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IMPROVING THE ACCURACY OF MEDICAL IMAGES USING A NEURAL NETWORK

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Abstract:
In this paper, digital signal processing to improve the quality of medical images and improve the accuracy of images using neural network. Effective use of digital technology and artificial intelligence in health care, signaling the development of our medicine. Based on existing literature, the article discusses the theoretical foundations of signal processing using digital technology and image processing using neural networks for disease diagnosis and prognosis.

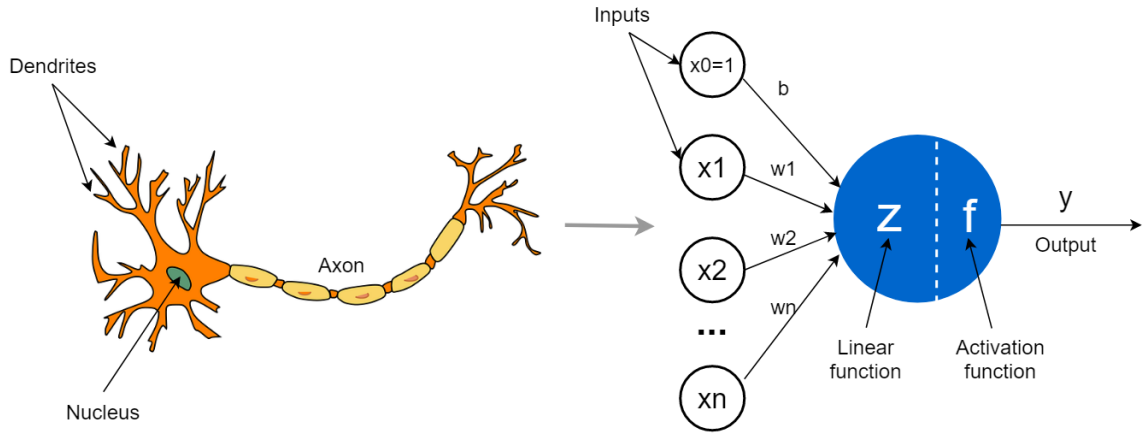
Keyword: Medical images, visualization, neural network, artificial intelligence, computer technology, medical devices.

INTRODUCTION

Today, great changes are being made in the field of healthcare in our country, and the equipping of doctors' workplaces with modern medical devices is a sign of the development of our medicine. The quality of medical services provided to patients in clinics and family clinics is increasing day by day. A computer information system designed to automate workplaces provides great assistance to the doctor, requiring him to avoid errors in diagnosing based on the patient's diagnostic data. This includes technological processes such as treatment prevention, reporting and presentation of medical statistical data, step-by-step implementation of planning work, and obtaining various types of medical records. The role of medical images in medicine is very important. The correct diagnosis of patients is of great importance today. The medical services provided to patients by doctors, modern methods of treatment, diagnostic methods, disease prevention and restoration of health, and the speed of first aid

provided to patients depend on the accuracy of medical images. The inaccuracy of images leads to the incorrect diagnosis of the patient.

Nowadays, digital technology is being introduced in many fields, including medicine, and each medical device in medical institutions is equipped with devices that meet modern world standards. In addition, all diagnostic medical devices have switched to digital technology and have the ability to quickly diagnose patients' illnesses.



Digital medicine is a field that has a positive impact on human health, which is associated with the use of information technologies as a means of measurement and influence. Digital medical products are characterized by high-quality medical devices and software. Previously, in the field of healthcare, patients were helped with X-ray devices and had to wait a long time to receive the results, and the images were not clear and crisp, and the accuracy of the doctor's diagnosis with these images was quite low. Currently, all medical devices in every clinic and private clinic have switched to digital technology, and the doctor's diagnosis depends on the accuracy of medical images. Only then will the doctor make no mistakes in diagnosing the patient. As the digitalization of medicine is developing all over the world, we can see that it is also developing in our country. The main goal of medical digital technology is to improve people's access to quality medical services.

The main purpose of artificial intelligence is to maintain and strengthen human health, prolong life, treat and prevent diseases. By the meaning of the term artificial intelligence, we understand the technologies based on the training of computer technologies and designed to replace human actions in the implementation of any processes.

Currently, the role of artificial intelligence in medicine is becoming increasingly important. Medical systems with artificial intelligence (AI) are present in many medical fields. As is known, doctors have less knowledge, experience, and experience, and often rely on sources from the educational process or literature, which makes it difficult to diagnose a patient. When making a specific diagnosis and treatment, the doctor combines basic ideas with personal experience, based on similarities, to confirm his assumptions. At the same time, based on his qualifications and experience, he recognizes the state and manifestations of the disease and predicts the dynamics of the process. According to the World Health Organization, artificial intelligence offers great opportunities for improving healthcare around the world. In foreign healthcare institutions, the main idea of neurocybernetics is to create a human brain that can think like a human brain through neurons. For this, artificial intelligence can be used to model structures similar to the structure of the human brain and create and implement these analogies through neurons.

Artificial intelligence is being used to analyze lung cancer cells, create human brain structures, create 3D hearts, analyze DNA, design prosthetics, optimize transplant times, reduce hospital costs and improve quality, and create modern models of emergency rooms.

Neural networks are considered the most promising in medical diagnostics and pathology screening. Today, in the era of the development of technology and equipment around the world, the role of modern medical computer technologies in detecting and predicting difficult-to-detect diseases in medicine, including oncology, is very important. To analyze medical images, the doctor uploads images to the system (one at a time or in a package). Then, the system sorts the list of studies by priority - from the highest probability of pathology to the lowest. Thus, the doctor first reviews the images of patients in whom the system suspects the presence of a neoplasm. This allows you to quickly conduct additional examinations, make a diagnosis and start treatment. The doctor opens a specific study in the list and sees an image in which the system has marked with a marker the places where signs of pathology are visible. Then the doctor looks at the description of the image automatically generated by the system and, if necessary, gives it comments. Thus, the main goals of services based on computer vision technologies are to facilitate the routine work of the doctor, reduce the time for research and, as a result, to provide faster assistance to the patient.

DNA analysis is another promising and actively developing area of application of neural networks. For example, a tool developed by Michigan State University conducts genetic research and, using the human genome, allows you to determine its height with an accuracy of three centimeters, predict the development of serious diseases

such as cancer, stroke and heart attack, identify mutations that affect bone density, and even predict the level of education. The work processes of doctors include not only consulting patients or conducting research. A large part of their time is spent filling out various types of documents. Neural network technologies can also help the doctor in this routine work. The first obstacle is not related to the use of medical neural networks, but to their development. Training artificial intelligence requires a large amount of data. When analyzing medical images, images with objects marked on them are required.

Therefore, developers cannot do without collecting their own data sets to train their models. And this, in turn, requires the direct participation of doctors. However, their participation is required not only in collecting and labeling data, but also at other stages of development. Without feedback, the product will be “out of touch” with real clinical practice and will not sufficiently take into account the specifics of the work of doctors.

Conclusion

The quality of services provided to patients in the healthcare sector is improving. Each clinic and private clinic are being equipped with digital medical technology devices. Through digital medical technology, qualified doctors are quickly and accurately diagnosing patients' diseases and preventing diseases. Modern digital medical technology devices include computed tomography, ultrasound, cardioecho, laboratory equipment and other medical devices, as well as image processing and increasing accuracy through neural networks.

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