On the application research of artificial intelligence technology in medical imaging

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Abstract. Medical images are an important basis for medical diagnosis. Nowadays, Artificial intelligence algorithms, particularly deep learning, have demonstrated remarkable progress in image-recognition tasks. In the context of COVID-19, image recognition functions based on artificial intelligence have been gradually applied to the recognition of various medical images. In medical imaging, AI has shown great potential by revolutionizing diagnostic imaging, improving accuracy, efficiency, and improved patient outcomes. At present, the three types of AI application in the field of medical imaging mainly include image recognition and analysis, auxiliary diagnosis and treatment scheme optimization. Firstly, this paper introduces the current research progress of artificial intelligence technology. At the same time, the current deep learning algorithm based on one of the artificial intelligence algorithms has achieved good results in medical image processing, so as to carry out related application research. Secondly, according to the current situation of clinical diagnosis, aiming at the problems in the current society, this paper lists the existing research results. Finally, the future development trend of deep learning based on artificial intelligence technology is prospected, and the medical community is expected to seize the application opportunities of artificial intelligence in the medical field and meet the corresponding challenges.

Keywords: Artificial intelligence, medical imaging, Computer aided diagnosis, Computer aided prediction system, Deep learning.

1. Introduction

At present, with the rapid development of computer technology, artificial intelligence, as the front-end application of computer technology, has become a hot research direction in China since 2017, and China has also issued the corresponding development plan. Artificial intelligence involves many disciplines, such as computer science, control science and engineering, statistics, brain neurology and so on. In the field of control science, making full use of computer technology to achieve or solve practical problems has become an essential method. In clinical medicine research, AI technology can automatically extract, analyze, integrate, and store clinical data and records [1].

China adheres to the scientific concept of development that puts people first, and the ultimate goal of scientific and technological development is to benefit all the people. At present, the distribution of domestic medical resources is extremely uneven. Ordinary people do not have a strong ability to self-diagnose, but will cause unnecessary anxiety because of their own search on the Internet. At the same time, based on China's large population of national conditions, it is difficult to ensure that everyone can seek medical treatment. Thus, artificial intelligence technology gradually began to be applied in the medical field. Based on the image recognition function of artificial intelligence, the technology has been gradually applied to the recognition of various medical images. The application of artificial intelligence in the field of medical imaging is still in the initial stage, facing many technical and ethical challenges, such as data quality problems, machine performance problems, algorithm bias problems, privacy leakage problems and responsibility division problems, etc., and measures need to be taken to avoid and restrict [2]. China has also applied certain artificial intelligence technology in the prevention and control of the COVID-19 epidemic, which has greatly reduced the risk of medical workers. In order to improve the diagnostic efficiency of doctors and enhance the guarantee of the life safety of medical staff, it is very necessary to further promote the development of artificial intelligence technology in the field of medical diagnosis and prediction.

2. Research progress in artificial intelligence technology

The research of artificial intelligence technology is based on the cognitive behavior mode to design the operation algorithm of artificial intelligence. Artificial intelligence technology mainly involves language recognition, image recognition, natural language processing and expert systems. Since the 1990s, the research of this technology has been in a steady state of development. Countries around the world are beginning to gradually increase the research on the use of artificial intelligence technology. In recent years, China has made significant progress in the field of artificial intelligence, such as deep learning, computer vision, big data and other key technologies.

(1) Machine Learning: Machine learning is fundamental to AI and involves building and training models to learn and make predictions from data. Deep learning (Figure 1) is an important branch of machine learning, using multi-layer neural network models to realize the learning and analysis of complex data. Researchers have been improving machine learning algorithms and models to improve their accuracy and efficiency, a similar study of deep reinforcement learning (DRL) to solve various difficulties in 5G networks [3].

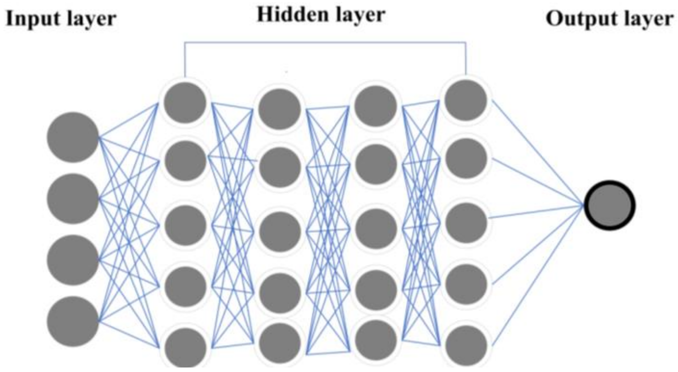

Figure 1. Deep learning model structure diagram

(2) Reinforcement Learning: Reinforcement learning is a learning paradigm in which agents can gradually learn to take optimal action through trial and error and feedback mechanisms. This approach has achieved great success in the game field, such as: by the uncertainty and variability of device mobility, decentralized network architecture, and constraints on network resources, mobile wireless networks face several challenges for any learning system. In this work, we use deep reinforcement learning (DRL) to learn the extensible and generalizable forwarding strategy [4] for this kind of networks

(3) Computer Vision: Computer vision is designed to let the computer understand and interpret images and video. In recent years, great breakthroughs have been made in target detection, image classification, pedestrian recognition, and face recognition by using deep learning technology. These technologies have been widely used in many fields, such as autonomous driving, security surveillance, and medical image analysis.

(4) Natural Language Processing, NLP: NLP studies how computers to understand and process human language. In recent years, remarkable progress has been made in question answering system, machine translation, semantic analysis and so on. For example, machine translation models have been able to achieve high-quality cross-language translation, making the language communication between humans and machines more convenient and accurate.

The rapid development based on DRL; artificial intelligence technology has made another major technological breakthrough--artificial intelligence predicts protein structure. At the same time, ensemble learning appears, a direct way to improve the performance of almost any machine learning algorithm. This significantly improves its efficiency compared to most existing integrated systems [5]. So far, the artificial intelligence technology is moving towards the research of the super-large scale pre-training model. Research shows that deep learning has achieved good results in medical image processing, whether in biological tissues or in cell-level recognition, detection and segmentation tasks, which is generally higher than that of traditional machine learning algorithms.

3. Current pain points in clinical imaging diagnosis

Medical imaging is a very important reference basis in the diagnosis. Due to the large work volume of clinicians in a single day, the number of medical practitioners decreases year by year, while the number of imaging physicians is even smaller. According to the statistics of the National Health Commission, from 2022 to the first half of 2024, a total of 2.8 billion radiation diagnosis and treatment were completed in China, while there were only about 86, 303radiologists in China and only 20, 000 associate chief physicians above. It can be inferred that there is a great lack of imaging doctors. For on-duty doctors, their daily workload is overloaded. In order to reduce the burden of imaging physicians and improve the efficiency and accuracy of diagnosis, the application of artificial intelligence technology in the medical field has gradually become a hot research direction.

On the other hand, there are some problems in the current AI medical field, such as algorithm overfitting, obvious inequality, poor interpretability, privacy protection, and lack of reliable verification [6]. As the application of artificial intelligence in the field of medical imaging is still in the initial stage, faced with many technical and ethical challenges, such as data quality, machine performance, algorithm bias, privacy leakage and responsibility division, measures need to be taken to avoid and restrict [7].

At present, there are mainly the following models in clinical diagnosis: CNN, VGG, LSTM, RNN, AlexNet, U-Net, SE-Net, Res-Net, Deng se-Net, Faster R-CNN, GoogLe-Net and U-net, etc. This paper mainly introduces the first three models.

CNN is a neural network dedicated to processing grid data (such as images). CNN can effectively capture local features and spatial relations through the convolution, pooling, and fully connected layers. CNN convolutional neural networks require high processing power and typically train models on high-cost machines with dedicated graphics processing units (GPUs).

VGGNet is a model proposed by the Visual Geometric Group of Oxford University, so it is abbreviated as VGGNet. Its overall network diagram is shown in Figure 2. Compared with other deep learning models, VGG networks require more computing resources and storage space. This is mainly because the VGG network contains multiple fully connected layers, each of which contains a large number of parameters, resulting in a large memory footprint. Another problem is that, although VGG networks achieve good results on image classification tasks, they are not particularly suitable for processing high-resolution images or for real-time processing. Because these operations will consume even more computing resources.

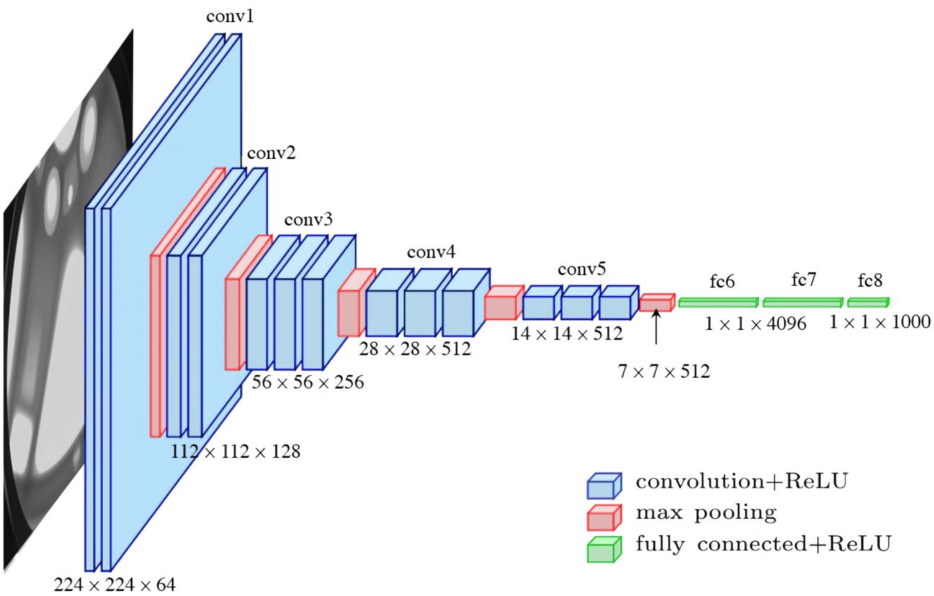

Figure 2. VGGNet Overall network

The model structure of LSTM itself is relatively complex, with the following pain points:

(1) There are disadvantages in parallel processing. With some latest networks.

(2) RNN gradient problem is solved in LSTM and its varieties, but not enough. It can handle 100 orders of magnitude, but for 1000 orders or longer, it is still tricky.

(3) Computing time. Each LSTM cell has four fully connected layers (MLP), and if the LSTM has a large time span and the network is deep, the calculation will be large and time-consuming.

4. Research of artificial intelligence technology in the medical field

4.1. Medical image recognition technology and research progress

As one of the basic functions of artificial intelligence, image recognition has been preliminarily applied in medical image recognition. The general research of the medical imaging mode is mainly nuclear magnetic resonance imaging (magnetic resonance imaging, MRI), CT (computed tomography), ultrasound, and multimodal magnetic resonance imaging, Such as functional magnetic resonance imaging (functional MRI, Of MRI), diffusion tensor imaging (diffusion tensor imaging, DTI) and magnetic resonance vascular imaging (magnetic resonance angiography, MRA) and other [8]. Each image mode reflects different physio pathological information. For example, CT images reflect the distribution of the attenuation coefficient of X-rays of specific spectrum in different tissues in the human body. Because the attenuation coefficient is directly related to the density, it reflects the three-dimensional density of human tissues. Label scarcity, class imbalance and data uncertainty are three primary challenges that are commonly encountered in the semi-supervised medical image segmentation. Clinically, CT brain is required for brain trauma or cerebrovascular lesions; pulmonary CT for pulmonary inflammation and tuberculosis; abdominal CT for liver, gallbladder and pancreas. Medical imaging is the most important source of information in disease screening, diagnosis, and treatment decision-making. Photo acoustic tomography (PAT) and magnetic resonance imaging (MRI) are two advanced imaging techniques that are widely used in preclinical research. Image segmentation is an important and difficult part of image processing. It has become a hotspot in the field of image understanding. This is also a bottleneck that restricts the application of 3D reconstruction and other technologies [9]. Y. Zhong et al. proposed an unsupervised PAMR Fuse deep learning framework, called PAMR Fuse, for misaligned PAT and MRI image fusion. PAMR Fuse Includes a multi-modal to unimodal registration network to precisely align the input PAT-MRI image pairs, and a self-attention fusion network, which selects informative features for fusion. We adopted an end-to-end mutual reinforcement pattern in the registration network to achieve joint optimization of cross-mode image generation and registration [10].

The input and output ends of the image are the imaging part, and the pathological information reflected by the image is obtained through the image mining. For the current development of medical imaging technology, it is also studied from the two directions of imaging end and image mining. On the one hand, the quality of the images provided by the imaging equipment is improved to provide high quality image data for diagnosis; on the other hand, the image comparison and the analysis of the severity of the lesions they reflect, to extract key information with clinical diagnostic significance. At the same time, for the actual situation of the large number of patients in Chinese hospitals, improving the imaging speed is also an important direction of research. Mardani M et al. proposed a method for modeling low-dimensional manifolds of high-quality magnetic resonance (MR) images using a generative adversarial network (GAN). Experimental results showed that the proposed method can achieve 5 x scanning acceleration, and the imaging results outperformed conventional compressed sensing algorithms. Using the advantages of different imaging modalities, the imaging algorithm is improved to improve the imaging speed. WANG S-H, PHILLIPS P, SUIY et al. study the detection of Alzheimer's disease (AD) by optimizing the CNN model, providing an effective detection technology based on computer vision. Numerical experiments show that leaky ReLU and maximum pooling are most effective in terms of performance. The sensitivity was 97.96%, specificity 97.35% and accuracy 97.65% [11].

Based on the development of automation technology, the proposal of intelligent medical imaging workflow has practical significance for the treatment of hospital overcrowding. The study is put forward in order to medical image detection process design into intelligent image scanning workflow, including the patient identity intelligent authentication, intelligent voice interaction, intelligent pendulum, intelligent scanning parameter setting, and other functions, thus reduce the doctor's repeated work, improve the circulation of hospital patients, improve patients' medical experience, but also standardize the data collection.

4.2. Artificial intelligence assists in clinical diagnosis

Artificial intelligence-assisted diagnosis system (Computer Aided Diagnosis, CAD) is an important part of the application of imaging in artificial intelligence. It is an effective combination of image processing, computer vision and medical image analysis, marking abnormal signs through system processing, so as to help doctors quickly find lesions, improve the diagnostic efficiency and accuracy [12]. On the one hand, it is based on image recognition and analysis, called imaging omics, which is a big data image analysis method. The basic analysis process includes five links, as shown in Figure 3: (1) image acquisition; (2) image segmentation; (3) feature extraction; (4) quantitative analysis; (5) model construction; on the other hand, learn a large amount of pathophysiological knowledge based on deep learning and make certain diagnosis according to the symptoms of patients. At present, there have a lot of experience in clinical diagnosis. Experts can input their experience into artificial intelligence equipment and analyze cases based on certain big data, so as to further improve the efficiency of clinical diagnosis. By the intelligent image recognition, pathological classification and intelligent multidisciplinary consultation, promote intelligent medical supervision and strengthen epidemiological intelligence surveillance and prevention. However, the development of China's medical artificial intelligence technology will bring both new opportunities and new challenges in the meantime [13].

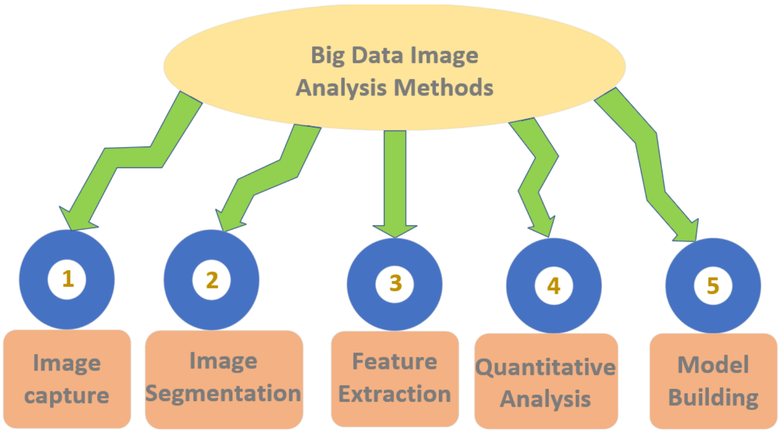

Figure 3. Big data image analysis methods

AI can also be used to design software so that it can automatically detect and mark suspicious areas in medical images as a radiologist's second pair of eyes. This helps to identify other subtle abnormalities that may have been overlooked. In addition, AI-based computer-aided detection systems can be trained on large datasets to continuously improve their accuracy and performance.

In the design of the relevant algorithms of artificial intelligence, combined with the contemporary development trend, the super-large hybrid identification model is used for pathological diagnosis. The model is a circular nested structure, using the computer language to complete the human-computer interaction function, and get certain feedback, thus providing the results of the preliminary diagnosis. Between January 2020 and July 2022, a total of 161 patients (101 males, 60 females; mean age: 57.6±10.5 years; range, 31 to 80 years) who underwent primary unilateral THA were retrospectively analyzed. The patients were divided into two groups as those who were treated with AI-assisted 3D preoperative planning technology (the observation group, n=95) and patients who were treated with traditional two-dimensional (2D) X-ray template planning technology (the control group, n=66).Wu L et al. research indicates that AI-assisted 3D preoperative planning is superior to traditional 2D X-ray template planning for predicting prosthesis size, and it also has the advantage in terms of acetabular cup positioning and lower-limb length restoration [14]. the versatility of 3D printing in addressing diverse healthcare needs [15] such as customization of medical devices and models, rapid prototyping, cost reduction, and fostering innovation in medical device development.

Deep learning-based medical image segmentation models are now fairly mature, but in clinical real-world environments, due to the differences in hospitals, medical equipment, and patient populations, these models' generalization ability is difficult to meet expectations. Transfer learning technology can establish relationships between different domains, utilizing labeled source domain samples to achieve precise segmentation of target domain samples and improve model performance. In recent years, the most concerned problem in the medical field is the outbreak of novel coronavirus (COVID-19) in 2019. At present, in addition to RT-PCR (real-time reverse recording fluorescence orientation) detection reagent and IgM / IgG (colloidal gold method) test paper, computed tomography technology has also provided great help for the detection, screening and clinical diagnosis of COVID-19 [16]. However, due to the high time and cost of expert annotation, the expert annotation samples of COVID-19 CT are generally insufficient [17], and the resolution of different CT scanners and the layer thickness of scanning images are different, so the diagnosis by using computer technology will bias the results. Therefore, the COVID-19 CT segmentation operation can effectively solve the problem of few annotated samples. With the amount of large omics data has increased exponentially, multi-omics analysis [18] has gradually emerged by the application of artificial intelligence.

4.3. Artificial intelligence assists in clinical decision-making

At present, most decisions in China's public hospitals are still based on the diagnosis of doctors at all levels. Clinical Decision Support System (clinical decision support system, CDSS) is a new intelligent system of artificial intelligence to assist clinical decision making. It originated in the United States. The original purpose of this application is to evaluate and improve the quality of medical care, reduce medical errors [19], and thus control the expenditure of medical expenses [20]. Since 2014, China's CDSS has begun to develop [21] rapidly. According to the statistics of 2022, the penetration rate of CDSS in China is only 20%. According to the questionnaire survey of domestic clinicians, 80% of clinicians have not used CDSS, and only 20% of clinicians have used it and know something about it. At the same time, the domestic CDSS technology still has many shortcomings. From the perspective of users, CDSS lacks compatibility, and its knowledge base needs to be improved.

At the same time, based on the development of artificial intelligence branch- - -deep learning, an intelligent clinical-assisted decision-making system typical represented by CADD system has emerged. The system has a strong image identification function and serves as a good helper for general medical image diagnosis. First, unlike ordinary images, medical images have a good training data set, generally do not have accurate annotation of medical images, because doctors do not have much time to annotate a large number of medical images; second, many medical images are three-dimensional or even four-dimensional, different from the general two-dimensional images; moreover, the difference between medical images is large, higher requirements for the generalization ability of the algorithm; finally, medical images have higher accuracy of diagnostic results than ordinary image identification [22]. Jessica Knight et al, in determining the reliability of US in detecting distal radius fractures in children, comparing the accuracy of 2 DUS and 3 DUS in ultrasound diagnosis, and assessing the utility of artificial intelligence in image interpretation [23]. In order to improve the performance of the deep learning model, R. Joshua Samuel Raj et al. proposed the OSC (Opposition-based Crow Search) algorithm. The OSC algorithm can extract the optimal features from the preprocessed images and improve the accuracy, specificity and sensitivity of medical image diagnosis, reaching 95.22%, 86.45% and 100% [24], respectively. In order to improve the performance of the deep learning model, R. Joshua Samuel Raj et al. proposed the OSC (Opposition-based Crow Search) algorithm. The OSC algorithm can extract the optimal features from the preprocessed images and improve the accuracy, specificity and sensitivity of medical image diagnosis, reaching 95.22%, 86.45%

and 100% [25], respectively. Niranjan Balachandar By optimizing the number of local training iterations, cyclic learning rate and cyclic weighted loss in CWT (Cyclical Weight Transfer), they improved the results of diabetic retinopathy detection task and chest X-ray classification task in different data sets, with the highest value of 98.6% and 99.1% [26], respectively. With the development of related technologies, smart healthcare has gradually used cloud computing, the Internet of Things (IoT), and supercomputers to manage healthcare systems. The amount of medical data stored is increasing, so machine learning (ML) models are needed to predict outcomes, especially in the treatment of chronic diseases. With the development of ML applications for clinical decision support systems, it has highlighted trends in nursing personalization and technology integration. The predictive analysis application uses ML and artificial intelligence (AI) to predict patient risk, outcome, and treatment response. Predictive analysis is even more important in healthcare when detecting Alzheimer's disease, cardiovascular events, radiology, and other diseases. Therefore, A. Barhate et al. studied the changes in disease identification, medical imaging, and personalized medicine therapy based on ML and precision medicine predictive analysis (PM). However, ethical issues and the deployment of transparent AI models still require more research. Through research predicts that using the insights provided by smart healthcare data, healthcare will be faster, more informed, and more patient-centered. The use of ML in healthcare has ushered in a new era in the industry by effectively saving patients' lives [27].

Jianfei Zhang et al. will transfer learning (Transfer Learning, TL) ideas applied to the non-Hodgkin's lymphoma classification task, first using the model to the input image feature extraction, then use principal component analysis (Principal Component Analysis, PCA) to the extracted features mapping processing, using the mapping features after training neural network, finally in the overall classification accuracy reached 98.93% [28]. Shalev Shwartz et al. Integrated CNN and random double coordinate descent optimization algorithm for the automatic classification of fetal facial ultrasound images, with an accuracy of 96.98%. Yu used the ResNet model to automatically identify melanoma in thermoscopic images based on deep aggregation features, and the AUC has reached over 80% [29].

To sum up, the research of domestic and foreign scholars on artificial intelligence-assisted clinical system strategy has achieved remarkable results under different standards. In the AUC, sensitivity and specificity of the image recognition system based on AI algorithm in the training general test set, as shown in Table 1:

Table 1. Summary

Literature	Target task	Network structure &Method	Result
R. Joshua Samuel Raj et.al.	Segmentation of diabetic retinopathy region	OSC (Opposition-based Crow Search)	Accuracy rate:95.22%
Shalev Shwartz et al.	automatic classification of fetal facial ultrasound images	CNN and random two-coordinate descent optimization algorithm	Accuracy rate:96.98%
WANG S-H, PHILLIPS P, SUI Y, et al.	Based on the brain-imaging data of 98 AD patients and 98 healthy controls to detect.	convolutional neural network (CNN)	It achieved a sensitivity of 97.96%, a specificity of 97.35%, and an accuracy of 97.65%, respectively.
Jianfei Zhang et.al.	Classification task for non-Hodgkin lymphoma	TL (Transfer Learning) and PCA (Principal Component Analysis)	Accuracy rate:98.93%
Niranjan Balachandar et.al.	Diabetic retinopathy detection task and chest X-ray classification	CWT (Cyclical Weight Transfer)	Accuracy rate:98.6% and 99.1%

4.4. AI-assisted prediction

AI can leverage a vast amount of medical data to gain valuable insights. By analyzing patient records, imaging data, and clinical outcomes, AI algorithms can identify patterns [30], predict disease progression, and assist in early diagnosis. This data-driven approach allows radiologists to make evidence-based decisions that improve treatment planning and patient outcomes.

Clinical prognosis usually refers to the requirement of patients to come to the hospital for review after one month. According to the national conditions of China's large population and the subjective and objective factors of patients, only some patients can come to the hospital for review in time, and judge the prediction of patients through the general experience of clinicians. However, the experience of clinicians has some errors, which cannot judge the prediction of clinical prognosis with precise logic. The AI-assisted analysis of the prediction of clinical prognosis greatly improves the accuracy of the prediction. It is not only beneficial to reduce the missed diagnosis rate of imaging doctors, but also helpful to improve the efficiency and quality of imaging doctors.

Computer-aided prediction systems are also used in early screening of diseases to determine the development of disease. According to incomplete statistics, there are six common serious diseases in today's society, which are: malignant tumor, acute myocardial infarction, sequelae of stroke, coronary artery bypass grafting, major organ transplantation, and end-stage renal disease. The prediction of major diseases not only helps to improve the length of life expectancy in today's society, but also can improve the quality of human life. In applications in the oncology field, AI algorithms can help personalize treatment plans by analyzing patient characteristics and generating tailored radiotherapy plans. By considering factors such as tumor size, location and treatment response, AI can optimize radiation dose and target specific regions while minimizing damage to healthy tissue. This ensures that patients receive the most effective treatment while minimizing side effects. In clinical practice, imaging examination still plays an important role in detection, diagnosis and prognosis.

S. Khushbu, A. Ganatra and C. Thacker provides an integrated approach for stroke prediction using multiple machine learning methods such as decision tree, k-nearest neighbor (k-NN), naive Bayes, Support Vector Machine (SVM), logistic regression, and random forest. Improve prediction accuracy and robustness by combining complementary properties of various classifiers by trying to leverage predictions from multiple models. The proposed ensemble approach was tested on a large-scale stroke prediction dataset. The results showed a significant improvement in prediction accuracy, reaching a state-of-the-art accuracy of 94.6%. That is an impressive 4% improvement over accuracy from the industry's previous efforts. This suggests a reduced associated morbidity and mortality by predicting stroke and performing early intervention [31].

Genomic analysis of imaging generally refers to the use of machine learning algorithms in artificial intelligence technology to analyze the characteristics of medical imaging modality, associated with its genes, and the use of genetic data to build predictive algorithms. Genomics analysis is mainly based on genetic characteristics, using imaging genomics to further judge and predict the probability of lesion survival and recurrence and to evaluate the prognostic effect. In the current research results, most researchers choose to use deep convolutional neural network to develop a kind of automatic identification system, and also establish and verify a prognostic risk prediction model. Moraes et al. [32], explored this idea with lung data for the success of histological images for age prediction has been limited and requires further exploration [33].

At the same time, AI algorithms can help personalize treatment plans by analyzing patient characteristics and generating tailored radiotherapy plans. By considering factors such as tumor size, location, and treatment response, AI can optimize radiation dose and target specific regions while minimizing damage to healthy tissue. This ensures that patients receive the most effective treatment while minimizing side effects.

4.5. Future development direction

The above methods and models are almost all highly dependent on the training data from large samples. However, clinical image data about difficult diseases is rare, and multi-region, multi-center and high-quality image big data is more difficult to obtain. Therefore, recently, lifelong learning [34] and meta-learning [35] have been born in artificial intelligence algorithms, and meta-learning includes fed-shot learning (FSL) [36], neural architecture search (NAS) [37]and other research hotspots.

The current problems lie in the construction of high quality of medical image database, such as the lack of high-quality data, inconsistent data quality control standards, uneven proportion of data types, relatively narrow coverage, serious homogenization, relatively high degree of sharing, and non-standard annotation. In the future, the algorithms will be optimized for these problems to make the diagnostic process more rigorous and more efficient.

It is an important part of the high-quality control standard, large sample, multi-center, multi-modal medical imaging database [38], an important part of the implementation of the national big data strategy, and also an important development direction in the field of AI medical imaging diagnosis.

5. Conclusion

To sum up, at present, artificial intelligence technology has a certain application foundation in the medical field, but its application is still in the initial stage of development. With the continuous change of artificial intelligence technology, there will be great development in the medical field in the future. For medical imaging, improving the speed of image recognition and image quality are the focus of current research. In prognosis diagnosis, the efficiency and accuracy of the diagnosis process, and the prediction system is improved in prognosis prediction. Finally, while developing cutting-edge science and technology, it brings more convenience to doctors and patients, and also provides good conditions for the harmonious and stable development of the society.

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