

Analysis of the Application of Artificial Intelligence in Medical Imaging

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Abstract: Medical imaging technology is considered one of the most critical diagnostic tools in the clinical analysis, and its imaging results provide medical interventions with the changes of patients' tissues and organs to support the diagnosis. With the development of computer technology, the application of artificial intelligence (AI) technology in clinical diagnosis has become increasingly more widespread. In order to enhance the quality of medical imaging work, this paper mainly analyzes the application effect of AI in medical imaging, further discovering the significance of the application of artificial intelligence in medical imaging.

Keywords: artificial intelligence; medical imaging; application analysis

1. Introduction

The stunning development of computer technology has enabled AI technology been employed in many fields of work, from production, education to people's daily work, and nowadays, artificial intelligence technology can be seen everywhere. AI technology integrates various disciplines such as computer science and mathematics. The computational learning ability, data resources, and algorithmic models are the basis for the development of artificial intelligence technology^[1]. With the continuous improvement of China's medical level and the introduction of new technologies and equipment, AI technology has gradually penetrated the medical field and has been applied widely. In the hectic medical intervention, medical imaging is one of the important sources of work, which is an important reference for doctors to diagnose diseases^[2]. In recent years, more and more AI technologies have been integrated into medical imaging work to improve the quality and efficiency of medical imaging workers by improving or combining traditional imaging.

2. Artificial Intelligence Technology

2.1 Artificial Intelligence

Artificial Intelligence, or AI, is a branch of computer science, a new technical science that looks into and develops theories, methods, technologies, and application systems for simulating, extending, and expanding human intelligence. AI has a wide range of research directions, including speech recognition, image recognition, machine learning, and intelligent robotics, etc. The theory of AI is not only limited to computer technology, but also incorporates mathematics, physiology, statistics, and systems science, and other aspects of discipline technology. Artificial intelligence is the study of the computer to simulate certain human thought processes and intelligent behavior so that the computer can achieve a higher level of application, better help humans to complete the corresponding needs.

2.2 Advantages of Artificial Intelligence

Artificial intelligence is based upon the theory of human intelligence, a technology formed relying on extension

and simulation. With strong computing ability, artificial intelligence, along with its computing power, can carry out various forms of fast data processing, and then output the information needed by people. Thanks to the high learning ability adherent to the intelligent learning program, AI is capable of machine learning, so as to adapt to the environment and improve the efficiency of artificial intelligence; with strong logical reasoning ability, AI technology can carry out logical reasoning through a variety of algorithms, thus enabling the computer system to solve more complex problems and provide people with corresponding decision support. In addition, the strong pattern recognition ability empowers the computer program to carry out the discovery of its intelligent features, which is more conducive to image recognition. With strong coordination and control and artificial intelligence algorithm, the computer program can better adjust the intelligent system of resource allocation and utilization, hence reduces resource consumption. Bestowed with the ability to reduce input costs and higher efficiency, AI technology has replaced manual work in many work areas and can reduce labor costs. In sum, the application value of AI is undoubtedly significant.

3.AI Medical Imaging

As the advantages of AI technology are known to the world, more and more artificial intelligence technologies are widely used in medical imaging, bringing new ways of examination and analysis to this field of work. Under the conventional medical level, the process of medical imaging work is not able to make detailed interpretation of image examination results, which causes bias in doctors' diagnosis and brings certain negative impact to medical intervention. With the wide application of AI technology in medical imaging, medical imaging diagnosis results have become more clear and accurate, effectively reducing the deviation of doctors in the diagnosis process, and to a certain extent, increasing the efficiency of diagnosis.

4.Application of Artificial Intelligence in Medical Imaging

4.1 Intelligent Reviewing

Artificial intelligence technology can determine whether pathological changes occur within a patient's visual presentation of examination during the process of medical imaging diagnosis, and the doctor will then check the results of his/her judgment, which can effectively help the doctor allocate time as well as energy. Today, intelligent imaging systems can not only identify the patient's lesion, but also determine the nature of the it. In general, with the combined help of large image data and clinical guidance, the intelligent image reviewing system can continuously learn the criteria for determining the type of disease and run continuously for a long time with high stability.

4.2 Artificial Intelligence in Radiotherapy

Nowadays, radiotherapy is still considered one of the most critical tools in clinical treatment in oncology. The process of radiotherapy treatment for tumors is complex, which includes simulated positioning, design of treatment plan, verification of treatment plan, and treatment implementation. Target volume delineation is a significant part of the process due to the fact that radiotherapy treatment is to treat the patient's focal tissues through various rays, which is more harmful and requires accurate positioning of the treatment area, thereby avoiding damaging the patient's normal tissue cells. Radiotherapists need to spend a considerable amount of time on manual indication based on the patient's medical imaging results, which slows the work efficiency. While the operation needs to be performed exclusively by radiotherapists, the shortage of radiologists caused by medical conditions leads to the fact that the majority of radiotherapists are concentrated in tertiary hospitals, and few primary hospitals are equipped with professional radiotherapists. This phenomenon further puts primary hospitals in a dilemma: even with radiotherapy equipment, they find it difficult to start radiotherapy work smoothly due to the lack of operators, which correspondingly requires patients to go to tertiary hospitals for treatment. Therefore, in order to improve the current treatment situation and increase the effectiveness of radiotherapists' work, medical institutions have combined artificial intelligence technology. The

developers set up the artificial intelligence technology system to effectively identify the focal tissue and surrounding organs to assist radiotherapists in target volume delineation of the patient's focal area through the artificial intelligent algorithm, which can obtain a higher accuracy rate and significantly enhance the work efficiency of radiotherapists.

4.3 Intelligent Analysis of Pathological Images

In contemporary medical intervention, there are relatively few pathologists. One study reported that the registered pathologists in China are far from the required standard of one to two case physicians for 100 beds, which cannot meet the medical needs^[3]. In the course of medical intervention, cancerous cells are similar in size to ordinary cells, and pathologists need to identify cancerous cells that are difficult to identify in the high pixel pathology results, which, combined with a relatively busy workload, is prone to certain errors. Most of the pathologists' working time is spent on examining patient's pathology slides, which affects the efficiency to a certain extent. As AI technology becomes more widely used, it facilitates the acquisition of pathology slides during clinical analysis, which in turn leads to a large number of quantitative analyses. Therefore, many groups of expertise are developing and improving AI technology to strengthen its ability to analyze pathology data, which in turn improves the accuracy of pathology diagnosis results and enhances the quality of pathology diagnosis. The use of AI technology makes the diagnosis more concise and accurate compared with traditional diagnosis by the naked eye or microscope and improves medical efficiency to a certain extent. Moreover, the diagnosis is transparent and traceable, so that the cause of misdiagnosis can be quickly checked if it occurs.

5. Conclusion

AI is a branch of computer science that attempts to understand the essence of intelligence and produce a new intelligent machine that can respond in a similar way to human intelligence, and research in this field includes robotics, language recognition, image recognition, natural language processing, and expert systems^[4]. Since its inception, AI has become increasingly sophisticated in theory and technology, and its application areas have expanded. Most of the medical data in today's treatment work are derived from medical images. At present, the analysis of most medical image data still consumes a lot of manpower, and the number of tasks and the complexity of images can lead to biased diagnostic results, which is very likely to affect the accuracy of diagnostic work to different degrees^[5]. Therefore, the use of manual processing has certain disadvantages. In recent years, with the continuous development of information technology, more and more AI technologies have been gradually incorporated into the combination of medical impact work through continuous improvement, and the use of AI technology not only improves the traditional image processing methods in medical imaging work and increases the accuracy of imaging examination results, but also enhances the efficiency of medical imaging workers and thus improves the overall quality of medical imaging. According to the analysis of the current situation, the application of AI technology in medical imaging is more concentrated in the field of simple diseases and specific diseases. While the application value is small, the application results have not yet reached the ideal state. And in the process of application of AI technology, there are still problems that need targeted solutions. Therefore, the application of AI technology in medical imaging still needs further research and development. Eventually, it will be implemented gradually. The researcher believes with the continuous development of AI technology and the continuous improvement of research workers, the medical and clinic fields are expecting prosperity in the combination of AI technology and medical imaging applications, which is not only limited to intelligent reviewing or pathology diagnosis, but also will continue to expand to more levels. And we expect the combination of AI technology and medical imaging to play a higher value in the future.

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