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Optimization of Real-Time Data Flow of Computer Distance Education in Higher Vocational Colleges Based on 6G-Like Communication System Architecture

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Abstract:First of all, this paper summarizes the key technical directions of satellite-ground deep integration, new spectrum communication, distributed cooperative MIMO and intelligent communication that may be involved in the future 6G, and focuses on the space-ground integrated network (SGIN) based on satellite-ground deep integration; Then, aiming at the two typical network topology architectures that may exist. This paper is devoted to the research on the architecture and development of the video teaching system based on streaming media technology in modern distance education, providing learners with a "learner-centered" networked learning environment. Based on the educational technology theory of streaming media technology and system development, the whole system development process from system requirements analysis to system design, to the production and release of streaming media data, and the production and release of web pages is described in detail.

Keywords: Real-Time Data Flow, Computer Distance Education, Higher Vocational Colleges, 6G-Like Communication System Architecture

1. INTRODUCTION

6G, the sixth generation mobile communication system, is a new generation of mobile communication technology following the 5G mobile communication system. Compared with 5G, the network transmission rate of 6G mobile communication technology is increased by nearly 100 times [1], and the network delay will be reduced from milliseconds to microseconds. The overall vision for 6G of "thinking about the world, everything follows your heart", which is composed of "holographic connection" and "ubiquitous connection", focuses on analyzing the challenges and potential candidate technologies for realizing this vision, in order to provide directional guidance for the development of 6G technology [2].

On the one hand, the wireless mobile network covers a wide range and is the largest land coverage network. Compared with the radar and other sensing networks, the range is wider. The combination of the wireless communication network and the radar system can greatly expand the sensing range [3]. With the rapid development of technology and its wide application in various fields of society, human beings have entered the information age. Since then, great changes have taken place in people's life, work, study and other aspects, and the penetration of information technology in the field of education has become more and more to be profound, distance education is triggering a profound revolution in the field of education with the help of information technology [4].

Some systems implemented by pure software, such as the LanStar multimedia network teaching system of Nanjing Yuanzhi Information Co., Ltd [5]. are very convenient to use and have comprehensive functions, but the real-time effect is too poor in low-bit networks, which seriously affects the learning effect. The Internet is widely used. Research on distance education has focused on two areas: real-time videoconferencing-based distance education and non-real-time Web-based distance education [6]. The research of real-time distance teaching mainly uses video conferencing system to transmit video and audio to build a distributed classroom, in which teachers and students are only physically different, which is called synchronous or teacher-oriented learning mode [7].

In modern distance education, voice is an indispensable part. Audio transmission is one of the important components of modern distance education. In this paper, a brief introduction is given [8]. Based on the application development of streaming media (continuous time-based media), the Internet is used as the transmission platform for distance education, and the acquisition and transmission of real-time voice in distance education is realized on this platform. Network distance teaching can be divided into two teaching modes: synchronous and asynchronous [9].

The asynchronous learning mode is to use Web browsing technology, and the teaching side first puts the multimedia courseware on the server [10]. Student users only need to download it to the local computer and then broadcast it when they need to watch it. This learning mode lacks interactivity. The support of information technology, the establishment of the Internet platform, the comprehensive use of multimedia and the formation of a learning society are all important factors [11]. The rise of modern distance education has created favorable conditions. The digital learning environment created by modern information technology is changing people's educational thoughts and concepts, providing a broad space for educational reform and development [12].

Comprehensiveness of the software analysis process. A comprehensive analysis of the system's requirements on the operating environment and network conditions has a great impact on the robustness and life cycle of the system [13]. In the real-time transmission of digital video, according to the characteristics of remote teaching images, the multimedia data stream is compressed by software encoding/decoding to maximize the encoding efficiency of the encoder, improve the transmission reliability, reduce the transmission delay, and

also the network protocol is improved to make it suitable for real-time multimedia transmission [14].

Li synchronous teaching mode is to let every student feel it. Face-to-face "teaching" means that you can collaborate with other students to learn, discuss problems, and communicate with the teacher in real time [15]. This mode requires that the teacher's teaching scene, teaching text, pictures, sounds, animations and other contents be transmitted to the stand-alone computer through the network in real time. The Federal Communications Commission has passed a resolution to open the "THz spectrum technology" [16]. The research and application of this technology is to lay the foundation for the research and development of 6G mobile communication systems. The relevant information disclosed by the above-mentioned government and business circles indicates the construction plan for the 6G mobile communication system. The layout has already started [17].

Reference [18] focuses on the re-expansion of 6G application scope and the re-improvement of technical performance, and summarizes satellite-ground integration and coverage expansion, millimeter wave and terahertz communication, data-driven artificial intelligence and endogenous security, distributed cooperative MIMO, etc. The possible technical fields involved, and some key technologies that need to be broken through to realize the wide-area Internet of Things are prospected [19].

2. THE PROPOSED METHODOLOGY

2.1 The 6G-Like Communication System Architecture

The 6G mobile communication system is designed to realize the vision of "ubiquitous coverage of global communication". It is integrated by near-Earth space platforms, space satellites and terrestrial mobile wireless networks, and fully introduces terahertz. The space-based access network is composed of multiple Middle Earth Orbit (MEO) and Low Earth Orbit (LEO) satellites form an independent constellation network, and each constellation network independently manages and provides services to users. It is inevitable that the integration of wireless communication and perception will become an important candidate technology for 6G, which can be described from the frequency convergence, the surge of resources required to improve service requirements, and the realization of technology consistency.

The International Organization for Standardization has launched 6G network research, and one of the three goals of 6G proposed by the International Telecommunication Union (ITU) is the fusion of satellite communications including many types of networks (ManyNets) [4], which fully shows that satellite communications will be the mainstay of 6G networks. An important part of. With new communication features such as full coverage, seamlessness, and high frequency spectrum, it can be widely used in holographic communication, long-range Internet of Things, unmanned aerial technology, virtual reality communication transmission, augmented reality communication transmission and other fields, and fill the current situation. These fields are limited by the insufficiency of the development of mobile communication technology. The 6G system integrates with the terrestrial network through the satellite network, learns from each other's strengths and complements the weaknesses, and can together form an integrated airspace, land, and ocean integrated communication network with seamless global coverage to meet the ubiquitous business needs of users.

The fusion or integration of communication and perception is a brand-new network form, so there will be major changes in the architecture. The changes in the architecture can be divided into changes in the system architecture and wireless (air interface) architecture. Compared with 5G, the network energy efficiency is improved by 100 times, and the spectrum efficiency is also improved by 5 to 10 times. The achievement of these business and performance indicators depends on the enabling of AI, cloud computing, distributed computing, and blockchain, and AI is an essential technology for enabling the entire Xingdi network. Compared with conventional laser communication, terahertz communication has higher confidentiality and lower requirements for the stability of the carrying platform. The above advantages of terahertz communication are very consistent with the performance requirements of the 6G mobile communication system in terms of transmission rate, bandwidth, confidentiality, and delay, and become the main technology that the 6G mobile communication system research and development relies on.

2.2 The Computer Distance Education in Higher Vocational Colleges

This system can provide learners with a flexible query method to achieve rapid retrieval and accurate positioning of video information for users. In the existing distance education teaching video system, the video retrieval method is often to retrieve the video name and query the specific video from the video database. Since this system is a distributed data exchange and processing system, the school and students are connected through a wide area network. The system must establish a set of abnormal recovery mechanism to ensure the stability and reliability of the system and the consistency of transactions.

There are three types of channel coding and cipher coding. The main goal of source coding is to compress the average number of bits per source symbol or the code rate of the source. The main goal of channel coding is to improve the reliability of information transmission, and the main method is to increase the code rate or frequency band (that is, channel capacity), which is just the opposite of source coding. The real-time transmission control protocol, in cooperation with the 3#4 protocol, is used for I+B monitoring and congestion control, providing a reliable mechanism for sequential transmission of packets and synchronization between media. Viewers can listen to and watch multimedia files while downloading, without waiting for the entire file to be downloaded before playing, and it does not occupy the client's hard disk space. The whole process of crane implementation involves a number of technologies such as Zhi streaming media data collection, compression, storage, transmission and network communication.

After the user selects the video, the system will extract the address of the descriptive text of the video from the database. When the user watches the video, the descriptive text (such as a PowerPoint presentation) will be presented synchronously. The content of the description is supplemented to gain a deeper understanding of the content of the video. The distance education system faces a steady stream of new courses and various new requirements. How to realize the expansion or upgrade of new functions on the basis of the existing operating framework is also a problem that must be considered. Distortion-free source coding can be achieved for discrete sources, and the information output of continuous sources is infinite, so it is impossible to achieve distortion-free source coding. Distortion-free coding of discrete sources is essentially a statistical matching coding. According to the

different probability distribution of the source, the matching code is selected.

2.3 The Optimization of Real-Time Data Flow in Computer Distance Education

In the 6G era, user business types and business granularity are more demanding than 5G networks, and they also need to support on-demand deterministic services. On the other hand, 6G networks need to provide network element function programmability and network orchestration capabilities to achieve rapid service upgrades and network agile management. The synaesthesia fusion system architecture needs to add new network elements and complete the network management after fusion Function. Figure 1 presents the system architecture of the proposed synaesthesia fusion network.

In this architecture, the obvious change is the addition of a perception server. The distance education system can be divided into application service layer, core management layer and core service layer according to the network level. The application service layer is the interaction layer and function realization layer between the distance education system and the user. Users can provide a variety of application function modules, such as synchronous courses, file storage, file retrieval, distributed sharing and instant communication. The transmission of data flow only needs to transmit valid data; the odd-numbered ports carry out the transmission of 3#54 control flow, which helps to monitor network traffic and congestion, and provides reliable guarantee for effective data transmission. Combined with 3#54, the transmission efficiency is optimized with effective feedback and minimum overhead. Streaming media does not require network bandwidth.

Rather, it is much smaller than the original. When the network bandwidth is too low for the media bandwidth or the mole jams can cause stuttering and incoherence in the picture and sound. Objects and their associations in the context of the system platform are called basic elements. The analysis of the system working model is mainly to determine the objects and object attributes and the association between objects, to clarify the events and the association between events, to give the object model and functional model in the system, so as to grasp the key characteristics of the system. According to the powerful function of OP$, this paper realizes the transmission of real-time audio in the distance education system in the Internet. A distance education system should usually include the following main subsystems: teacher teaching system, student self-learning system, question answering system, homework and examination system and teaching management system.

3. CONCLUSIONS

This paper analyzes the inevitability of synaesthesia fusion, gives the system architecture and air interface architecture of synaesthesia fusion, and finally gives technical research suggestions in terms of frequency, space and computing power. Key technologies such as optical phased array multi-user access, high-efficiency satellite-to-ground laser communication, and optoelectronic integrated networking, which are in urgent need of breakthroughs in the future 6G, are analyzed and prospected. For other key technologies that may be involved in the development of 6G, it has played an important role in the progress of the subject research, and the main energy can be devoted to the research on the selection of the compression scheme, and the existing network transmission and multicast transmission technologies are applied. Practice, and at the same time improve in practice according to the characteristics of the application.

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5. REFERENCES

[1]Yue Bin, Wang Xiaoyu, Guo Donglei. Key technologies and applications of UAV oil pipeline inspection [J]. Oil Depot and Gas Station, 2021, 30(1):6.

[2] Zhang Yuchong, Hu Yunpeng, Sun Leifeng, et al. Application of UAVs in Oil and Gas Pipeline Inspection [J]. China Security, 2021(12):4.

[3] Duan Yunyue, Xie Dejun. The exploration and application of UAV inspection technology in the management of high consequence areas of long-distance pipelines [J]. Oil Depot and Gas Station, 2020, 29(1):7.

[4] Wang Hongmiao. Design and implementation of automatic test software for UAV flight control computer [J]. Information and Computer, 2019(16):3.

[5] Liu Wen, Lu Xiaofeng, Mao Jianhua, et al. Intelligent inspection scheme of UAV based on airborne computer [J]. Computer Measurement and Control, 2022, 30(7):7.

[6] Chen Jiaze, Qin Bo. The method of UAV inspection application connected to the automatic control system of oil and gas pipelines [J]. Automation Today, 2019(12):2.

[7] Jia Ke, Hao Yafeng, Xu Changchun, et al. A UAV pipeline inspection system and multi-station relay method: CN112737662A[P]. 2021.

[8] Li Chenxuan, Shi Yun, He Xianbo, et al. Location of leakage in refined oil pipeline and its improvement method [J]. Inner Mongolia Petrochemical, 2019(5):3.

[9] Hu Qin, Zhang Shuxian. An online maintenance drone for oil pipelines: CN108482661B[P]. 2019.

[10] Zhou Ji, Meng Lingxuan, Zhang Jirong, et al. A fully intelligent inspection system for oil and gas pipelines based on UAV remote sensing and deep learning: CN210511074U[P]. 2020.

[11] Yang Jian, Sun Han. UAV detection algorithm based on deep feature extraction [J]. Computer Technology and Development, 2021, 031(011):71-75.

[12] Chen Guihui, Yi Xin, Li Zhongbing, et al. Third-party construction target detection of pipeline inspection aerial images based on improved YOLOv2 and transfer learning [J]. Computer Applications, 2020, v.40;No.356(04) :138-144.

[13] Li Hao, Wu Shuguang, Yu Deying, et al. Design and verification analysis of UAV high-precision positioning module based on network RTK [J]. Surveying and Mapping Science and Technology, 2022, 10(3):10.

[14] Yong Peng, Song Xin, Hu Weidong. Application of Computer Vision Technology in Pipeline Inspection [J]. Smart City, 2021, 7(17):2.

[15] Du Huailin. Research on the application of UAV technology in long-distance oil and gas pipeline inspection [J]. Science and Technology Innovation, 2021.

[16] Deng Zhiqiang, Que Hao, Chen Yuanpeng. Research progress on the application of UAV technology in long-distance oil and gas pipeline inspection [J]. China Petroleum and Chemical Standards and Quality, 2021, 41(22):2.

[17] Li Pengyin, Ji Shouhong, Qian Jiren, et al. Research and application of communication relay of natural gas pipeline inspection drones [J]. Value Engineering, 2021.

[18] Shen Jian, Nie Xiaowei, Chen Zhaolong, et al. Research on UAV data signal transmission technology in oil pipeline inspection [J]. China Equipment Engineering, 2021(S01):2.