

**Department of Electronic & Telecommunication** **Engineering**

**Subject:** Wireless Sensor Network (UECL412)

**TAE – 2:** IEEE Paper

**Topic:** Architecture of Sensor Network.

**Name: -** Abhirat A. Bawane.

**Roll No:** 19

**Year/Semester:** 4th/ 7th

**Submitted To:**Dr. Bhushan Vidhale.

Signature:

**Paper Title -** The Architecture and Characteristics of Wireless Sensor network

**Paper Link:** [**https://ieeexplore.ieee.org/document/5360030**](https://ieeexplore.ieee.org/document/5360030)

#### ****1. Objective of the Paper****

The paper provides an overview of:

* **Architecture of Wireless Sensor Networks (WSNs)**
* **Characteristics, node deployment strategies, and routing protocols**
* **Future research challenges** in WSNs.

#### ****2. Summary of Content****

* **Architecture:**
  + Describes typical WSN architecture including sensor nodes, sink nodes, and communication with the Internet.
  + Discusses OSI-based layered architecture and additional management planes (power, mobility, task management).
  + Introduces biologically inspired architecture (BiSNET).
* **Characteristics:**
  + Limited computation, memory, and battery energy.
  + Multi-hop communication and self-organization.
  + Highly application-dependent and often deployed in harsh environments.
* **Node Deployment:**
  + Deterministic and stochastic methods based on environment.
  + Discusses potential field, virtual force, and clustering approaches.
* **Routing Protocols:**
  + Covers energy-efficient protocols such as LEACH, PEGASIS, MECN, SPEED, B-MAC, and DQEB.
  + Compares WSNs with MANETs, highlighting unique constraints like energy, node density, and data-centric communication.
* **Applications:**
  + Environmental monitoring, health monitoring, home automation, military, disaster detection.

#### ****3. Strengths****

* Comprehensive overview of **multiple aspects of WSNs.**
* Inclusion of **recent (at the time) routing protocols and deployment strategies.**
* Highlights **energy efficiency challenges a**nd **dynamic topology requirements.**
* Provides a **layered model (OSI + management planes),** which is useful for researchers.

#### ****4. Weaknesses / Limitations****

* Lacks **experimental or simulation results** to validate concepts.
* Some sections are **broad and descriptive without deep analysis.**
* Limited focus on **security mechanisms,** which are critical in WSNs.
* Does not propose a novel architecture but rather **summarizes existing ones.**

#### ****5. Contributions****

* Serves as a **survey-type paper** introducing WSN architecture and its essential components.
* Points out **future research directions**: power conservation, topology reconfiguration, deployment in hostile environments.

#### ****6. Future Research Directions (as per the paper)****

* Improving **energy conservation** techniques.
* Enhancing **robustness and fault tolerance**.
* Designing **adaptive, application-specific routing protocols.**
* Optimizing **sensor deployment in dynamic or unknown terrains.**

**7. Conclusion**

This paper acts as a **foundation for understanding WSN architecture and routing strategies.** It is suitable for **beginners and researchers looking for an overview rather than technical implementation details**. The paper highlights the **key challenges** of WSNs—energy efficiency, dynamic topology, and application relevance while encouraging further in-depth research.