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Generative AI-Powered Service Operating Systems: A Comprehensive Study of Neural Network Applications for Intelligent Data Management and Service Optimization

Venkata Bhardwaj Komaragiri

Lead Data Engineer, Ciena, Maryland, USA

Generative AI-powered service operating systems are transforming data management and service optimization by leveraging neural networks to enhance automation, decision-making, and adaptability. This study provides a comprehensive analysis of how neural network architectures, including deep learning and transformer models, enable intelligent data processing, predictive analytics, and autonomous system optimization. By integrating generative AI, service operating systems can dynamically refine workflows, personalize user experiences, and enhance operational efficiency across industries such as healthcare, finance, and smart infrastructure. Additionally, we explore the role of AI-driven automation in improving scalability, reducing latency, and ensuring data integrity. This research highlights key advancements, challenges, and ethical considerations in deploying generative AI for intelligent service management, emphasizing the potential for more adaptive, efficient, and resilient digital ecosystems.