

A Study on Machine learning and Cloud Computing

Manpreet Kaur, Research scholar (computer science), Tania University

Abstract

Machine Learning (ML) and Cloud Computing have emerged as two significant technologies that are transforming modern information systems, data processing, and intelligent applications. This study examines the relationship between machine learning and cloud computing and explores how their integration can improve the development, deployment, and management of intelligent computational solutions. Machine learning enables computer systems to identify patterns, learn from data, and generate predictions or decisions with limited explicit programming, while cloud computing provides scalable computing resources, storage, networking, and software services through internet-based platforms. The combination of these technologies allows organizations to process large datasets, train complex machine learning models, and deploy applications without requiring extensive on-premises infrastructure. The study examines important applications of cloud-based machine learning in areas such as healthcare, finance, education, retail, cybersecurity, manufacturing, and business analytics. It also considers key benefits, including scalability, cost efficiency, flexibility, accessibility, faster model development, and efficient resource utilization. At the same time, several challenges require attention, including data privacy, cybersecurity, network dependency, computational costs, model transparency, vendor dependency, and regulatory compliance. The study highlights the importance of selecting appropriate cloud architectures, machine learning algorithms, and security mechanisms according to specific application requirements. It concludes that the integration of machine learning with cloud computing provides a powerful technological framework for developing scalable and intelligent applications. Continued research and responsible implementation can further enhance its effectiveness while addressing security, ethical, and operational challenges.

Keywords: Machine Learning, Cloud Computing, Artificial Intelligence, Data Analytics, Cloud-Based Machine Learning, Big Data, Scalability, Data Security, Intelligent Systems, Model Deployment, Cloud Services, Computational Intelligence.

