

Exploring the application of cloud computing technology in computer big data analysis

Xiangjun Zhao ^{1, *}, Zirui Qiao ¹, Xiaoyang Li ², Lingfei Zhu ³

¹ Qinghai University for Nationalities, Qinghai, China

² Taiyuan University of Technology, Taiyuan, China

³ Soochow University, Suzhou, China

* Corresponding Author Email: 1372626528@qq.com

Abstract. In the future, cloud computing technology will continue to evolve in the direction of more openness, intelligence and integration; big data analytics will develop in the direction of generation prediction, personalized recommendation and autonomous driving. The integration of cloud computing technology and big data analytics will breed more opportunities and industrial changes. The two are closely related and the development trend of mutual promotion is unstoppable, worthy of in-depth attention and follow-up by enterprises and related institutions.

Keywords: cloud computing technology; computer technology; big data analytics.

1. Introduction

Cloud computing technology and big data analysis are two hot spots and trends in the development of information technology today. Cloud computing technology, with its advantages of massive storage, high-performance computing and resource virtualization, can provide powerful technical support for big data analysis. Relying on cloud computing technology, big data analysis can dig deeper into the value of massive data, discover the laws and knowledge implied by the data, and provide important decision support for enterprises. Therefore, cloud computing technology plays a pivotal role in big data analysis.

2. General overview

2.1. Cloud Computing Technology Overview

Cloud computing technology is an Internet-based computing model that relies on data centre clustering technology to virtualize computing, storage and application resources and provide network access on demand. It mainly includes three service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). Cloud computing technology has the advantages of low cost, high scalability and flexibility, and is an important direction in the development of contemporary information technology [1].

2.2. Big Data Analytics Overview

Big Data analytics is the process of selecting, processing and analysing massive, diverse and rapidly generated data sets to obtain valuable information and models. The main processes include data collection, data storage, data processing and calculation, data analysis and mining, and data visualization. [2] Big data analysis can discover the hidden regularity and relevance of data and provide important decision support for enterprises.

2.3. The value of cloud computing technology in big data analytics

Cloud computing technology has the advantages of low cost, high scalability and high virtualisation, which can provide massive and cheap data storage space and high-performance computing resources



for big data analysis to meet the requirements of high-speed collection, storage and processing of big data. The cloud service model can effectively build a big data analysis platform and reduce enterprise investment. The high virtualisation of cloud technology makes the big data analytics platform highly flexible and scalable. In summary, cloud computing technology, with its innovation in IT infrastructure, platform and software, provides a storage and computing platform for big data analysis, cloud service model reduces the threshold of big data application, and virtualisation technology improves the flexibility and scalability of big data analysis, which helps promote the development of big data industry and application, and is worthy of in-depth study.

3. Application of cloud computing technology in big data collection

3.1. Cloud storage technology to capture massive amounts of data

Cloud storage technology can provide massive, safe and low-cost data storage services, supporting data storage of petabytes or more. Big data applications can directly upload the massive data collected to the cloud storage platform. Cloud storage technology can effectively solve the problem of massive data storage for big data applications, shorten the cycle of big data collection and accelerate the speed of big data analysis.

3.2. Cloud monitoring technology to collect operational data in real time

Cloud monitoring technology can monitor the operation of cloud platforms in real time through various monitors deployed in the cloud infrastructure, and generate a large amount of operation and maintenance data and log information. These monitoring data and logs are one of the important sources of big data analysis. [3] Using cloud monitoring technology, these data can be collected in real time, providing real-time data support for big data analysis.

3.3. Cloud collection of social network data

The user data and interaction data generated by social networking platforms is an important source of big data applications. Cloud crawler technology can regularly collect data generated on major social networking platforms and store it in cloud storage, providing social psychological and interactive behaviour data for big data analysis. Cloud computing technology has the advantage of being highly scalable and can cope with the collection and storage of massive amounts of social data.

In summary, cloud computing technology plays an important role in the process of big data collection. Cloud storage technology can collect and store massive amounts of structured data; cloud monitoring technology can collect the operation data of cloud platforms in real time; cloud crawler technology can collect social network data in bulk. Together, these three cloud technologies can provide comprehensive and real-time data support for big data analysis and promote the effectiveness of big data applications.

4. Application of cloud computing technology in big data processing

4.1. Cloud computing provides massive data storage and powerful computing power

Cloud computing technology relies on data centre clusters, which can provide petabytes or EB-level data storage space and powerful computing power. This meets the demand for massive data storage and efficient computation for big data processing, and can speed up the data processing process such as screening, cleaning, conversion and aggregation of big data, significantly improving the efficiency of big data processing.

4.2. Cloud platform supports distributed processing of massive amounts of data

Cloud computing platforms are characterized by resource pooling and high availability, and can support the deployment and operation of distributed algorithms such as MapReduce for Big Data.

Enterprises can build Hadoop, Spark and other distributed data processing frameworks on the cloud platform to achieve parallel processing of massive data. This helps enterprises to quickly establish big data processing systems, reduce construction costs and improve resource utilization.

4.3. Virtualization technology for dynamic management of big data processing

Cloud computing technology is characterized by a high degree of virtualisation of resources, and can dynamically allocate computing resources according to the computing load of big data processing and achieve automatic scaling. This can minimize wasted resources and provide the necessary computing resources according to the actual needs of big data processing, helping to reduce the cost of data processing in enterprises and improve economic efficiency.

In summary, cloud computing technology can efficiently support the storage, computing and management of big data with its powerful computing power, massive and cheap data storage and high virtualisation of resources. Cloud platforms can deploy various distributed data processing frameworks to achieve parallel processing of large-scale data. The automatic scaling of cloud technology can dynamically expand data processing resources according to actual needs and effectively control data processing costs, which makes cloud computing technology play an important role in big data processing.

5. Application of cloud computing technology in big data analysis

5.1. Cloud technology supports offline and real-time analysis of big data

With the advantages of elastic computing and massive storage, cloud computing technology can support both offline analysis and real-time analysis of big data. Enterprises can set up offline analysis platforms such as Hadoop on the cloud to conduct in-depth mining and insight of massive data, and analyse historical data to discover patterns. At the same time, cloud technology has the characteristics of real-time scalability and low latency, and can deploy real-time computing frameworks such as Spark Streaming to quickly analyse and process data generated in real time, enabling real-time monitoring and early warning of business [4].

5.2. Cloud platform for deep learning and machine learning of big data

Cloud computing platforms can provide powerful computing resources such as GPUs to support the training of deep learning and machine learning algorithms. Enterprises can build deep learning frameworks on cloud platforms, such as TensorFlow and PyTorch, and use massive amounts of data to train neural network models to achieve data classification, clustering, regression and prediction functions. This provides powerful data mining methods and tools for enterprise big data mining and analysis.

5.3. Cloud visualization for visual display of big data analysis results

Cloud visualisation technology can display the results of big data analysis in the form of intuitive charts and reports, helping enterprises to deeply understand the results and laws of data analysis. Cloud visualisation solutions can be closely integrated with big data analysis platforms to correlate big data analysis results in real time and present them in the form of graphs and charts, helping enterprises to intuitively discover important information in data, gain insight into data analysis and make important decisions. [5]

In summary, cloud computing technology plays an important role in big data analysis. Cloud technology can support both offline and real-time analysis of big data; cloud GPU and other computing resources can train deep learning models to achieve intelligent analysis of big data; cloud visualization can show the results of big data analysis in an intuitive way to help data decision-making. With cloud computing as the basis, enterprises can quickly build big data analysis platform and use

advanced artificial intelligence technology to achieve deep excavation and analysis of big data, which will generate significant economic and social benefits.

6. Conclusion

This paper analyses the important role and application of cloud computing technology in big data analysis. Firstly, cloud technology plays an important role in the collection of big data, such as social network data, surveillance data and cloud storage data. Secondly, cloud computing technology can provide powerful storage and computing resources for big data processing, and support distributed processing and management of big data. Finally, cloud technology can realise offline analysis, real-time analysis, deep learning and visualisation of big data, and realise intelligent analysis and application of big data. Cloud computing technology and big data analytics are closely linked in terms of infrastructure, applications and data mining, and their integration will have a profound impact on industry and society. As cloud computing technology and big data analytics continue to deepen, the opportunities and changes created by the combination of the two will become more extensive and deeper.

References

- [1] Zhao Lin. Exploration on the application of cloud computing technology in computer big data analysis [J]. *Modern Industrial Economics and Informatization*, 2023, 13 (02): 175 - 177. doi: 10.16525/j.cnki.14 - 1362/n.2023.02.064.
- [2] Wei Jingli. Reflections on the application of cloud computing technology in computer big data analysis [J]. *Modern Industrial Economics and Informatization*, 2022, 12 (09): 76 - 78. DOI: 10.16525/j.cnki.14 - 1362/n.2022.09.031.
- [3] Lv Guoqing. Exploration on the application of cloud computing technology in computer big data analysis [J]. *Wisdom China*, 2022 (07): 92 - 93.
- [4] Zhang Xiaolong. Application of cloud computing technology in computer big data analysis [J]. *Computer Knowledge and Technology*, 2022, 18 (19): 25 - 27. DOI: 10.14004/j.cnki.ckt.2022.1290.
- [5] Liang Hao. The use of cloud computing technology in computer big data analysis - A review of Cloud Computing and Big Data [J]. *Science and Technology Management Research*, 2020, 40 (16): 267.