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**Abstract**

Wireless Sensor Networks have limited resources with traditional data gathering techniques. One of the limitations of wireless sensor nodes is its inherent limited energy resource. Therefore, designing an effective wireless sensor network to maximizing the lifetime of sensor node in order to minimize maintenance and maximize overall system performance becomes important. In this article, we have outlined the design factors and challenges in sensor networks. Then, we describe several MAC layer and routing layer protocols proposed for sensor networks. In this paper, we propose an adaptive approach to find an optimal routing path from source to sink when the sensor nodes are randomly deployed in a restricted service area with single sink. Our analysis says our approach reduces the message communication to find a optimal routing path. Hence, the network consumes less energy and increases the lifetime of the network.

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### Index Terms

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### Keywords

Wireless Sensor Network Communication Protocols Energy Efficiency