

Department of Electronic & Telecommunication Engineering

Subject: Wireless Sensor Network (UECL412)

TAE – 2: IEEE Paper

Topic: Architecture of Sensor Network.

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Signature:

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 and 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.