



# Analysis of the Influence of VR Technology Based on Big Data Edge Computing and Deep Learning on Short Video Teaching

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## Abstract

This paper comprehensively analyzes the application of big data, edge computing, and deep learning technology in the field of virtual reality (VR), as well as their impact on short video teaching. This paper introduces the fundamental concepts and applications of big data, edge computing, and deep learning. It also discusses the current status and challenges of using short videos in teaching. This paper elaborates on the advantages of applying VR technology based on big data edge computing in short video teaching and discusses the potential applications of deep learning. The edge computing of Big Data, deep learning, and VR technology have been fully utilized in various aspects of our lives, particularly in the realm of short video teaching. With the assistance of VR technology, short video teaching has been elevated and plays an essential role in promoting short video teaching.

## Keywords

Big data, edge computing, deep learning, virtual reality

## Introduction

With the rapid development of information technology, frontier technologies such as big data, edge computing, and deep learning have shown great potential in various fields. As a new way of interactive experience, virtual reality (VR) technology is gradually penetrating the field of education, bringing brand-new teaching possibilities. As a vivid and intuitive teaching resource, a short video is favored by educators because of its simple and fast characteristics. The paper aims to provide new ideas and methods for educational informatization, and discuss the application of big data edge computing and deep learning technology in the VR field, as well as their influence on short video teaching.

## 1. Overview of edge computing techniques for big data

### 1.1 Concept and application field of big data

The concept of big data stems from the substantial growth and diversification of data scale. It focuses not only on the amount of data but, more importantly, on the changes in the speed, diversity, and value of data. Big data has a wide range of applications, including but not limited to business intelligence, marketing, healthcare, social networking, Internet of Things, and other fields. Big data has a wide range of applications, including but not limited to various fields. In the field of medicine and healthcare, big data can assist doctors in making more accurate diagnoses and treatment plans by analyzing patients' medical records, medical images, and genomic data.

### 1.2 Principle and characteristics of edge calculation

The core principle of edge computing is to push the computing tasks to the network edge devices for processing, so

as to realize the proximal computing and data processing. Compared with the traditional cloud computing mode, edge computing has the characteristics of low delay, high bandwidth, energy saving, and high efficiency. Edge computing is especially suitable for industrial automation, intelligent transportation, and other scenarios with high real-time requirements, which can effectively reduce the delay of data transmission and improve the speed of data processing.

## **2. The application of deep learning in VR technology**

### **2.1 Foundation and development of deep learning**

Deep learning is an important technology derived from the field of artificial intelligence, and its basic theory comes from the research and development of neural networks. The core idea is to realize the automatic analysis and processing of complex data, through the multi-level neural network structure, to simulate the connection between the human brain neurons. Deep learning has made great breakthroughs in the past few years and becoming one of the core technologies of various AI applications, thanks to the continuous improvement of computer hardware performance and the wide application of big data technology. The development of deep learning technology has provided strong support for the application of VR technology. Deep learning algorithm can realize intelligent recognition and analysis of virtual scenes in VR image processing, and improve the sense of reality and fidelity of images [1]. In terms of VR content generation and enhancement, deep learning technology can provide users with a richer and more immersive virtual experience, and realize the intelligent generation and optimization of virtual scenarios. Deep learning technology can also provide support for personalized VR experience, enabling intelligent monitoring and analysis of users' behavior and emotional states. The continuous development of deep learning technology brings new opportunities and new challenges to the application of VR technology. VR technology based on deep learning will play an increasingly important role in short video teaching, bringing more comprehensive and in-depth changes to the field of education. With the continuous maturity of deep learning technology and the continuous expansion of application scenarios.

### **2.2 Typical application of deep learning in the VR field**

It is increasingly widely used in the field of virtual reality, which provides a strong support for the development and application of VR technology and is one of the important applications of deep learning technology. In VR image processing, deep learning algorithms can play an important role in the real-time recognition, segmentation, and reconstruction of VR scenes, and improve the quality and realism of VR images. Deep learning technology also plays an important role in VR content generation and enhancement. Deep learning technology can enhance the intelligent generation of VR scenarios, including the automatic generation of images, audio, and video content and optimization. Developing and applying deep learning technology in the VR field undoubtedly provides strong technical support [2]. In VR technology, with the continuous enhancement of their ability to analyze users' behaviors and emotions, people can use deep learning algorithms to provide personalized VR experience services, so as to improve the interaction between users and the VR environment and create a more immersive virtual reality experience for users.

### **2.3 The compatibility between deep learning and short video teaching**

Deep learning and short video teaching exhibit remarkable synergy in today's educational landscape. Deep learning, a subset of machine learning, enables computers to process vast amounts of data and extract meaningful patterns, enhancing understanding and prediction capabilities. Short-video teaching, on the other hand, condenses complex concepts into engaging and easily digestible clips, ideal for today's fast-paced learners. The combination of these two paradigms offers a powerful tool for knowledge dissemination. Deep learning algorithms can analyze learning patterns and behaviors, providing insights that inform the creation of more effective short-video content. Conversely, short videos can serve as rich data sources for deep learning models, continuously refining and improving their understanding of teaching and learning dynamics. Moreover, short videos are highly accessible, making it easier for learners to access and engage with educational content, regardless of their location or schedule. This flexibility, coupled with the depth and precision of deep learning, creates a dynamic and responsive educational environment that caters to the diverse needs of modern learners. In conclusion, the alignment between deep learning and short-video teaching represents a significant advancement in educational technology. Together, they offer a promising path towards more personalized, engaging, and effective learning experiences.

### **3. Status and challenges of short video teaching**

#### **3.1 The application status of short video in teaching**

As a concise and vivid audio-visual resource, short video has been widely adopted in teaching in recent years. Both students and teachers tend to use short videos in knowledge teaching and learning. Including language, science, history, art, and other disciplines and education stages of short video teaching application fields. In terms of language learning, short films can help students improve their listening and speaking ability, and enhance their practical application ability in language communication. In science education, students can have a more intuitive understanding of abstract scientific knowledge through video displays, showing experimental operations and scientific phenomena. Short videos are also widely used in online education platforms and mobile learning applications to facilitate students to acquire knowledge anytime and anywhere.

#### **3.2 Problems and challenges existing in short video teaching**

Although there are many advantages of short video teaching, it also faces many challenges and problems. The quality of short video content is uneven, and there are problems such as inaccurate data, simple content, and poor teaching effects. Making and editing short video teaching requires certain technical and professional knowledge, and the relevant skills and experience may be lacking among teachers and educators. There are also legal and ethical problems that need to strengthen management and supervision, such as copyright protection, privacy and security, etc. The duration of a short video may lead to one-sided and simple knowledge content that cannot be deeply explored and explored. Students may rely on short videos for the cultivation of long text and deep reading ability [3]. In the face of these problems and challenges, relevant institutions should strengthen the standard management of short video teaching and quality assessment, enhance the relevant skills and quality of teachers and students, strengthen copyright protection and privacy security, promote short video teaching to the direction of more efficient, rich and in-depth, to strengthen the management of video teaching and quality assessment

### **4. Application of VR technology based on big data edge computing in short video teaching**

#### **4.1 The advantages of big data edge computing in VR technology**

Will big data edge computing technology combined with virtual reality technology bring a lot of short video teaching advantages, big data edge computing can improve the VR application response speed and performance stability, on the edge equipment data processing and analysis can reduce the delay of data transmission do more real-time smooth VR experience. Big data edge computing can improve the data security and privacy protection of VR applications, and data processing and analysis on Internet edge devices can reduce the security risks in data transmission and protect users' privacy information. Big data edge computing can also reduce the energy consumption cost of VR applications and the effective utilization of computing resources; thus, will effectively reduce the operation cost of short video teaching [4]. These advantages will effectively promote the improvement of the teaching quality of short videos and the popularization of the application, and also provide a good opportunity for the further development and application of big data edge computing technology. With the increasing maturity of big data edge computing technology, it will be applied and popularized in future education and promote short video teaching.

#### **4.2 The application prospect of deep learning in short video teaching**

As a powerful data analysis and processing tool of depth learning technology applied in short video teaching has great application prospects, it can intelligent analysis and identification of short video content, extract key information and knowledge, to provide accurate teaching content recommendations and personalized learning path, to students learning behavior and emotional state intelligent monitoring and analysis, make teachers to students learning situation and demand have a more accurate understanding, and personalized teaching guidance [5]. Deep learning can also automatically evaluate and optimize the teaching effect of short video teaching so that the teaching quality is constantly improved and improved. And the combination with big data edge computing technology brings great opportunities for the development of short video teaching.

## 5. Conclusion

Fusing big data, edge computing, and deep learning technologies for short video teaching presents unprecedented opportunities and challenges. By intelligently analyzing and efficiently processing big data at the edge, short video teaching can become more personalized and efficient, offering a richer and more vivid learning experience. This, in turn, can significantly contribute to students' all-round development and teaching quality. Therefore, this subject demands urgent attention. It is necessary to continuously enhance the research and application of big data, edge computing, and deep learning technologies in short video teaching to make significant contributions to the development of a more intelligent and efficient education system.

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