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# Green Computing: Energy-Efficient Algorithms for Data Centers

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**Abstract:** *Data centers have become a critical part of modern computing infrastructure, supporting cloud services, enterprise applications, and big data processing. However, their high energy consumption results in significant operational costs and environmental impact. Green Computing emphasizes the design of energy-efficient algorithms, workload management strategies, and optimized resource allocation to reduce power usage without compromising performance. This study proposes a framework that integrates task scheduling, workload consolidation, and Dynamic Voltage and Frequency Scaling (DVFS) to achieve energy efficiency. Simulation results indicate a 20–30% reduction in energy consumption while maintaining Quality of Service (QoS). The paper highlights the importance of holistic energy management and provides directions for future research in AI-driven predictive optimization for data centers.*

**Keywords**: Green Computing, Energy-Efficient Algorithms, Data Centers, Workload Consolidation, Cooling Optimization.


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