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# Opportunistic Routing Techniques in WSN: A Review

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**ABSTRACT:** *The wireless sensor network is the decentralized type of network in which sensor nodes sense the information as pass information to base station. Due to decentralized architecture and far deployment of the network energy consumption is the major which reduce network efficiency. The clustering is the efficient approach which reduces energy consumption of the network. In this paper, various energy efficient techniques of wireless sensor networks are reviewed and analyzed in terms of certain parameters.*

**KEYWORDS:** *WSN, LEACH, Opportunistic routing, Lifetime*

## I. Introduction to WSN

Wireless sensor networks consist of thousands and hundreds of sensor nodes. These sensors communicate directly or indirectly with base station. Moreover each sensor node contains, processing, sensing, transmission, position finding system, mobilizer and power units. Mainly sensor nodes are deployed in larger area. Sensor nodes produce high information in physical environment. Each sensor nodes decision is based upon its knowledge, decisions based on base stations. They have special quality to send data to different route from base stations. A BS can be fixed or mobile to communicate with sensor nodes and exchange data with them.

## II. Challenges

Some of the challenges are:

**1) Data Aggregation:** Sensor nodes can produce duplicate data from different regions. Data aggregation techniques combine data from various nodes, according to a definite aggregation function, e.g., duplicate repression, minima, maxima and average. Data aggregation is used to meet energy efficiency and data transfer optimization in all routing protocols.

## 2) Energy Consumption without Losing Accuracy:

The sensor nodes can use up their limited supply of energy performing computations and transmitting information in a wireless environment. As such, energy-conserving forms of communication and computation are essential. Sensor node lifetime shows a strong dependence on the battery lifetime.

In a multihop WSN, each node plays a dual role as data sender and data router. The malfunctioning of some sensor nodes due to power failure can cause significant topological changes and might require re-routing of packets and reorganization of the network.

**Security:** One of the challenges in WSNs is to provide high security requirements. Many wireless sensor networks collect sensitive information. The security requirements in WSNs are comprised of node authentication and data confidentiality. As a consequence, sensor networks require new solutions for key establishment and distribution, node authentication, and secrecy.

### III. Literature Review:

S.NO	RESEARCHER	PAPER NAME	JOURNAL	FINDINGS
1.	Azrina Abd Aziz	A Survey on Distributed Topology Control Techniques for Extending the Lifetime of Battery Powered Wireless Sensor Networks	IEEE	They review about how energy can be increased by design by studying various energy efficient algorithms. It also offers the algorithm which has best battery lifetime. At the end it is found that there is various research issues related to energy efficient approach.
2.	Alka Singh	Energy Efficient Routing of WSN using Particle Swarm Optimization and V-Leach Protocol	IEEE	In this paperPerformance comparison with existing leach protocol demonstrates proposed protocol gives better performance to limit energy dispersal in the transmission and expands the life time of the wireless sensor systems.

3.	Abdellah Chehri	Energy-Aware Multi-Hop Transmission for Sensor Networks based on Adaptive Modulation	IEEE	In this paper they proposed WSN is composed of small battery-powered devices that has sensors and wireless communication capabilities. Energy management is one of the key issues in WSNs because it directly impacts the network life-time. In order to overcome this restriction, several energy efficient approaches for different layers have been investigated.
4.	Ines Slama	Topology Control and Routing in Large Scale Wireless Sensor Networks	IEEE	In this paper a two-tiered Wireless Sensor Network (WSN) is explained where nodes are divided into clusters and nodes forward data to base stations through cluster heads.
5.	Seungki_Hong	An Energy Efficient Topology Control Protocol in Wireless Sensor Networks	IEEE	In this paper, they explained that topology control is the best technique to reduce energy consumption in wireless sensor network and to reduce interference to reduce communication nodes.
6.	Sushil Kumar	Performance Analysis of Leach and Enhanced Leach in WSN	IEEE	In this paper, the authors proposed a method that delineates that the enhanced leach is a routing protocol. The results of the enhanced leach protocol are comparison with existing Leach Protocol.

#### IV. OPPORTUNISTIC ROUTING IN WSNS

Challenged networks where network contacts are intermittent or where link performance is highly variable and there is no complete path from source to destination for most of the time optimistic Routing. The path can be highly unstable and may change or break quickly. To make communication possible intermediate nodes may take keeping of data during the blackout and forward it when the connectivity resumes. Opportunistic Routing used broadcast transmission to send packets through multiple relays. Opportunistic routing archives higher throughput than traditional routing. First protocol was designed by Biswas and Morris in 2004. The main idea behind Opportunistic

Routing is select a subset of the nodes between the source and the destination node and the node closest to the destination will first try to retransmit packets. The main two steps are -

1. Selection of the forwarder sets: Selecting only the potential nodes between the source and destination to increase the routing efficiency.
2. Prioritization among these forwarders: The highest priority forwarder should be the closest one to the destination.

The wireless sensor network is the self-configuring type of network which can be used to sense environmental conditions like temperature, pressure etc. The sink is deployed which act will like the base station and all the sensed information passed to sink.

The main issue in wireless sensor network is the battery consumption as it is very difficult to recharge or replace battery of sensor nodes.

To increase lifetime of the sensor networks technique of clustering will be applied in which static and dynamic clustering techniques will be applied.

Technique of opportunistic based routing is proposed for data routing in wireless sensor networks. In the opportunistic type of routing the source node store the data on the intermediate node which will move near to the base station and deliver data to the base station. The data which is stored on the intermediate node also given the priority and data which has higher priority is delivered first to base station.

## V. Conclusion

In this work, it is concluded that wireless sensor network is the self-configuring network in which energy consumption, security are the major issues which reduce its efficiency. The clustering is the efficient approach which increase lifetime of the wireless sensor networks. In this review paper, energy efficient approach which are proposed so far are analyzed and reviewed.

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