

# Review of: "Optimized Low-powered Wide Area Network within Internet of Things"

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Potential competing interests: No potential competing interests to declare.

## Introduction to IoT and LPWAN:

- Highlight the growing significance of the Internet of Things (IoT) in daily life. Emphasize how Low-Powered Wide Area Networks (LPWAN) provide reliable connectivity in low-density areas with minimal energy consumption.

## Increasing Data Traffic:

- Discuss the exponential growth of IoT applications worldwide and the subsequent increase in data traffic within IoT networks. Mention the forecasted rise to billions of IoT devices, stressing the need for effective and reliable energy conservation technologies.

## Research Motivation:

- Explain the motivation behind researching optimized LPWANs, driven by the necessity for energy-efficient IoT technology due to the anticipated increase in connected devices.

## Experiment Overview:

- Provide a brief overview of the experimental stages conducted in the research.

## Initial Simulation without Optimization:

- Detail the first stage of the experiment, where a simulation of the wireless sensor network was run without optimization using MATLAB Simulink, resulting in a power consumption of  $6.3997e-17$  joules.

## Optimization with Particle Swarm Algorithm:

- Describe the second stage of the experiment, where the network was tested with power optimization using particle swarm optimization algorithms. This resulted in improved power consumption of  $2.5230e-17$  joules, demonstrating a 60% reduction in energy usage.

## Long Range Wide Area Network Protocols:

- Explain the third stage, which involved various simulation tests of Long Range Wide Area Network protocols, examining network communication parameters such as throughput, packet loss, delay, data transmission, buffer size, and network

density.

**Results and Analysis:**

- Present the results from the simulations, highlighting the significant reduction in energy consumption achieved through optimization. Include comparisons and analysis of the different network protocols tested.

**Discussion on Energy Efficiency:**

- Discuss the implications of the findings, particularly how the optimized LPWAN can enhance energy efficiency in IoT networks. Consider potential benefits and limitations observed during the experiments.

**Conclusion and Future Directions:**

- Summarize the key outcomes of the research, emphasizing the importance of energy-efficient IoT technologies. Suggest directions for future research to further improve energy conservation and address any remaining challenges.