**A NODE OVERHAUL SCHEME FOR ENERGY EFFICIENT CLUSTERING IN WIRELESS SENSOR NETWORKS**

**LITERATURE REVIEW**

**[1] F. Karray, M. W. Jmal, A. Garcia-Ortiz, M. Abid, and A. M. Obeid:** [Wireless sensor nodes](https://www.sciencedirect.com/topics/engineering/wireless-sensor-node) are the main components in [wireless sensor networks](https://www.sciencedirect.com/topics/engineering/wireless-sensor-network). Such devices affect the performance and the accuracy of the network. Countless commercial and research nodes exist and their comparison is critical. Literature surveys do not provide a comprehensive overview about all the existing nodes’ technologies.

The main goal of this paper is to provide a deep overview of the current state of the art with enough background, to allow to design evolutionary nodes and to analyse thoroughly the node design components and application trends. This survey is helpful not only for researchers but also for industry. Therefore, a work that gives an inclusive overview is required. With the [exponential growth](https://www.sciencedirect.com/topics/engineering/exponential-growth) of technologies and electronics, it is essential to know the latest trends, the innovative future directions and to eliminate redundancies.

This paper allows a global overview about existing nodes in industrial and research works to get decisions about the future of node fabrication.

**Summary:** Studied about acquiring information from physical word in automatic, systematic and intelligent way using a large number of WSND.

**[2] A. Shahraki, A. Taherkordi, Ø. Haugen, and F. Eliassen:** Wireless Sensor Networks (WSNs) typically include thousands of resource-constrained sensors to monitor their surroundings, collect data, and transfer it to remote servers for further processing. Although WSNs are considered highly flexible ad-hoc networks, network management has been a fundamental challenge in these types of networks given the deployment size and the associated quality concerns such as resource management, scalability, and reliability. Topology management is considered a viable technique to address these concerns. Clustering is the most well-known topology management method in WSNs, grouping nodes to manage them and/or executing various tasks in a distributed manner, such as resource management. Although clustering techniques are mainly known to improve energy consumption, there are various quality-driven objectives that can be realized through clustering. In this paper, we review comprehensively existing WSN clustering techniques, their objectives and the network properties supported by those techniques. After refining more than 500 clustering techniques, we extract about 215 of them as the most important ones, which we further review, categorize and classify based on clustering objectives and also the network properties such as mobility and heterogeneity. In addition, statistics are provided based on the chosen metrics, providing highly useful insights into the design of clustering techniques in WSNs.

**Summary:** Studied about that most of existing clustering techniques are unable to support heterogeneous and mobile network infrastructures. Given that many applications require supporting such network characteristics, more effort is needed on addressing heterogeneity and mobility through clustering. In addition, the results show that although clustering techniques focus on reducing energy consumption and improving load balancing, they are able to solve more divers challenges. This will encourage the scientists to leverage clustering to solve other networking challenges..

**[3] Hein zelman, Wendi Rabiner, Anantha Chandrakasan, and Hari Balakrishnan:**

Networking together hundreds or thousands of cheap microsensor nodes allows users to accurately monitor a remote environment by intelligently combining the data from the individual nodes. These networks require robust wireless communication protocols that are energy efficient and provide low latency. We develop and analyze low-energy adaptive clustering hierarchy (LEACH), a protocol architecture for microsensor networks that combines the ideas of energy-efficient cluster-based routing and media access together with application-specific data aggregation to achieve good performance in terms of system lifetime, latency, and application-perceived quality. LEACH includes a new, distributed cluster formation technique that enables self-organization of large numbers of nodes, algorithms for adapting clusters and rotating cluster head positions to evenly distribute the energy load among all the nodes, and techniques to enable distributed signal processing to save communication resources. Our results show that LEACH can improve system lifetime by an order of magnitude compared with general-purpose multihop approaches

**Summary:** Studied about LEACH outperforms static clustering algorithms by requiring nodes to volunteer to be high-energy cluster-heads and adapting the corresponding clusters based on the nodes that choose to be cluster-heads at a given time. At different times, each node has the burden of acquiring data from the nodes in the cluster, fusing the data to obtain an aggregate signal, and transmitting this aggregate signal to the base station.

**[4] I. Akyildiz, W. Su, Y. Sankarasubramaniam, and E. Cayirci:** This paper describes the concept of sensor networks which has been made viable by the convergence of micro-electro-mechanical systems technology, wireless communications and digital electronics. First, the sensing tasks and the potential sensor networks applications are explored, and a review of factors influencing the design of sensor networks is provided. Then, the communication architecture for sensor networks is outlined, and the algorithms and protocols developed for each layer in the literature are explored. Open research issues for the realization of sensor networks are also discussed.

**Summary:** Studied about architecture for sensor networks is outlined, and the algorithms and protocols.

**[5] H. Shin, S. Moh, I. Chung, and M. Kang:** This study examines the problem that sensors are irregularly deployed in a wireless sensor network (WSN). Such irregularity makes clustering protocols less efficient. This paper proposes a new clustering algorithm, called balanced clustering algorithm (BCA), for irregularly deployed WSNs. In BCA, each node determines the probability that the node itself becomes the cluster head (CH) by considering the sensing population, which is defined as the number of nodes within the sensing range of a node. As a result, the coverage area of each cluster is distributed almost equally and unused redundant nodes are turned into sleep mode. Therefore, the large deviation of the coverage areas of clusters in a network can be decreased and the unnecessary duplication of sensing and transmission can also be decreased. In addition, the inefficient energy consumption is reduced significantly because the sleeping nodes do not send duplicated information over high populated areas. According to the simulation, the proposed BCA reduces energy consumption, increases the network lifetime and distributes the detection area of each cluster evenly, compared to the conventional schemes.

**Summary:** Studied about balanced clustering algorithm (BCA).