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Special Issue: "Data Science in the Cloud: Overcoming Challenges and Maximizing Opportunities for Machine Learning"

Vinay Singh

INTRODUCTION

As Data Science is a rapidly evolving field in which large amounts of data are analyzed to derive meaningful insights using machine learning-based techniques. In contrast, cloud computing offers a scalable and cost-effective platform for storing and processing data for machine learning-based applications. The combination of data science and cloud computing has emerged as a powerful tool for organizations seeking a competitive advantage through data-driven decision-making. The problem statement is that traditional machine learning approaches frequently involved storing data on local servers and analyzing it with specialized tools. However, this approach can be costly, time-consuming, and unscalable in the face of large data volumes. Many organizations are turning to cloud-based machine-learning platforms to address these challenges.

Several challenges are in the way to overcome to this problem and some of them are the complexity of integrating different tools and technologies is one of the major challenges of machine learning in cloud computing. Data scientists must be skilled in a variety of programming languages, cloud platforms, and machine-learning tools. Furthermore, data scientists may run into compatibility issues with various cloud platforms and services.

Keywords: NA

Classification: LCC: QA76.585-76.589

Language: English



Great Britain
Journals Press

LJP Copyright ID: 975822
Print ISSN: 2514-863X
Online ISSN: 2514-8648

London Journal of Research in Computer Science and Technology

Volume 23 | Issue 2 | Compilation 1.0



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I. INTRODUCTION

Dear Colleagues,

As Data Science is a rapidly evolving field in which large amounts of data are analyzed to derive meaningful insights using machine learning-based techniques. In contrast, cloud computing offers a scalable and cost-effective platform for storing and processing data for machine learning-based applications. The combination of data science and cloud computing has emerged as a powerful tool for organizations seeking a competitive advantage through data-driven decision-making. The problem statement is that traditional machine learning approaches frequently involved storing data on local servers and analyzing it with specialized tools. However, this approach can be costly, time-consuming, and unscalable in the face of large data volumes. Many organizations are turning to cloud-based machine-learning platforms to address these challenges.

Several challenges are in the way to overcome to this problem and some of them are the complexity of integrating different tools and technologies is one of the major challenges of machine learning in cloud computing. Data scientists must be skilled in a variety of programming languages, cloud platforms, and machine-learning tools. Furthermore, data scientists may run into compatibility issues with various cloud platforms and services.

Another issue to consider is data security and privacy. To protect against data breaches and unauthorized access, sensitive data should be stored in the cloud. Organizations must ensure

that adequate security measures are in place to prevent unauthorized access to their data.

Finally, organizations face difficulties in managing and maintaining their cloud-based machine-learning platforms. These platforms' management and maintenance can be complex, necessitating specialized knowledge and skills. Organizations must have the resources in place to effectively manage their cloud-based machine learning platforms.

There will be several benefits for this as cloud-based machine learning platforms are highly scalable and can handle large data volumes, allowing organizations to analyze and process large datasets more easily. Cloud-based platforms also give data scientists access to a wide range of machine learning tools and frameworks, allowing them to experiment and develop models quickly. Furthermore, cloud-based machine learning platforms can assist organizations in lowering costs by eliminating the need for costly hardware and infrastructure. The cloud allows businesses to pay for only what they use, allowing them to scale their computing resources up or down as needed. This scalability also enables organizations to experiment with new machine-learning approaches without incurring significant costs.

How the challenges can be solved:

To address the challenges of machine learning in cloud computing, organizations can implement a number of best practices. To begin, they can invest in training programs to help data scientists learn how to work with cloud-based machine-learning platforms. Specialized courses or training programs provided by cloud vendors may be included in this training.

Second, organizations can protect sensitive data by implementing strong security measures such as data encryption and access controls. This may entail collaborating with cloud vendors to ensure that the necessary security measures are in place to protect their data.

Finally, organizations can use cloud vendors' managed services to simplify the deployment and management of machine learning platforms. Managed services can provide organizations with pre-configured machine-learning platforms, allowing them to concentrate on analysis rather than infrastructure management.

Machine learning in cloud computing provides many benefits to organizations, including scalability, access to a diverse set of tools and frameworks, and cost savings. To realize these benefits, organizations must overcome several challenges, including integrating various tools and technologies, ensuring data security and privacy, and managing and maintaining their machine-learning platforms. Organizations can overcome these challenges and reap the benefits of machine learning in the cloud by implementing best practices, such as investing in training, implementing robust security measures, and leveraging managed services provided by cloud vendors.

This Special Issue aims at publishing high-quality manuscripts covering new research on topics related to the Integration of cloud computing and Big data for better IOT utilization including but not limited to the *following*:-

- Cloud Computing
- Cloud Architecture
- Security in Cloud
- Public, private, and hybrid clouds
- AI Algorithms for better cloud computing
- Microservices and containerization
- Virtualization vs Containerization
- Internet on Things(IoT)

Keywords

- Cloud applications
- Hybrid Cloud
- Cloud architecture

- Virtualization, containerization, and container orchestration
- Public, private, and hybrid clouds
- Artificial Intelligence
- Machine Learning

Topics of interest include, but are not limited to:

- Novel big data analytics technology for IoT security;
- Lightweight IoT data transmission and communications.
- Authentication and access control for data usage in IoT;
- Sustainability in Cloud
- Artificial intelligence.
- Communications and networking in Cloud
- Convergence of communications, computing and systems.
- Relevant algorithms, approaches, analyses and modelling;
- Machine learning;
- Data confidentiality and privacy protection for IoT;
- Data analytics in Cloud computing
- Big data impediments
- Big data meets green challenges.
- Environmental concerns and protections.

Important dates:

- Deadline for submissions: 31/07/2023
- 1st round of acceptance notification: 31/08/2023
- Submission of revised papers: 15/09/2023
- 2nd round of acceptance notification: 15/10/2023
- Publication online (tentative): 10/12/2023

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