

Intelligent Cloud Systems: AI-Driven Enhancements in Scalability and Predictive Resource Management

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Abstract: *This research article explores the transformative role of Artificial Intelligence (AI) in cloud computing, with a focus on its influence on scalability, resource management, and predictive analytics within distributed systems. As cloud infrastructure becomes integral to organizational operations, AI technologies have emerged as vital tools for enhancing performance and efficiency.*

The study emphasizes how AI enables scalability through dynamic resource allocation and auto-scaling, allowing systems to adapt seamlessly to changing demands. It also examines AI-driven resource management strategies, which utilize machine learning algorithms to optimize operations, lower costs, and ensure system resilience through predictive maintenance and anomaly detection. Furthermore, the article highlights predictive analytics, demonstrating how AI processes large datasets to support informed decision-making and improve system reliability.

By integrating intelligent automation with cloud computing, this article underscores AI's pivotal role in advancing the capabilities of distributed systems.

Keywords: Artificial Intelligence (AI), Cloud Computing, Scalability, Resource Management, Predictive Analytics, Machine Learning