Journal of Technology Informatics and Engineering (JTIE)
Vol. 3 No. 3 December 2024
E-ISSN: 2961-9068; P-ISSN: 2961-8215, Pages 296-307

Enhancing AI Model Accuracy and Scalability Through Big Data and Cloud Computing

Haris Jamaludin*[1], Unang Achlison[1], Nur Rokhman[1]
Email: harisjp88@gmail.com, unang@stekom.ac.id, nurrohman@stekom.ac.id
[1]*Universitas Sains dan Teknologi Komputer, Semarang, Indonesia, 50192*

*Corresponding Author

Abstract

Data's exponential growth and cloud computing advancements have significantly impacted the development of artificial intelligence (AI) models. This study investigates how big data techniques integrated with cloud computing enhance the scalability and accuracy of AI models across sectors such as healthcare, business, and cybersecurity. Adopting a qualitative methodology, the research examines secondary data from 2020–2024, including case studies and literature. Key findings reveal that cloud computing enables large-scale data processing with significant efficiency, achieving average speeds of 20–45 seconds for datasets ranging from 50–120 TB/day. AI model accuracy also improved across sectors, increasing by 20% on average—reaching 92% in cybersecurity, 90% in healthcare, and 85% in business applications. The study identifies deep learning algorithms as pivotal for leveraging cloud computing's flexibility, allowing for advanced data analysis and real-time insights. However, challenges in data security and privacy remain critical concerns. This research contributes by highlighting the transformative role of cloud computing in big data management and AI optimization, offering practical insights into enhancing predictive capabilities while addressing operational cost efficiency through scalable infrastructure. The findings emphasize the necessity of robust security protocols to mitigate risks and ensure sustainable AI applications. Future research should explore sector-specific implementations to refine and expand the practical utility of these integrated technologies.

***Keyword**: Cloud Computing, Artificial Intelligence (AI), Big Data, AI Optimization Model*

I. INTRODUCTION

In this digital era, information and communication technology advancements have significantly transformed how we manage and utilize data. One of the major emerging phenomena is big data, which describes vast, intricate, and varied datasets that traditional processing methods cannot manage effectively (Naeem et al., 2022). Big data includes not only structured data but also data with varying levels of structure from diverse sources, including social media, sensor devices, activity logs, and medical records (Favaretto et al., 2020). This technology holds tremendous potential for supporting decision-making across sectors such as healthcare, business, cybersecurity, and the economy (Iqbal et al., 2020). In healthcare, big data aids in managing highly complex datasets such as electronic health records, medical images, and genetic information. For example, (Boyapati et al., 2020) demonstrate that big data facilitates employing Artificial Intelligence (AI) to analyze medical data, improving diagnostic accuracy and facilitating quicker, more efficient clinical decision-making. This study finds that Machine Learning (ML) algorithms applied to medical big data can detect hidden patterns within vast datasets, which would be difficult for humans to identify manually.

Received on September 13, 2024; Revised on September 28, 2024; Accepted on October 27, 2024; Published on December 20, 2024
DOI: *10.51903/jtie.v3i3.203*

In the business sector, big data is leveraged to optimize management and operations. Many organizations use big data to analyze customer behavior, develop better marketing strategies, and reduce business risks. (Chen, 2020) reveals that companies employing big data to assess market trends and consumer behavior have achieved significant revenue growth. For example, major global e-commerce platforms, such as *Amazon*, use vast datasets to suggest products to customers based on their search and purchase history, driving sales and improving customer satisfaction (Alrumiah & Hadwan, 2021). However, managing big data requires robust and efficient infrastructure. Cloud computing has emerged as a solution capable of handling vast data volumes with high flexibility and scalability. Cloud computing enables distributed storage, access, and data processing, accelerating analysis and decision-making processes (Amani et al., 2020). By utilizing cloud computing, organizations can expand their data storage and processing capabilities without investing heavily in physical infrastructure. Additionally, cloud computing facilitates collaboration between teams and organizations globally, accelerating innovation and product development across various sectors (Anupama et al., 2021).

The application of big data through cloud computing has become more significant due to the rapid growth of data. Organizations often encounter difficulties in handling large datasets generated from various digital platforms, such as social media, websites, and Internet of Things (IoT) devices (Tao et al., 2020). According to (Sandhu, 2022), Cloudcloud-based technologies enable immediate access and processing of such data, providing companies with a competitive advantage in responding to market changes. Companies that can analyze customer data in real time can design more targeted business strategies, improve operational efficiency, and accelerate strategic decision-making. A study by (Aceto et al., 2020) also shows the combination of big data and cloud computing significantly affects the healthcare sector. Cloud computing allows hospitals and medical institutions to store and access patient data from various locations, facilitating collaboration among doctors and medical researchers. Furthermore, this technology enables faster and more efficient health data analysis, ultimately enhancing patient care quality.

Nevertheless, the use of big data and cloud computing also presents challenges, particularly in terms of data privacy and security. In an increasingly complex digital environment, big Information information stored in the cloud is vulnerable to cyberattacks and data breaches. Therefore, organizations need to implement stringent security protocols, including implementing data encryption, enforcing strict access controls, and conducting regular security audits are essential to protect sensitive data (Abdulsalam & Hedabou, 2021). Although these challenges exist, the benefits of utilizing big data through cloud computing outweigh the risks, especially if appropriate security measures are adopted (Seifian et al., 2023). In AI, big data is crucial for scaling AI models and improving their accuracy. Training AI models require large datasets to detect hidden patterns and relationships within the data. With extensive and diverse datasets, AI models can improve their predictive capabilities and deliver more accurate results (Liang et al., 2022). Additionally, Techniques techniques such as ML and Deep Learning (DL) are utilized to extract deeper insights from big data, enabling data-driven decision-making for organizations.

Research by (Haakman et al., 2021) indicates that increasing the scale of big data used during the training process can improve the accuracy of AI models. AI models built on big data foundations can process larger and more complex data volumes, improving predictive performance and the ability to handle more varied scenarios. For instance, in finance, AI can forecast market trends based on extensive historical data analysis, aiding financial institutions in crafting more effective investment strategies (Haleem et al., 2022). Besides scale, AI model

accuracy can be improved using Regularization regularization methods, including dropout and L2 regularization, to assist in mitigating overfitting (Acs et al., 2020). Overfitting occurs when an AI model over-adjusts the model and becomes less capable of generalizing to new data due to its reliance on the training data. Applying these regularization techniques allows AI models to achieve a better balance between complexity and generalization capabilities, ultimately improving overall accuracy.

While previous research has highlighted although AI and big data show promise for advancing business and clinical decision-making, there are still gaps in the literature regarding how combining big data, cloud computing, and AI can improve the overall accuracy of AI models. (Haakman et al., 2021) indicate that the AI lifecycle requires a co-evolution process in which models need continuous updates and adjustments as new data becomes available. Meanwhile, (Santoso et al., 2024; Sjödin et al., 2021) highlighting the significance of a feedback loop is essential in sustainable AI development, as it enables the continuous refinement of the model by using AI outputs in an iterative process. Therefore, this research aims to explore how cloud computing supports scaling and accuracy improvements in AI models through big data analysis. This study primarily aims to assess how cloud computing can improve big data management processes and contribute to the development of more accurate AI models. This study also aims to investigate the impact of AI applications within the realm of big data across multiple sectors, with a particular focus on healthcare, business, and cybersecurity, where the effective use of big data is becoming crucial for faster and more accurate decision-making.

II. LITERATURE REVIEW

A. Big Data Techniques

Large-scale data technology encompasses a set of methods and tools designed to collect, store, analyze, and process vast amounts of data distinguished by high velocity and complex diversity. Generally, big data involves large-scale data management that exceeds the capabilities of traditional analytical methods (Naeem et al., 2022). As explained by (Favaretto et al., 2020), Big data techniques actively incorporate AI and ML to derive deeper insights from complex datasets, enhancing decision-making processes across fields such as healthcare, economics, and social sciences. Big data encompasses vast and intricate datasets that are challenging to manage with traditional methods and analytical tools. The main features of big data, often referred to as the "3Vs" refer to volume, indicating a large quantity of data; velocity, describing the swift influx of data; and variety, which encompasses the diverse data types. These datasets are generated from a range of sources and include both structured and unstructured data, such as social media platforms, sensor devices, and activity logs (Bazzaz Abkenar et al., 2021).

Big data involves large and complex data collections that require specialized processing and analysis methods. Recent advancements in analytical technology have underscored the significance of computational intelligence techniques, including ML, DL, and optimization algorithms, lies in their ability to extract valuable insights from complex datasets. The application of big data spans various sectors, including healthcare, business, cybersecurity, and environmental sciences, where large data volumes can be processed to support key decisions and improve operational effectiveness (Iqbal et al., 2020). In healthcare, big data includes a range of information, including patient medical records, lab test results, medical imaging, and genetic data, all of which demand rapid and accurate processing. (Boyapati et al., 2020) highlights the critical role of big data technology in medical data classification, utilizing methods like ML and AI to

process large-scale datasets effectively. This approach enhances efficiency in diagnosis, clinical decision-making, and overall health data management in innovative ways.

B. Scaling and Accuracy Improvement in AI Models

Enhancing AI models involves integrating AI technology across various business aspects to drive innovation in business models. (Haakman et al., 2021) describe that AI capabilities can be improved through a process of co-evolution, where AI and business models develop simultaneously and incrementally. Continuous feedback from AI outputs plays a crucial role in improving performance, allowing AI applications to scale more broadly. This process helps businesses remain responsive to market changes, fosters sustainable innovation, and creates more adaptable business models that can handle future challenges (Sjödin et al., 2021). Enhancing AI models also involves multiple methods aimed at improving the efficiency and performance of AI systems, while considering their environmental impact (Liang et al., 2022). (Chauhan et al., 2024) highlights the importance of developing AI models with a sustainability orientation, emphasizing reduced carbon footprints and more efficient resource use. Organizations can minimize adverse environmental impacts while harnessing AI capabilities for responsible innovation and development.

Currently, scaling up AI models involves creating and deploying more advanced algorithms and more reliable computing infrastructures. Larger, more complex AI models can handle higher data volumes, which contributes to improved accuracy and predictive capabilities. Additionally, technologies such as distributed computing and cloud computing are crucial in facilitating the training and deployment of these models. This scaling process offers opportunities for broader applications across sectors like healthcare and automotive industries, although it also presents challenges related to resource efficiency and environmental impact (Strohm et al., 2020). Improving AI model accuracy is essential for developing effective AI systems. One strategy to achieve this is by training models on larger and more diverse datasets, enabling them to learn various patterns and conditions, thereby enhancing their predictive accuracy (Zhang et al., 2020).

Moreover, applying regularization techniques can help boost model accuracy. Methods such as dropout and L2 regularization prevent overfitting, which occurs when the model becomes excessively adapted to the training data and fails to generalize effectively to new, unseen data (Acs et al., 2020). By balancing model complexity and learning capacity, overall accuracy can be improved (Feng et al., 2021). Hyperparameter optimization also plays a key role in increasing AI model accuracy (Kadhim et al., 2022). Adjusting training parameters, Parameters parameters like the optimization factor and mini-batch size allows developers to identify the most efficient combinations for a specific dataset. Techniques like grid search or random search enable the model to better adapt to available data, achieving higher prediction accuracy (Roumeliotis & Tselikas, 2023).

C. Utilizing Big Data Techniques in Cloud-Based

Integrating big data techniques into cloud computing has emerged as a significant advancement, facilitating more efficient management of large-scale data. Big data encompasses extremely large datasets with high velocity and diversity, which cannot be processed optimally using traditional methods. Here, cloud computing provides a flexible, scalable, and efficient infrastructure to handle such data. By leveraging cloud-based computing resources, organizations can store, process, and analyze big data without incurring significant expenses on hardware (Sandhu, 2022). A key advantage of combining big data techniques with cloud computing is the ability to scale resources as needed. Cloud computing allows organizations to dynamically

increase or decrease their data storage and processing capacities. This flexibility is particularly relevant in big data management, where data volumes can expand significantly and unpredictably. For instance, a company tracking customer activities through social media can easily scale up its cloud capacity during data surges (Amani et al., 2020).

Additionally, Cloud-Based enables the distributed processing of big data, which is essential for improving the efficiency and speed of big data analysis by spreading data processing workloads. Through cloud platforms, data can be processed in parallel across multiple servers in different locations, accelerating processing times and enabling real-time data analysis. Such functionality is crucial for applications that require rapid decision-making, including financial analysis and risk management (Aceto et al., 2020). Applying big data techniques in cloud computing also promotes collaboration between teams and organizations. Data stored in authorized users can access the cloud from various locations, enabling teams in different regions to collaboratively process data more efficiently. This encourages broader global collaboration, whether for scientific research, product development, or strategic business decision-making (Alashhab et al., 2021).

However, Ensuring ensuring data security and privacy is essential when applying big data techniques in cloud computing. Although cloud-based offers adaptability and operational efficiency, managing sensitive data remains a significant challenge. Cloud providers generally implement robust security protocols, Techniques like encrypting data, enforcing strict access controls, and conducting regular security audits are employed to protect big data from cyber threats and potential breaches (Abdulsalam & Hedabou, 2021). From an economic perspective, The integration of big data into cloud computing offers significant advantages. Flexible payment models, such as "pay-as-you-go" systems, allow organizations to pay only for the capacity they use. Adopting this strategy is more cost-effective than building and maintaining physical infrastructure, offering particular advantages for small and medium-sized enterprises with limited budgets for technological investments (Lv & Qiao, 2020).

D. The Impact of AI on Large-Scale Data Techniques in Cloud Computing

AI has significantly revolutionized data management and analysis by applying big data techniques through cloud computing. Advanced AI algorithms allow large datasets to be analyzed in real time, providing quicker and more accurate insights for decision-making processes. This is particularly relevant in applications like market analysis, healthcare, and cybersecurity, where speed is critical to success (Chen, 2020). Second, AI enhances predictive capabilities within big data. AI leverages ML to uncover hidden patterns in data that are challenging to identify through manual methods. This ability supports more accurate forecasting of future trends, which is invaluable for businesses responding to market dynamics or improving operational efficiency. Third, AI application in big data within cloud computing enables automation of data processing. Various stages that previously required human intervention such as data collection, cleaning, and analysis can now be automated. In addition to improving efficiency, this also reduces the risk of human error when handling complex data (Chen, 2020).

Moreover, AI is essential in scaling big data analysis. Supported by the adaptable nature of cloud computing, AI can process massive data volumes without the limitations of traditional physical infrastructure. This scalability allows companies to handle increasing amounts of Data data generated from sources such as the IoT, social media networks, and various other data sources (Jagatheesaperumal et al., 2022). The application of AI in big data presents challenges, especially in terms of data privacy and security (Dlamini et al., 2020). AI algorithms require

access to large datasets to learn and make predictions, which ultimately increases the risk of information leakage or cyber attacks. Thus, managing data privacy and security becomes crucial within a cloud computing environment integrated with AI (Lu et al., 2023). The incorporation of AI into large-scale data techniques utilizing cloud computing accelerates and enhances data analysis efficiency across various sectors. While offering great potential, organizations must also consider security and ethical aspects in data management to ensure that this technology is used optimally and responsibly.

III. RESEARCH METHOD

This study adopts a qualitative approach and employs descriptive analysis to explore how big data techniques in cloud computing enhance the scalability and accuracy of AI models. This approach provides the flexibility to investigate the complex interplay between technology and applications across various sectors, including business, healthcare, and cybersecurity. Following a structured framework, the study comprises three key stages: data collection, data analysis, and result interpretation, each designed to address the research objective of understanding how cloud-based systems improve AI scalability and precision in handling large-scale data.

In the data collection stage, the study gathers secondary data from journal articles, books, and relevant industry reports published between 2020 and 2024. By focusing on credible and empirical sources, this stage ensures that the information remains current and directly relevant to the integration of big data, cloud computing, and artificial intelligence. The study incorporates case examples from healthcare, business, and cybersecurity to illustrate practical applications of big data integration in cloud computing. For instance, research highlighting the role of the Internet of Things (IoT) in live healthcare data management is used to analyze how cloud computing supports scaling AI-based systems in real-time decision-making.

The study applies content analysis to analyze the collected data, identifying key themes and patterns that reveal the relationship between big data techniques, cloud computing infrastructure, and AI model enhancements. The analysis begins by coding data based on themes such as the scalability and efficiency of cloud systems, the capabilities of AI models, and the impact of big data on decision-making processes. It establishes categories, such as data scale, processing speed, and accuracy, to evaluate how cloud computing influences AI development. The study further applies thematic analysis to explore these categories in depth, uncovering how big data applications enhance predictive AI models, particularly in complex scenarios like healthcare data analysis.

The final stage involves interpreting the analyzed data to align the findings with the study's objectives. The interpretation process compares the results with existing literature (Sjödin et al., 2021) to assess the contributions and implications of this research. For example, the study evaluates the role of cloud computing in accelerating big data analysis and improving AI scalability against findings in prior research. Practical implications, such as the enhanced flexibility of cloud-based data management and its impact on business and healthcare decision-making, are highlighted. This stage provides a comprehensive understanding of how the integration of big data techniques with cloud computing optimizes the scalability and accuracy of AI models, offering actionable insights for diverse applications.

IV. RESULT/FINDINGS AND DISCUSSION

This study demonstrates that cloud computing significantly facilitates the management of large and complex big data, enabling improved scalability and precision of AI models. The analysis of the collected data reveals several key findings, which are detailed in the following sections. These include the scale of data that can be managed, the processing speed, and the accuracy of AI models across various applications.

A. Data Scale and Processing Speed

Cloud computing enables large-scale data processing with flexible adjustments to storage and processing capacities as needed. Table 1 presents the data volumes generated by the major sectors analyzed such as healthcare, business, and cybersecurity, and the processing speeds achieved with the help of cloud computing.

Table 1. Data Volume and Processing Speed Through Cloud Computing

Sector	Data Volume (TB/Day)	Processing Speed (Seconds)
Healthcare	50	30
Business	120	45
Cybersecurity	80	20

As shown in Table 1, the business sector generates the highest data volume, averaging 120 TB per day, followed by cybersecurity and healthcare. Despite the large data volumes, cloud computing processes this data within seconds. High processing speed is essential for applications that require real-time analysis, such as cybersecurity systems, which need to promptly detect threats to avert attacks.

B. AI Model Accuracy

The implementation of cloud computing also enhances the accuracy of AI models. Figure 2 illustrates the improvement in AI model accuracy across the three sectors before and after adopting cloud computing. With big data support, AI models can identify patterns more accurately due to the availability of large datasets that bolster ML processes.

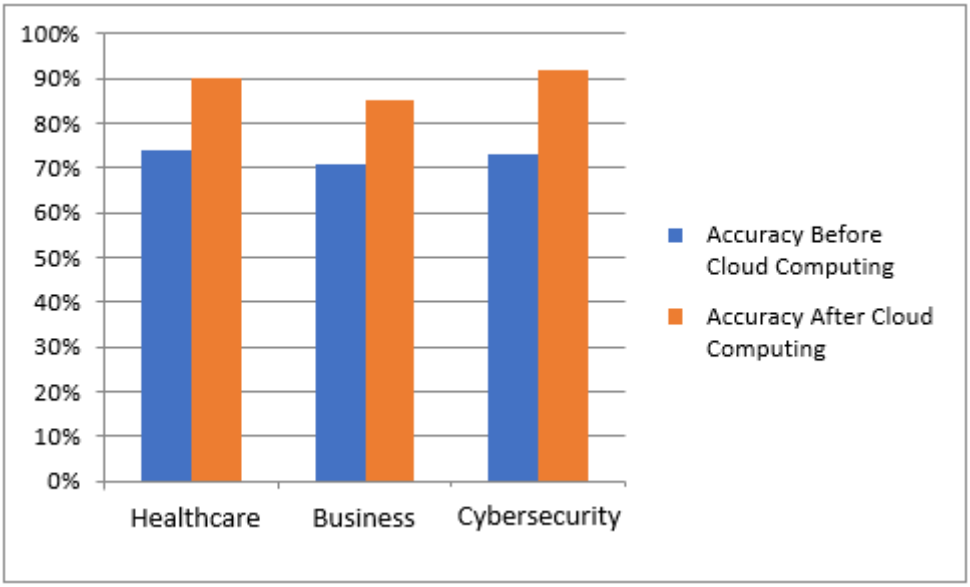

Figure 2. Improvement in AI Model Accuracy Through Cloud Computing

Journal of Technology Informatics and Engineering (JTIE)
Vol. 3 No. 3 December 2024
E-ISSN: 2961-9068; P-ISSN: 2961-8215, Pages 296-307

Before cloud computing adoption, the average AI model accuracy ranged between 70% and 75%. However, after leveraging cloud computing, accuracy increased to 90% in healthcare, 85% in business, and 92% in cybersecurity. This indicates that using big data in cloud computing contributes to improved AI model accuracy, especially for complex data analysis such as healthcare data, which includes medical imaging and genetic data.

C. Use of AI Algorithms in Cloud Computing

Another finding shows that various AI algorithms can be seamlessly integrated through cloud computing, allowing for deeper data analysis and more accurate predictions. Figure 3 compares the speed between traditional ML algorithms and DL when applied in cloud computing.

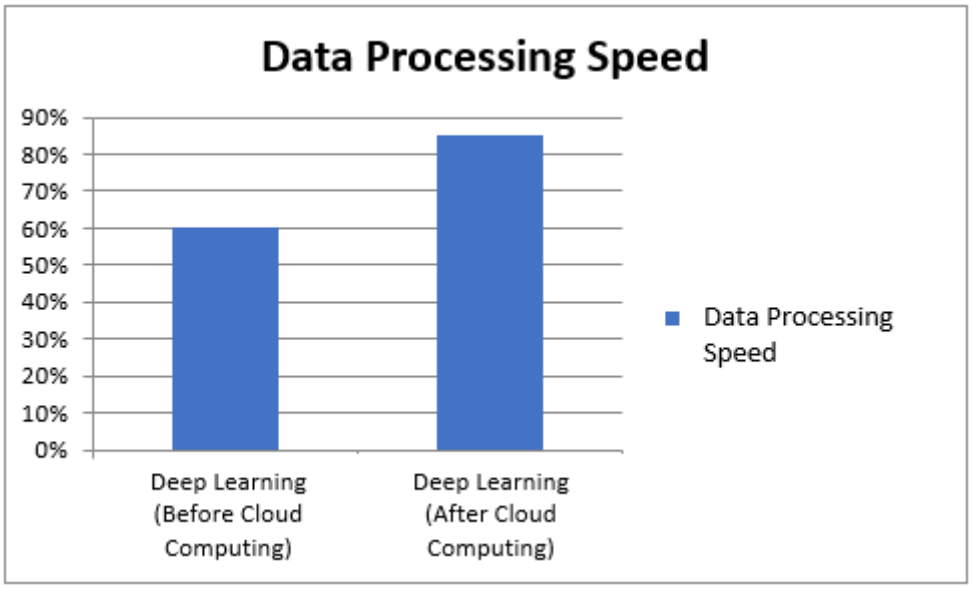

Figure 3. Deep Learning Speed on Cloud Computing

From Figure 3, it is evident that deep learning algorithms offer higher speeds in processing big data, particularly in cybersecurity, where threat patterns can be identified more rapidly. This demonstrates that cloud computing provides a flexible infrastructure for various algorithms, allowing organizations to select the most suitable algorithm for their needs.

D. Impact of Cloud Computing on Cost Efficiency

Beyond scalability and accuracy improvements, this study also finds that cloud computing can reduce operational costs. With a pay-as-you-go payment model, companies can achieve significant savings as they only pay for the capacity they use. This is particularly advantageous for small and medium-sized enterprises seeking to adopt AI technology while facing budget limitations. The findings of this research demonstrate that cloud computing not only improves data management scale and speed but also significantly enhances AI model accuracy. This visualization of the findings supports a deeper understanding of how cloud computing transforms big data management and optimization for AI analysis and how cost efficiency can be attained.

Discussion

The result of this research supports previous research on the benefits of cloud computing in big data management and AI accuracy enhancement while also offering unique contributions. Compared to existing literature, this study demonstrates that cloud computing not only facilitates faster data processing but also provides greater flexibility in processing scale. This aligns with

findings by (Sjödin et al., 2021), who state that cloud computing enables AI implementation on a larger, sustainable scale due to its adaptability to organizational needs. This study also supports the perspective of (Naeem et al., 2022), highlighting that big data technology requires a flexible, scalable infrastructure, which cloud computing can provide. However, the study reveals some limitations, particularly concerning privacy and data security challenges in cloud computing. These challenges are crucial, as cloud computing requires data to be stored in centralized locations, potentially increasing the risk of data breaches if security protocols are not well-implemented (Yanamala, 2024). This research finds that, although cloud computing offers advantages in big data management, organizations need to pay close attention to security, especially when handling highly sensitive data, such as health and financial information.

The study's implications suggest that organizations aiming to implement AI on a large scale should consider cloud computing infrastructure as an effective solution. Cloud computing not only enhances processing speed but also allows for significant cost savings due to its flexible payment model, enabling organizations to pay solely for the capacity they utilize. This is especially relevant for organizations with limited budgets. Furthermore, the study indicates that the combination of large-scale data and cloud computing drives the development of AI that is more accurate and better aligned with market demands. The main contribution of this study is to highlight the crucial role that cloud computing and big data play in broadening the scope of AI applications across different sectors. Thus, this research strengthens the existing literature by highlighting the importance of big data in facilitating the effective and efficient implementation of AI. From a novelty standpoint, this study highlights the role of cloud computing in enhancing AI predictive accuracy, a subject that has been inadequately explored in previous research. This adds value for organizations considering AI adoption, as the findings show that cloud computing can serve as a robust foundation for more effective and cost-efficient AI implementation.

V. CONCLUSION AND RECOMMENDATION

Conclusion

This study demonstrates that the application of big data through cloud computing is crucial in improving the scalability, speed, and accuracy of AI models across diverse sectors, such as healthcare, business, and cybersecurity. Cloud computing provides a flexible and scalable infrastructure that enables organizations to manage big data more efficiently, supporting real-time analysis vital for swift and accurate decision-making. These findings highlight the importance of integrating big data with AI as a foundation for innovation, positively impacting business model effectiveness and service quality, particularly in healthcare data management. However, this study also identifies challenges Concerns about data security and privacy arise, particularly as big data stored in cloud computing demands strong protection to mitigate the risks of data breaches or cyberattacks.

Recommendation

Based on this study's findings, companies planning to adopt cloud computing technology are advised to focus on strengthening data security protocols and privacy protections. Investing in reliable security systems, such as data encryption and access monitoring, is essential to minimize risks associated with big data management. Additionally, companies should consider leveraging the usage-based pricing model offered by cloud service providers to enhance cost efficiency, particularly for organizations with evolving needs. Meanwhile, practitioners and researchers in AI and big data are encouraged to continue developing and refining algorithms,

such as deep learning, to better utilize the scale of big data enabled by cloud computing. Finally, collaboration between industry and academia is strongly recommended to accelerate innovation in cloud computing and AI applications, ensuring these technologies can be implemented effectively and sustainably across diverse contexts.

REFERENCES

Abdulsalam, Y. S., & Hedabou, M. (2021). Security and Privacy in Cloud Computing: Technical Review. *Future Internet*, *14*(1), 11. https://doi.org/10.3390/fi14010011

Aceto, G., Persico, V., & Pescapé, A. (2020). Industry 4.0 and Health: Internet of Things, Big Data, and Cloud Computing for Healthcare 4.0. *Journal of Industrial Information Integration*, *18*, 100129. https://doi.org/10.1016/j.jii.2020.100129

Acs, B., Rantalainen, M., & Hartman, J. (2020). Artificial Intelligence as the Next Step Towards Precision Pathology. *Journal of Internal Medicine*, *288*(1), 62–81. https://doi.org/10.1111/joim.13030

Alashhab, Z. R., Anbar, M., Singh, M. M., Leau, Y. B., Al-Sai, Z. A., & Alhayja'a, S. A. (2021). Impact of Coronavirus Pandemic Crisis on Technologies and Cloud Computing Applications. *Journal of Electronic Science and Technology*, *19*(1), 25–40. https://doi.org/10.1016/j.jnlest.2020.100059

Alrumiah, S. S., & Hadwan, M. (2021). Implementing Big Data Analytics in E-Commerce: Vendor and Customer View. *IEEE Access*, *9*, 37281–37286. https://doi.org/10.1109/access.2021.3063615

Amani, M., Ghorbanian, A., Ahmadi, S. A., Kakooei, M., Moghimi, A., Mirmazloumi, S. M., Moghaddam, S. H. A., Mahdavi, S., Ghahremanloo, M., Parsian, S., Wu, Q., & Brisco, B. (2020). Google Earth Engine Cloud Computing Platform for Remote Sensing Big Data Applications: A Comprehensive Review. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *13*, 5326–5350. https://doi.org/10.1109/jstars.2020.3021052

Anupama, K. C., Shivakumar, B. R., & Nagaraja, R. (2021). Resource Utilization Prediction in Cloud Computing Using Hybrid Model. *International Journal of Advanced Computer Science and Applications*, *12*(4), 373–381. https://doi.org/10.14569/ijacsa.2021.0120447

Bazzaz Abkenar, S., Haghi Kashani, M., Mahdipour, E., & Jameii, S. M. (2021). Big Data Analytics Meets Social Media: A Systematic Review of Techniques, Open Issues, and Future Directions. *Telematics and Informatics*, *57*, 101517. https://doi.org/10.1016/j.tele.2020.101517

Boyapati, S., Swarna, S. R., Dutt, V., & Vyas, N. (2020). Big Data Approach for Medical Data Classification: A Review Study. *Proceedings of the 3rd International Conference on Intelligent Sustainable Systems, ICISS 2020*, 762–766. https://doi.org/10.1109/iciss49785.2020.9315870

Chauhan, D., Bahad, P., & Jain, J. K. (2024). Sustainable AI Environmental Implications, Challenges, and Opportunities. *Explainable AI (XAI) for Sustainable Development: Trends and Applications*, 1–15. https://doi.org/10.1201/9781003457176-1

Chen, Y. (2020). IoT, Cloud, Big Data and AI in Interdisciplinary Domains. *Simulation Modelling Practice and Theory*, *102*, 102070. https://doi.org/10.1016/j.simpat.2020.102070

Dlamini, Z., Francies, F. Z., Hull, R., & Marima, R. (2020). Artificial Intelligence (AI) and Big Data in Cancer and Precision Oncology. *Computational and Structural Biotechnology Journal*, *18*, 2300–2311. https://doi.org/10.1016/j.csbj.2020.08.019

Favaretto, M., de Clercq, E., Schneble, C. O., & Elger, B. S. (2020). What Is Your Definition of Big Data? Researchers' Understanding of the Phenomenon of the Decade. *Plos One*, *15*(2), 0228987. https://doi.org/10.1371/journal.pone.0228987

Feng, S., Keung, J., Yu, X., Xiao, Y., Bennin, K. E., Kabir, M. A., & Zhang, M. (2021). COSTE: Complexity-Based OverSampling Technique to Alleviate the Class Imbalance Problem in Software Defect Prediction. *Information and Software Technology*, *129*, 106432. https://doi.org/10.1016/j.infsof.2020.106432

Haakman, M., Cruz, L., Huijgens, H., & van Deursen, A. (2021). Ai Lifecycle Models Need to be Revised. *Empirical Software Engineering*, *26*(5), 95. https://doi.org/10.1007/s10664-021-09993-1

Haleem, A., Javaid, M., Asim Qadri, M., Pratap Singh, R., & Suman, R. (2022). Artificial Intelligence (AI) Applications for Marketing: A Literature-Based Study. *International Journal of Intelligent Networks*, *3*, 119–132. https://doi.org/10.1016/j.ijin.2022.08.005

Iqbal, R., Doctor, F., More, B., Mahmud, S., & Yousuf, U. (2020). Big Data Analytics: Computational Intelligence Techniques and Application Areas. *Technological Forecasting and Social Change*, *153*, 119253. https://doi.org/10.1016/j.techfore.2018.03.024

Jagatheesaperumal, S. K., Rahouti, M., Ahmad, K., Al-Fuqaha, A., & Guizani, M. (2022). The Duo of Artificial Intelligence and Big Data for Industry 4.0: Applications, Techniques, Challenges, and Future Research Directions. *IEEE Internet of Things Journal*, *9*(15), 12861–12885. https://doi.org/10.1109/jiot.2021.3139827

Kadhim, Z. S., Abdullah, H. S., & Ghathwan, K. I. (2022). Artificial Neural Network Hyperparameters Optimization: A Survey. *International Journal of Online and Biomedical Engineering*, *18*(15), 59. https://doi.org/10.3991/ijoe.v18i15.34399

Liang, W., Tadesse, G. A., Ho, D., Li, F. F., Zaharia, M., Zhang, C., & Zou, J. (2022). Advances, Challenges and Opportunities in Creating Data for Trustworthy AI. *Nature Machine Intelligence*, *4*(8), 669–677. https://doi.org/10.1038/s42256-022-00516-1

Lu, Y., Phillips, G. M., & Yang, J. (2023). The Impact of Cloud Computing and AI on Industry Dynamics and Competition. *SSRN Electronic Journal*, *30*(7), 797–804. https://doi.org/10.2139/ssrn.4480570

Lv, Z., & Qiao, L. (2020). Analysis of Healthcare Big Data. *Future Generation Computer Systems*, *109*, 103–110. https://doi.org/10.1016/j.future.2020.03.039

Naeem, M., Jamal, T., Diaz-Martinez, J., Butt, S. A., Montesano, N., Tariq, M. I., De-la-Hoz-Franco, E., & De-La-Hoz-Valdiris, E. (2022). Trends and Future Perspective Challenges in Big Data. *Smart Innovation, Systems and Technologies*, *253*, 309–325. https://doi.org/10.1007/978-981-16-5036-9_30

Roumeliotis, K. I., & Tselikas, N. D. (2023). ChatGPT and Open-AI Models: A Preliminary Review. *Future Internet*, *15*(6), 192. https://doi.org/10.3390/fi15060192

Sandhu, A. K. (2022). Big Data with Cloud Computing: Discussions and Challenges. *Big Data Mining and Analytics*, *5*(1), 32–40. https://doi.org/10.26599/bdma.2021.9020016

Santoso, J. T., Wibowo, A., & Raharjo, B. (2024). Enhancement of Internal Business Process Using Artificial Intelligence. *Jurnal Nasional Pendidikan Teknik Informatika (JANAPATI)*, *13*(3). https://doi.org/10.23887/janapati.v13i3.79242

Seifian, A., Bahrami, M., Shokouhyar, S., & Shokoohyar, S. (2023). Data-Based Drivers of Big Data Analytics Utilization: Moderating Role of IT Proactive Climate. *Benchmarking*, *30*(10), 4461–4486. https://doi.org/10.1108/bij-11-2021-0670

Sjödin, D., Parida, V., Palmié, M., & Wincent, J. (2021). How AI Capabilities Enable Business Model Innovation: Scaling AI Through Co-Evolutionary Processes and Feedback Loops. *Journal of Business Research*, *134*, 574–587. https://doi.org/10.1016/j.jbusres.2021.05.009

Strohm, L., Hehakaya, C., Ranschaert, E. R., Boon, W. P. C., & Moors, E. H. M. (2020). Implementation of Artificial Intelligence (AI) Applications in Radiology: Hindering and Facilitating Factors. *European Radiology*, *30*(10), 5525–5532. https://doi.org/10.1007/s00330-020-06946-y

Tao, D., Yang, P., & Feng, H. (2020). Utilization of Text Mining as a Big Data Analysis Tool for Food Science and Nutrition. *Comprehensive Reviews in Food Science and Food Safety*, *19*(2), 875–894. https://doi.org/10.1111/1541-4337.12540

Yanamala, A. K. Y. (2024). Optimizing Data Storage in Cloud Computing: Techniques and Best Practices. *International Journal of Advanced Engineering Technologies and Innovations*, *1*(3), 476–513.

Zhang, Y., Vera Liao, Q., & Bellamy, R. K. E. (2020). Efect of Confidence and Explanation on Accuracy and Trust Calibration In AI-Assisted Decision Making. *FAT* 2020 - Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*, 295–305. https://doi.org/10.1145/3351095.3372852