

# **Spatial Correlation-Based Clustering in Wireless Sensor Network**

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## **Abstract**

The wireless sensor networks generally comprised of a large number of sensors. The sensors are disposable and resource-constrained devices. Despite the significant improvement in battery technology, energy conservation is still an imperative function of wireless sensor networks to prolong the network operational lifetime. In the last decade, the clustering approach is normally employed to extend the network operational lifetime, where aggregated sensed information is sent to the base station. The cluster heads are responsible for managing cluster members, information accumulation, and data transmitting. Therefore, the selection of an efficient cluster is a primary concern in the clustered architecture. This paper proposes a correlation model and a localized clustering approach whose goal is to extend the network operational lifetime using fuzzy logic and spatial correlation characteristics. The fuzzy logic is utilized to key out the cluster heads and spatial correlation characteristics are employed to form clusters of closely located sensors in the observing field. Simulation results demonstrate that a significant improvement in energy efficiency can be attained utilizing the proposed approach as compared to the LEACH, CHEF, and DEC approaches.

**Keywords:** clustering, fuzzy logic, localized, wireless sensor network, correlation

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