A Project Report

On

**TITLE**

BY

**STUDENT NAME**

**STUDENT ID**

Under the supervision of

**SUPERVISOR NAME**

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**ECOLE CENTRALE SCHOOL OF ENGINEERING**

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**Ecole Centrale School of Engineering**

**Mahindra University**

**Hyderabad**

Certificate

This is to certify that the project report entitled “**TITLE”** submitted by Mr/Ms. STUDENT NAME (Roll No. xxxxxxxxx) in partial fulfillment of the requirements of the course PR XXX, Project Course, embodies the work done by him/her under my supervision and guidance.

**(SUPERVISOR NAME & Signature)**

Ecole Centrale School of Engineering, Hyderabad.

Date:

ABSTRACT

This project explores the effectiveness of LEACH-SWDN (Low-Energy Adaptive Clustering Hierarchy with Sliding Window) compared to the standard LEACH protocol for wireless sensor networks. LEACH-SWDN aims to enhance network lifetime and energy efficiency by incorporating a dynamic sliding window for cluster head (CH) selection.

The project implements both LEACH and LEACH-SWDN within a simulation environment. We conducted simulations with varying network parameters to assess their performance based on metrics like:

* **Network Lifetime:** How long the network remains functional (e.g., percentage of alive nodes remaining).
* **Packet Delivery Ratio:** The percentage of packets successfully reaching the sink node.
* **Energy Consumption:** The average and total energy consumed by nodes.
* **Number of Cluster Heads:** The number of CHs formed in each round.

Results are visualized through informative plots and graphs. Statistical analysis helps determine the significance of performance differences between LEACH and LEACH-SWDN. The project analyzes how the sliding window mechanism in LEACH-SWDN influences CH selection and network behavior compared to LEACH's static approach.

We highlight the potential advantages of LEACH-SWDN, such as potentially improved network lifetime and more balanced energy consumption. However, we acknowledge potential trade-offs like increased complexity due to the sliding window management. Finally, the project suggests future research directions for further improvement of the modified LEACH-SWDN protocol.

This project provides a valuable comparison of LEACH and LEACH-SWDN, demonstrating the potential benefits of using a sliding window mechanism for CH selection in wireless sensor networks.

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