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Analysis of 5G Communication and Artificial Intelligence Technology Integration Analysis

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Abstract: ***With the rapid development of information technology, people's communication methods are constantly improving. As the most popular way of communication, 5G has received widespread attention from all walks of life. In order to meet the rapid economic and cultural needs of human society, wireless communication systems are needed to maintain the personalized needs of emerging networks and equipment. Compared with 3G/4G wireless networks, 5G communication can provide huge increased throughput, reduce network latency, and achieve the maximum range of smart devices. 5G communication technology has the characteristics of large broadband, fast transmission speed, low delay, high security It is currently the most advanced technical means of communication technology. As a new type of technology, artificial intelligence technology integrates 5G communication with artificial intelligence technology. Effective technology complement each other, 5G technology can achieve the leaping development of artificial intelligence, and artificial intelligence technology can also make 5G communication technology more scientific planning. The article discusses the significance of the integration of 5G communication and artificial intelligence technology, and explore its integration strategy and strategy and Path to give full play to the functional advantages of the two and make certain contributions to the development of modern technology in my country.***

Keywords: Artificial intelligence; 5G communication; technology; Fusion; Value.

1. INTRODUCTION

5G technology, as a new communication technology, has strong intelligence and inclusiveness, and its strong transmission efficiency and stability are important technical support for the development of AI technology. The organic integration of 5G technology and artificial intelligence technology can be said to be the future trend of modern information technology development, and based on the background of 5G communication technology, the computing efficiency of artificial intelligence technologies is better. Data analysis is more efficient and can effectively improve the intelligence level of artificial intelligence technology, so research on the integration of technologies of 5G communication and artificial intelligence has strong practical and theoretical value, and is an effective measure to promote social science technological progress and economic development. Tu (2025) introduces SmartFITLab, an intelligent platform for 5G field interoperability testing[1]. Human resource technology is advanced by Xie and Liu (2025), who develop EvalNet for recruitment interview processing through sentiment analysis and multimodal data fusion[2]. For small business operations, Zhu (2025) creates TaskComm, a task-oriented language agent for workflow optimization[3], while Zhang (2025) employs reinforcement learning for automated ad campaign optimization tailored to small businesses[4]. Similarly, Hu (2025) explores few-shot neural editors for 3D animation specifically designed for small and medium enterprises (SMEs)[5]. Broader industrial applications are examined by Tan (2024), who analyzes AI application trends in automotive production[6], and by Zhuang (2025), who investigates the evolutionary logic of real estate marketing strategies under digital transformation[7]. Recommendation systems are enhanced by Han and Dou (2025) through a method integrating hierarchical graph attention networks with multimodal knowledge graphs[8]. In specific market segments, Zhang et al. (2025) apply AI for sales forecasting and advertising analysis in the gaming industry[9], while technical performance is improved by Yang (2025) through component-based architecture for web applications[10]. Corporate finance research by Cheng et al. (2025) reveals connections between executive human capital and stock price volatility[11], and urban planning is accelerated by Xu's (2025) UrbanMod for text-to-3D city modeling[12]. Healthcare innovation is represented by Hsu et al. (2025), who develop MEDPLAN, a two-stage RAG-based system for personalized medical plan generation[13]. Data processing frameworks are advanced by Yuan and Xue (2025) through cross-media data fusion and intelligent analytics for comprehensive information extraction[14]. Finally, computer vision research by Chen et al. (2022) pioneers one-stage object referring with gaze estimation[15], demonstrating the continuous evolution of fundamental AI capabilities that underpin these diverse applications.

2. 5G TECHNOLOGY AND HUMAN INTELLIGENCE TECHNOLOGY CONCEPT

2.1 5G technology

With the advent of the Internet era, communication networks have become an indispensable part of people's lives, learning and work, and with the application of electronic communication technology in various fields, The demand for communication networks from all sectors of society is gradually increasing, and the traditional 2G, 3G, 4G, 5G not only marks the development of communication technology, but also represents the number of people's demand for communication network. The 5G communication technology has strong transmission efficiency, and at the same time has low latency. Greatly improve the network response time, can meet the needs of different intelligent devices on the communication network, it can be said that 5G communication technology is the foundation of the Internet of things, artificial intelligence development, only 5G communication technology can bear the high requirements of intelligent devices on communication technology. 5G technology has a huge capacity, compared to the traditional network, the network transmission efficiency is higher, the cost is lower, it can realize the communication between people and objects, between objects. The transmission rate of 5G can reach 10 GPS, 100 times that of 4G. In terms of storage capacity, 5G is 1,000 times larger than 4G. 5G can be widely used in smart homes and the Internet of Things, and can simultaneously realize the online connection of multiple IoT devices. In addition, 5G also has important application value in smart cities, car networking, autonomous driving and intelligent manufacturing. Therefore, 5G communication technology is a breakthrough in the development of communication technology.

2.2 Artificial Intelligence Technology

Artificial intelligence (AI) is a branch of computer science that can independently complete specific instructions by simulating scenarios, human consciousness, and thinking. AI involves fields such as robotics, language recognition, image recognition, expert systems, etc. It has gradually integrated into modern life and added color to it. The most typical examples include Apple's Siri (smart voice assistant) and other mobile personalized functions. In more specific applications, artificial intelligence technology can meet the requirements of different instructions with its huge database, and artificial intelligence can be compared to a pleasant intelligent system. It can complete typical human intelligence tasks, such as logiccalculation, speech recognition, result analysis, behavior judgment, etc. Artificial intelligence technology has significant significance in intelligent home, artificial intelligence medical, intelligent teaching, industrial manufacturing and other fields.

3. 5G COMMUNICATION TECHNOLOGY AND HUMAN INTELLIGENCE INTEGRATION DEVELOPMENT PATH

3.1 5G + smart devices

5G communication technology is the key to realizing the interconnection of everything, artificial intelligence devices need to rely on 5G communication networks for information and data transmission and related functions, and the radio technology of 5G communication can effectively sense the environment. Therefore, the parameter adjustment of smart devices can be achieved, the communication network of smart devices is more stable, and the integration of 5G communication technology and artificial intelligence technology can effectively take advantage of the resource limitation problem of smart devices, providing good conditions and technical support for the development and application of smart devices.

3.2 5G + intelligent logistics

With the continuous development of China's economy, the traditional logistics model can no longer meet the needs of current society, intelligent logistics and intelligent logistics have become a trend in the industrial development of logistics, and the organic integration of 5G communication technology and artificial intelligence technology can achieve logistics transport and Intelligent warehousing, order processing, logistics and distribution services, 5G communication technology to achieve the effective operation of intelligent equipment, such as JD.com smart warehouse, Amazon.com smart warehouse, etc., all marks the integration of 5G communication technology and artificial intelligence technology on the logistics industry.

3.3 5G + Smart Factory

With the real-time plans of Industry 4.0, scale, intelligent and industrialization have become the trend of current factory development, and smart factories can not only improve factory output, but also achieve product quality and standardization, effectively reduce the labor production cost of enterprises, and improve factory production output.

The organic integration of 5G communication technology and AI technology provides effective technical means for smart factory construction. 5G communication technology can effectively improve the network transmission efficiency between smart factory equipment and ensure that HMI equipment is always in efficient operation. The application of artificial intelligence equipment can realize the process of factory production, intelligent, unmanned, can be said to be a breakthrough in the manufacturing plant, can improve the quality of products to the greatest extent at the same time, improve the output, such as Tesla super factory.

4. 5G COMMUNICATION AND HUMAN INTELLIGENCE TECHNOLOGY INTEGRATION DEVELOPMENT SCENARIO

4.1 5G Application in Intelligent Medical

In recent years, with the development of technology, 5G communication technology is also widely used in medical human intelligence. 5G technology can establish a faster and more stable emergency communication system, ensure close coordination of all aspects of emergency work, and use 5G to transmit ultra-high-definition video and smart medical device data, which can help hospital doctors understand the situation of patients in emergency vehicles in advance. The visiting doctor can see the patient's surgery scene in real time, grasp the real-time data of the operation, and achieve remote operation through such functions as high-definition audio real-time interaction, two-way transmission of the control signal, and real-time sharing of monitoring data. The technical conditions combined with the transmission of high-definition video with force-sensing devices allow doctors to provide advanced remote consultations to patients. For example, in ward management, the emergence of ambulatory robots is a product of 5G communication technology and artificial intelligence technology, which can realize the intelligence of hospitals, help doctors to conduct real-time remote ambulatory visits, and reduce the burden on doctors. In terms of disease prevention, 5G communication technology supports the real-time transmission of large amounts of human health data, helping medical institutions to achieve continuous physical monitoring of the wearer. It could better support continuous monitoring and sensory processing devices and collect large amounts of real-time patient data on a continuous basis. AI technologies can fully and continuously document and analyze the state of public health on a comprehensive and continuous basis and further suggest suitable health care solutions. In the current situation where regional medical resources are unevenly distributed and high-quality medical services cannot sink, reliance on telemedicine can alleviate the resource shortage caused by geographical limitations. The participants of the whole medical activity will also enjoy the mobile medical treatment in the 5G environment, providing higher quality medical services for the Volkswagen. A more convenient service.

4.2 5G Application in Automotive Networking

The application of 5G in the Internet of Vehicles is also a current hot spot. The concept of connected cars derives from the Internet of Things, i.e. the Internet of things. In the 5G era, automotive technologies can overcome the shortcomings of traditional automobiles, further improve the performance of automobiles, promote the development of automobile and communication and transportation industries, and realize the ultimate goal of 5G era. Through the comprehensive application of information technology, electronic sensing, satellite navigation and positioning, electronic control, computer processing, and traffic engineering, the connected vehicle system has realized a wide range of system projects connecting people, cars, and roads, playing out synergies and improving traffic efficiency. Ensure traffic safety and improve energy efficiency. Automotive interconnection has been applied as early as the 2G, 3G and 4G era, but limited by the characteristics of communication networks, can only achieve relatively simple infotainment functions. In the 5G era of strong and low-latency network connectivity, the field of connected cars will open up new heights. In the early stages of 5G development, technologies such as CV2X can achieve functions such as safety warning, vehicle coupling management efficiency, and partial autonomous driving. After large-scale 5G coverage, it will promote the realization of road collaborative control, vehicle collaborative driving, and advanced / fully automated driving. Intelligent driving greatly increases the requirements of network delay and data flow, so 5G communication technology is also the foundation of intelligent driving and automatic driving. 5G network relies on the technical characteristics of high transmission rate, low delay and high stability, which lays the foundation for the demand of intelligent driving network. The combination with 5G is the only way for the development of car interconnection and intelligent driving, and the low latency characteristics of 5G can meet the driving needs. In addition, the full coverage of 5G and the characteristics of large-scale links can also make the driving signal more powerful, bringing unprecedented good experience to users. Specifically, the 5G user experience rate can reach 100mbps to 1Gbps, supporting the ultimate business experience such as mobile virtual reality; The connection density can reach 1 million per square kilometer, effectively supporting the access of a large number of IoT devices; The traffic density can reach 10 mbps / square

meters, supporting the future migration traffic growth of more than a thousand times; The transmission latency can be as high as milliseconds, meeting the stringent requirements of vehicle networking and industrial control.

4.3 5G Application in Education

In recent years, with the rapid development of artificial intelligence technology in the fields of life, production and learning, society is accelerating into this artificial intelligence era, where people work and live with artificial intelligence. In the context of such an era, AI education must be developed to allow students to understand AI and better adapt to work and study in today's intelligent life. Traditional classroom teaching is not the only teaching method, and online teaching has become an important part of professional teaching, which can effectively break through the space of traditional offline classrooms. Due to the time limitation, the integration of 5G communication technology and artificial intelligence technology can realize the intelligentization and intelligentization of the field of education, completely change the teaching supply of traditional education, and make it possible to personalize and diversify teaching. In practical teaching, the integration of 5G and AI technology can first improve the teaching level of teachers. In the absence of artificial intelligence, teachers can only make breakthrough changes in teaching strategies, and in academic examinations, teachers usually verify students' mastery of knowledge points and teaching effectiveness through regular tests. The application of artificial intelligence can help teachers adjust teaching methods, enrich the knowledge base, understand the acceptance of students, and make education more human and personal. Secondly, teachers can use 5G technology to innovate VR/AR classroom teaching to give students an immersive learning experience; Through distance learning, Pegatron will explore the teaching mode of dual teachers and master's courses. Using big data analysis to collect learning data, customise personalized teaching programs according to students' characteristics, fully utilize the advantages of network resource sharing, continuously expand existing textbooks, and realize textbook sharing. Teachers may choose to record or livestream teaching lessons. Some teachers upload classroom video clips to the classroom platform before the class begins to improve student preparation. Classroom videos and materials can be saved for a long time so students can watch them anytime, anywhere. If students don't hear anything or don't understand in class, they can study carefully after class has finished. This approach breaks the constraints of time and space and helps students better grasp knowledge points. Some current online teaching software is equipped with automatic paper correction functions, and the corrected data will be analyzed twice and pushed to the teacher. Teachers can test students' learning outcomes in the classroom and generate learning outcome in the classes, thereby helping students to focus on the classroom. It not only ensures the teaching efficiency, but also improves the teachers' teaching according to the system's data analysis, teachers can conduct personalized after-school assignments and conduct targeted teaching, thereby realizing the intelligent and intelligentization of classroom teaching.

5. CONCLUSION

The technical integration of 5G communication and AI is a key measure for the development of science and technology. With the effective integration of the two, it can create greater value for social education development, industrial upgrading, intelligent manufacturing and other fields. In the specific integration, it is necessary to dig deep into the technical advantages and coherence of the two to fully realize the integration effect and promote high-quality development of society.

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