

DEEP LEARNING FOR DATA CENTER INFRASTRUCTURE OPTIMIZATION: IMAGE AND TEXT ANALYSIS

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ABSTRACT

Optimizing data center infrastructure is a crucial challenge in today's computing environments, where effective resource management can drive down operational costs and boost performance. Deep learning has demonstrated remarkable success across various applications, and its potential to transform data center operations is becoming increasingly clear. This paper delves into the application of deep learning models—particularly in image and text analysis—for improving data center infrastructure management. Image analysis can be leveraged to monitor physical conditions, identifying issues such as equipment failures or thermal hotspots. Meanwhile, text analysis can process operational logs, aid predictive maintenance, and support capacity planning by extracting meaningful insights from unstructured data. By integrating both approaches, organizations can make more informed decisions, ultimately enhancing efficiency and reliability. This research outlines potential methods, key challenges, and future directions for adopting deep learning to optimize data center operations, providing a robust framework for businesses looking to embrace AI-driven infrastructure management strategies.

KEYWORDS: *Deep Learning, Data Center Optimization, Image Analysis, Text Analysis, Infrastructure Management, Predictive Maintenance, Resource Allocation, Operational Efficiency, Anomaly Detection, AI-Driven Solutions.*

Article History

Received: 18 Apr 2025 | Revised: 20 Apr 2025 | Accepted: 24 Apr 2025
