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Application and Development of AI Intelligent Hospital Guidance System Based on Multimodal Large Language Model (MLLM)

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Abstract. Under the background of present ever-changing science and technology, artificial intelligence is reshaping our lives with its powerful penetration. AI intelligent guidance system, as an outstanding representative of artificial intelligence technology, is gradually integrated into the hospital outpatient service system, bringing unprecedented medical experience to patients. These AI intelligent guidance systems not only have efficient and accurate guidance functions, but also play a positive role in specialist diagnosis and treatment, patient psychological adjustment, and medical knowledge popularization. This paper will deeply discuss the application and development of AI intelligent guidance system based on Multimodal Large Language Model (MLLM) in hospital outpatient service, in order to provide useful reference for building an efficient and convenient hospital outpatient service system.

Keywords. Multimodal Large Language Model (MLLM); AI intelligent guidance system; Hospitals; Application development

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1. The purpose of applying AI intelligent guidance system based on Multimodal Large Language Model (MLLM) in hospital outpatient department

In today's fast-developing information technology era, AI intelligent consultation system has become an indispensable part of the hospital outpatient service system. By analyzing the current application status of AI intelligent consultation systems in hospitals, we can clearly see the positive effects of these systems in specialty consultation, patient psychological adjustment, and medical knowledge dissemination. In order to build an efficient, convenient, and effective hospital outpatient service system and improve the quality of hospital outpatient services, the application of AI intelligent consultation systems is particularly important.

1.1. Responding to the national strategy for science and technology development

The Outline of China's Medium and Long-term Science and Technology Development Plan clearly points out that AI intelligent guidance system should be used as a strategic high-tech means of priority development in the future. This policy orientation provides strong support for the research and development and application of AI intelligent guidance system. As the forefront of hospital outpatient service, the introduction of AI intelligent guidance system is not only a positive response

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to the national science and technology development strategy, but also an inevitable choice for hospitals to transform to intelligence and modernization.

1.2. Help to better carry out health education activities

Through the introduction of AI intelligent guidance system, it can help medical professionals to better carry out health education activities, improve the health literacy of residents, and promote the development of national health. China's Basic Medical and Health Promotion Law stipulates: "Medical and health personnel shall carry out health education to patients when providing medical and health services." Medical staff not only have professional medical knowledge, but also are front-line staff in contact with patients. Regular and designated health education activities can strengthen the good interaction between medical staff and patients and residents, but also disseminate scientific and accurate health knowledge and improve the quality of health science popularization information.

1.3. Explore the application value of AI intelligent guidance system

The application value of AI intelligent guidance system is that it can provide efficient and accurate guidance services to help patients quickly find the required medical resources and information. Exploring the reception work of outpatient patients in the international popular hospital AI intelligent guidance system, we can find that these AI intelligent guidance systems do show strong potential and advantages in practical applications. Through the introduction of AI intelligent guidance system, hospitals can further optimize the outpatient medical service system and improve patient satisfaction and medical experience

1.4. Effectively improve patients' bad psychological emotions

In the course of medical treatment, patients are often accompanied by tension, anxiety, depression and other bad psychological emotions. Especially for children, due to age and cognitive limitations, they are more prone to fear and avoidance. Through its friendly appearance, friendly language and intelligent interaction, the AI intelligent guidance system can effectively alleviate the negative psychological emotions of patients. They can provide psychological comfort and support to patients, help them better adapt to the medical environment, and reduce psychological stress.

1.5. We will improve the outpatient medical service system

The application of AI intelligent guidance system can further optimize the outpatient medical service system. First of all, they can assist medical staff in patient triage and guidance work, reducing the work pressure and burden of medical staff. Secondly, the AI intelligent guidance system can also provide medical knowledge popularization and health education services to help patients better understand disease knowledge and self-care methods. In addition, the AI intelligent guidance system can also be seamlessly connected with the hospital information system to achieve real-time sharing and transmission of medical data, and improve the overall efficiency and quality of medical services.

1.6. Integration of domestic and foreign advanced technology

This project starts from theory and practice, integrates well-known intelligent AI intelligent guidance system technology at home and abroad, and starts from the actual work of hospital outpatient service, aiming to create an AI intelligent guidance system that conforms to China's national conditions and the characteristics of the medical system. By introducing and learning from foreign advanced intelligent AI intelligent guidance system technology, combined with the actual needs and development trends of the domestic medical industry, we can create an AI intelligent guidance system product with independent intellectual property rights and core competitiveness. This not only helps to improve the efficiency and quality of hospital outpatient medical services, but also promotes

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the rapid development and progress of the domestic intelligent AI intelligent guidance system industry.

1.7. Embodies the principle of medical public welfare

The application of AI intelligent guidance system is not only to improve the quality and efficiency of hospital outpatient service, but also to reflect the principle of medical public welfare. When the AI intelligent guidance system guides each patient, it is not affected by the physical condition of the guide worker, and can provide guidance services for patients all day long and without interruption. This spirit of selfless dedication and sense of mission to save the dying and heal the wounded is an important embodiment of the principle of medical public welfare. Through the application of AI intelligent guidance system, we can lay a good foundation for promoting the harmonious and stable development of society.

2. Application background of AI intelligent guidance system based on Multimodal Large Language Model (MLLM)

In the wave of artificial intelligence, it is not difficult to find that the lifestyle and quality of the public are quietly changing. This change has not only permeated our daily lives, but also reshaped our interaction with technology. The rise of artificial intelligence technology has undoubtedly become the core engine of this change, which is closely integrated with our social life and paints a picture of a future full of intelligence, efficiency and convenience. When it comes to the outstanding representatives of artificial intelligence, intelligent AI intelligent guidance system undoubtedly occupies an important position. With their high intelligence and autonomy, they have won people's wide attention. These AI intelligent guidance systems are not only cold machinery, but also the wisdom crystallization of advanced artificial intelligence algorithms, sensors and actuators. They are acutely aware of their surroundings, understand and carry out our commands, and even, in some cases, have a natural and fluid conversation with us. In the practical application of intelligent AI intelligent guidance system, it is not difficult to find the close interweaving between hardware, scenes and data. Taking AI intelligent guidance system as an example, they are based on the identity of AI intelligent guidance system and achieve the harmonious unity of hardware and scene through clever design and high integration. At the same time, with the help of advanced data processing technology, these AI intelligent guidance systems can achieve data interconnection and centralized management, breaking the situation of data islands, making data a key element to promote intelligent development. In the medical field, the application of intelligent AI intelligent guidance system is more extensive and in-depth.

Taking the surgical AI intelligent guidance system "Da Vinci" as an example, it has greatly improved the success rate of surgery and shortened the recovery time of patients by relying on accurate surgical operation and stable performance. In addition, drug delivery AI intelligent guidance system and AI intelligent guidance system also play an indispensable role in medical services. They not only improve the efficiency of medical services, but also bring more convenient and comfortable medical experience to patients. However, to achieve this goal, we need to continuously focus on and promote the optimization and innovation of science and technology. Only through continuous innovation and development of artificial intelligence technology can we ensure that intelligent AI intelligent guidance systems play a greater role in various fields. At the same time, we also need to pay attention to the ethical and social implications of intelligent AI guidance systems to ensure that they are developed in line with human values and interests.

3. Introduction of AI intelligent guidance system based on Multimodal Large Language Model (MLLM)

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In today's era of rapid development of information technology, it is not difficult to find that advanced technologies such as intelligent terminals, big data and voice interaction are gradually penetrating into the medical field, bringing unprecedented changes to the medical industry. In particular, intelligent tools such as intelligent triage call system and 3D virtual person intelligent guide system are widely used in hospital outpatient clinics, which reflects the far-reaching impact of this change. Today, medical units across the country are actively introducing a variety of AI intelligent guidance systems, which not only have basic "communication" capabilities, but also provide "guide" services for patients. Such innovative applications not only greatly reduce the work pressure of medical staff, so that they can focus more on the treatment and care of patients, but also reflect the hospital to keep up with the pace of The Times, and actively embrace the management concept of new technology. More importantly, the introduction of AI intelligent guidance system has effectively reduced the labor cost of the hospital and improved the overall operational efficiency.

When it comes to the system design of AI intelligent guidance system based on a Multimodal Large Language Model (MLLM), it is necessary to mention the core technology behind it. An excellent AI intelligent guidance system system, including intelligent perception, comprehensive decision-making, operation management, command control and data integration and other parts. The intelligent perception system is the "eyes" and "ears" of the AI intelligent guidance system. It uses multiple interaction methods such as hearing, sight and touch to capture patients' needs and information in an all-round way. When a patient asks a question to the AI intelligent guidance system, it can quickly recognize the speech, convert it into text for understanding, and then give the corresponding answer. At the same time, it can also capture the patient's expressions and gestures through the camera to gain a deeper understanding of the patient's emotions and intentions. The advantage of intelligent sensing system lies in its multimodal sensing ability and humanized processing. It can process speech, image and other information at the same time, and provide rich data support for the integrated decision system. In addition, multi-terminal support and cloud mode also make the expansion and maintenance of the system more convenient. The integrated decision system is the "brain" of the AI intelligent guidance system. It can comprehensively analyze the data information provided by the intelligent sensing system and make reasonable decisions based on it. When the AI intelligent guidance system detects the patient entering the hospital, it can quickly start the guidance program to provide accurate department guidance for the patient. At the same time, it can also recommend the right doctor and treatment plan for the patient based on the patient's medical history and the characteristics of the disease. In addition to intelligent perception and integrated decision systems, operations management systems, command and control systems, and data integration systems each play an important role. Together, they constitute a complete system of AI intelligent guidance systems, enabling them to work efficiently and accurately in complex medical environments.

4. A full range of guidance services based on a Multimodal Large Language Model (MLLM) of AI intelligent guidance system

The AI intelligent guidance system has the functions of laser navigation, autonomous positioning and obstacle avoidance. The realization of this function relies on advanced laser navigation technology and sensor technology. Through the built-in laser scanner, the AI intelligent guidance system can sense the surrounding environment in real time, obtain environmental information, and process it through algorithms to achieve autonomous positioning. When encountering obstacles, the AI intelligent guidance system can automatically plan the route, avoid collisions, and ensure safe operation. This function enables the AI intelligent guidance system to freely shuttle in the complex hospital environment and provide accurate guidance services for patients. Secondly, the AI intelligent guidance system also has a motion function. It supports a variety of movement modes

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such as forward, backward, left and right rotation, and can move flexibly according to the needs of patients. Through the laser navigation function, the AI intelligent guidance system is able to automate movement within a pre-set range without human intervention. This function enables the AI intelligent guidance system to be closer to patients and provide more intimate services to patients. In addition to basic navigation and motion functions, the AI intelligent guidance system also has face recognition functions. Through the built-in HD camera and face recognition algorithm, the AI intelligent guidance system can accurately identify the face characteristics of patients, and match and identify with the built-in photo library. This function not only improves the accuracy of the guidance service, but also increases the interest of the service, so that patients feel more warmth and care in the process of medical treatment. In addition, the AI intelligent guidance system also has speech recognition and human-computer dialogue functions. Through the built-in voice recognition module and artificial intelligence technology, the AI intelligent guidance system can accurately identify the patient's voice commands, understand the semantics, and give the corresponding voice answers. Patients can obtain the required medical information and guidance services through a simple conversation with the AI intelligent guidance system. This function makes the guidance service more intelligent and convenient, and improves the patient's medical experience.

In practical application, the AI intelligent guidance system based on the Multimodal Large Language Model (MLLM) can also show the corresponding role advantages. First, it can popularize medical knowledge for patients. Through the built-in medical knowledge database and voice synthesis technology, the AI intelligent guidance system can introduce medical knowledge such as vaccination knowledge, disease care knowledge, and precautions to patients, helping patients better understand their own health status and medical needs. Secondly, the AI intelligent guidance system can introduce the overall layout of the hospital. By showing patients the department distribution map, floor distribution map and other information of the hospital, the AI intelligent guidance system can help patients quickly understand the layout structure of the hospital, and reduce the incidence of patients getting lost and going to the wrong department. Finally, the AI intelligent guidance system can also introduce the distribution of various departments for patients. By showing patients the location, function, doctor information and other information of each department, the AI intelligent guidance system can help patients quickly find the department they need to see a doctor, shorten the time for patients to see a doctor, and improve the efficiency and quality of medical services. In order to achieve these functions, the hospital has conducted in-depth communication and cooperation with AI intelligent guidance system research and development enterprises. The hospital provides detailed department distribution maps, specialized medical knowledge databases and other information to the research and development enterprises to ensure that the AI intelligent guidance system can accurately carry out guidance services. At the same time, the hospital also put forward specific requirements and suggestions to the research and development enterprises according to the actual needs, in order to continuously improve and optimize the functions and services of the AI intelligent guidance system. According to the needs and requirements of the hospital, the research and development enterprise has carried out in-depth research and development and debugging of the AI intelligent guidance system to ensure that the AI intelligent guidance system can run stably and accurately, and meet the actual needs of the hospital.

5. Application effect of AI intelligent guidance system based on Multimodal Large Language Model (MLLM)

Most patients and their families spoke highly of the medical knowledge popularization function of the AI intelligent guidance system. This new way of knowledge transfer not only makes medical knowledge more vivid and interesting, but also enables patients and their families to deepen their understanding of medical knowledge in a relaxed and pleasant atmosphere. Especially for children

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who seek medical treatment, the interactive and interesting nature of the AI intelligent guidance system has greatly attracted their attention, effectively improving the tension, anxiety and other bad psychological emotions caused by medical treatment. The AI intelligent guidance system makes medical knowledge no longer unreachable, but something that children can touch, understand and be interested in through edutainment. In addition, the AI intelligent guidance system has greatly improved the convenience and efficiency of patients' medical treatment by introducing the hospital's characteristic service items, characteristic specialties, doctor specialties, and the location of the medical room for the medical group. Patients no longer need to spend a lot of time looking for consulting rooms or consulting staff, but simply communicate with the AI intelligent guidance system, and they can quickly obtain the required information, which greatly reduces the time of hospitalization for patients. This efficient way of information transmission not only saves valuable time for patients, but also improves the overall operating efficiency of the hospital outpatient service. The AI intelligent guidance system is not affected by the conditions of the guidance workers themselves, and can provide services for patients all day long and without interruption. At the same time, the way of human-computer interaction makes the service process more lively and interesting, without any emotional fluctuations, bringing a new medical experience for patients. Because of this, the application of AI intelligent guidance system in hospital outpatient clinics has been highly recognized by patients and their families. Today, the AI intelligent guidance system has become a major feature of the hospital outpatient clinic. It not only provides patients with a more convenient, efficient and humanized service experience, but also brings tangible benefits to the hospital. On the one hand, with the increasing tension of the medical environment, the adverse psychological and emotional problems of patients are becoming more and more prominent. Through its unique interactive way and psychological comfort function, the AI intelligent guidance system helps to regulate the patients' bad psychological emotions and reduce the patients' violent tendency of tension and anxiety. At the same time, combined with other personalized service methods, such as music therapy, psychological counseling, etc., AI intelligent guidance system can create a more comfortable and warm treatment environment for patients, and soothe patients' negative emotions as much as possible. On the other hand, AI intelligent guidance system also shows great potential in assisting medical guidance work. Through automated and intelligent service methods, AI intelligent guidance system can greatly save human resource costs and improve the efficiency of guidance work. At the same time, the efficient service of AI intelligent guidance system can also make patients and patients' families more recognized and satisfied with hospital outpatient services. This win-win situation will help promote the continuous development and innovation of hospital outpatient services.

6. Conclusion

The application and development of AI intelligent guidance system based on Multimodal Large Language Model (MLLM) in hospital outpatient service is not only the embodiment of scientific and technological progress, but also the inevitable choice of medical service innovation. In the future, with the continuous development and improvement of artificial intelligence technology, AI intelligent guidance system will play a more important role in the medical field. However, we should also be soberly aware that the development of intelligent AI intelligent guidance system is inseparable from the optimization and innovation of science and technology. At the same time, we also need to pay attention to the ethical issues of intelligent AI intelligent guidance systems to ensure that they do not violate moral and ethical principles while serving humanity. Only in this way can we give full play to the potential of AI intelligent guidance system and contribute to the construction of a more harmonious and beautiful medical environment.

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