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Adaptive Clustering in Energy Efficient Routing Protocol for Mobile Nodes in WSNs

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Introduction: Wireless Sensor Networks (WSN) is a collection of large number of small sensor nodes which communicate sensed data over a radio channel covering wide geographical region.
Problem statement: A number of algorithms have been developed to enhance the network lifetime of WSN by efficiently utilizing the sources of energy. The most commonly used approach is clustering that is prone to uneven load balancing and instability issues. Furthermore, topological changes in WSN structure especially with mobile nodes significantly effect network lifetime.
Methodology: In this study, we have proposed an Adaptive-Cluster-based Energy Efficient Routing Protocol (A-EECBRP), which employs a novel geometrical Voronoi-based configuration to solve load balancing and mobility issues while maintaining network stability and coverage. Furthermore, energy cost function and Energy Harvesters (EH) devices were implemented to reduce energy consumption and increase network life. Moreover, the concept of handshaking and random waypoint model for nodes movement between cluster groups was examined to define mobile nodes.
Results: Simulation results obtained from network analysis performed on MATLAB® showed that A-EECBRP reduced energy consumption by almost 1500 rounds as compared to LEACH-M. This significantly improved the network lifetime of WSN as compared to the LEACH-M routing protocol. Therefore, our proposed scheme provides a huge potential for implementing energy-efficient routing protocols in mobile wireless sensor networks.

Keywords: Voronoi Diagram, Wireless Charging, Mobile Nodes, Routing Protocol, Clustering, Energy Harvesters.

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Author's Contribution.
All authors contributed significantly to the study.

Acronyms
(A-EECBRP) Adaptive- Cluster-based Energy Efficient Routing Protocol
(WSN) Wireless Sensor Networks
(VLSI) Very Large Scale Integration
(BS) Base Station
(IoT) Internet of Technology
(APTEEN) Adaptive Threshold TEEN
(BDI) Battery Discharge Index
EH Energy Harvesting

Project details. NiL **Conflict of interest:**
The authors of this paper declare no conflict of interest.