

lowest energy, this planning is always required and done using WSN strategy planning and management [8].

2. Robot control: in order to enhance utility capability such as sensor, navigation, localization in WSN is required.

3. Guidance in automatic manufacturing environments. Automatic manufacturing requirement in environmental planning strategy in WSN is required which consume low energin communication.

4. Seismic Monitoring: monitoring to Volcano, tsunami, earth quack such tragedy using application of WSN been applied.

5. Health care monitoring: in order to patient’s physiological parameters consistently application of wan is required.

Issues involved in WSN:

1. Energy Efficiency.
2. Self-Configuration
3. Limited computational resources like power.

TC packet format of OLSR contain following content using which different communication factor effects the network communication.

0										1										2										3	
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
Reserved										Htime					Willigness																
Link Code					Reserved					Link Message Size																					
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Figure 1: TC packet format of OLSR

### 1. LITERATURE REVIEW

Routing Protocols could be broadly classified in to three categories-

[1] Proactive or Table driven Routing Protocol:

Proactive protocols continuously learn the topology of the network and exchange information among the

network. The routing information is available in routing table, thus when there is a need to a destination the route information is available immediately. Proactive routing maintains route to every other node in the network without considering of whether all the routes are actually used or not, but shortest path can be find without time delay. It is

good for high traffic network. Examples of proactive routing protocols are OLSR, DSDV etc.

[2] Reactive or On demand Routing Protocol:

The reactive routing protocol find route between source and destination whenever that route is needed. Whereas in proactive protocols we are maintaining all the routes without regarding its state of use. Cost of finding routes is expensive since flooding is involved in the network. It is good for low/medium traffic network. Examples of reactive routing protocols are AODV, DSR etc.

[3] Hybrid Routing Protocol:

In above discuss methods have some pros and cons. Hybrid routing protocols is a combination of proactive and reactive routing protocols. It includes the advantages of both protocols. These types of protocols can incorporate the facility of other protocols without compromising with its own advantages. Examples of proactive routing protocols are ZRP, TORA etc.

In the field of WSN for increasing the network lifetime by reducing energy usability in the network routing scenario, they have investigates and performed the research to find reason behind energy depletion and how can mitigate from it. They have proposed multi metric scheme which was integrated with the existing algorithm OLSR using their routing approach. Authors performed simulation using NS3 environment where they have shown the efficiency in the terms of packet delivery ratio (PDR) which outperform 10-20% more efficient than the existing standard OLSR technique.

Multi metric Scheme: A routing matrix introduced along with the existing standard OLSR with which

the following concepts were added for reducing energy consumption at each node to get maximum output from a network in wireless sensor network communication. Packet transmission and Overhearing from the neighbor nodes are two important factor which consider for the energy efficient routing according to their work. They have utilized three routing approach namely 1. MAC queue utilization 2. Residual energy, 3. Node degree. They have changed the proactive manner of standard OLSR and TC packet format in order to make integrated routing scheme. They have used Greedy Heuristic Algorithm for the routing table computation for efficient routing scheme in Enhanced OLSR work done by them. And in future they kept a work in large network to make a network system fast due to their changes done in TC packets. Hence robustness of system can be done by proceeding the work.[1]

Limited energy of the sensor nodes is the main constraint in operation of the network. In this paper they have stated that various limited energy of the wireless sensor node is always arise an issue in the routing protocol with energy efficiency and they proposed that a leader selection algorithm for these routing protocol to enhance the network lifetime to a greater extent. Distance of the node from the base station, degree of connectivity of the node and trust level of the node is individually analyzed and is linearly combined with weights associated with each parameter. This gives overall potential function of a node to become a leader. The number of round after which leader selection takes place is also equated. Through simulation the algorithm is compared with traditional energy –distance based method for routing protocols LBEERA, OREC, PEGASIS and SHORT. Significant improvement of network lifetime is

Obtained using this leader selection algorithm. Highest improvement of more than 8% increase in network lifetime is observed when distance of the node from the base station is given a higher linear combination weight.

They have worked with three major parameters in designing the protocol as listed below.

1. Distance of the node from the node from the sink.
2. Degree of the node
3. Trust level of the node.

Finally they have concluded stated that node from the base station, degree of connectivity of the node and trust level of the node coupled with its instantaneous energy determines the potential of a node to be a leader. They have mentioned for future work can be done to calculate or acquiring an optimal value for linear combination values at which the network lifetime enhancement is maximum.[2]

In this paper they discuss and evaluate the performance of OLSR protocol on the basis of MPR count, "HELLO" message sent, routing traffic sent and received, total TC message sent and forward, total hello message and TC traffic sent are analysis. OLSR is a proactive link state routing protocol, in this a node is immediately able to route (or drop) a packet. Link-state routing algorithms choose best route by determining various characteristics like link load, delay, bandwidth etc. Link-state routes are more reliable, stable and accurate in calculating best route and more complicated than hop count. In this routing each node expand a spanning tree and each node can obtain the whole network topology. Periodic message is

broadcast over the network to update the topological information of each node. MPR is used to minimize the flooding of broadcast packet in the network by reducing duplicate retransmission in the same region. In this paper, MANET routing protocol in the OLSR were performance analyzed. The performance of OLSR protocol through a network different size carried out a comparative analysis of the performance and found it had better performance in all aspects in a network. The performance of OLSR which can be achieved by Hello Traffic Sent (bit/sec), Total TC message sent (TTMS) and Total TC message forward (TTMF), Total hello message and TC traffic sent (bit/sec), Routing traffic received (pkt/s), Routing traffic sent (pkt/s), MPR Count.[3]

In wireless sensor network many of the routing schemes are developed to find lowest energy path for increasing the lifetime of the network. In this paper they take the view always using lowest energy path may not optimal from the point of view of network lifetime. They propose a new scheme called "Energy aware routing" uses suboptimal paths to provide substantial gains. It is a reactive routing and destination initiated protocol where the consumer of data initiates the route request and maintains the route. Multiple paths are maintained from source to destination.

However, diffusion sends data along all the paths at regular intervals, while energy aware routing uses only one path at all times. But due to the probabilistic choice of routes, it can continuously evaluate different routes and choose the probabilities accordingly. The protocol has three phases-

1. Setup phase or interest propagation
2. Data Communication phase or data propagation
3. Route maintenance [4]

Energy consumption is the main issue involve in wireless sensor network. For any sensor network the lifetime of a sensor node depends on battery capacity. Hence it is important to adopt energy efficient scheme for information processing in the network. In this paper they proposed an algorithm which will ensure that data is transmitted to that data is transmitted to the Fusion Node in all scenarios considering the efficient energy consumption factor and also the propagation delay. They introduced a rerouting algorithm of shortest path selection based on Layered Deployment Mode (LDM). This ensure that the data is received by a particular node gets transferred to the Fusion Node in cases even if batteries of more than one node are completely exhausted .The major features that they achieved an effective and Fail-proof communication between the sensing node and fusion node without the system failing and an alert whenever the battery level of a node gets below a specified level. Whenever the battery level of a particular node is completely exhausted, the algorithm redirects the data through the next shortest path. They compare average energy and average delay of the system with CHIRON. Finally they conclude that LDM is better approach as it offers to save a lot of energy compared to CHIRON. [5]

In this paper they proposed a new scheme energy aware routing protocol (E-AODV) based on AODV protocol. They used two parameters packet delivery ratio and delay to demonstrate that how small

changes in the principle of the AODV protocol can efficiently balance the energy consumption between nodes. They describe a node whose battery is used too much to refuse to route the traffic of the other nodes. The route built between any pair of nodes consists only of nodes whose energy level is higher than the threshold. [6]

### **3. PROBLEM IDENTIFICATION**

On studying the current scenario and work already done by the authors we analyzed that there is still need some issues to be resolved which is given by the authors. There are some problems identified as TC packet modification process needs to enhance such that it can give same performance on large network. TC packet modification is reducing the slow process due to extra operation in greedy algorithm. Optimization process is required where packet transfer topology and algorithm need to investigate.

### **4. PROPOSED WORK**

The proposed work can be done in following steps to resolve slowdown process:

1. TC packet modification and multiple topology need to be apply and we will monitor PDR using different topology and techniques.
2. Finally we will conclude and optimize our algorithm using efficient topology which outperform good result in case of packet delivery ratio.
3. Further process can be optimizing as to obtain topology as per number of node in the network.

## 5. CONCLUSION

In this Paper we have discussed review about the various techniques were used by different author for energy consumption and depletion scenario and various techniques used by them. Different author proposed their work and simulation using Network simulator in order to demonstrate the algorithm in wireless sensor network. We have investigated the latest paper about the energy depletion and mitigation in which author have given the integration of three efficient point which enhanced the power of OLSR and improved the PDR by 5-10%. furthermore we have come to analyze we still need to improve the communication cost while maintaining the same performance in the current algorithm, thus our further work will be on to working in the area of time consumption in the communication with wireless sensor Network.

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