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BASIC DISEASE DETECTION BASED ON NEURAL NETWORKS.

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Annotation. *The article discusses the basics and practical applications of disease detection based on neural networks. The article provides detailed information about the main types of neural networks, in particular, feedforward networks, convolutional networks (CNN), recurrent networks (RNN) and deep neural networks (DNN). It also analyzes the application of these networks in such fields as oncology, cardiology, neurology, endocrinology and infectious diseases, their effectiveness and advantages in disease detection. The article also reviews the widespread use of neural networks in medicine, along with limitations, data security and understandability issues.*

Key words: *Neural networks, disease, federated networks, convolutional networks (CNN), recurrent networks (RNN) and deep neural networks (DNN), oncology, cardiology, neurology, endocrinology, infectious diseases, data security, understandability issues.*

Аннотация. *В статье рассматриваются основы и практические приложения обнаружения заболеваний на основе нейронных сетей. В статье приводится подробная информация об основных типах нейронных сетей, в частности, сетях прямого распространения, сверточных сетях (CNN), рекуррентных сетях (RNN) и глубоких нейронных сетях (DNN). Также анализируется применение этих сетей в таких областях, как онкология, кардиология, неврология, эндокринология и инфекционные заболевания, их эффективность и преимущества в обнаружении заболеваний. В статье также рассматривается широкое использование нейронных сетей в медицине, а также ограничения, проблемы безопасности и понятности данных.*

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Ключевые слова: *Нейронные сети, болезнь, федеративные сети, сверточные сети (CNN), рекуррентные сети (RNN) и глубокие нейронные сети (DNN), онкология, кардиология, неврология, эндокринология, инфекционные заболевания, безопасность данных, проблемы понятности.*

Neural networks, one of the most advanced branches of artificial intelligence, provide great opportunities for early detection of diseases and effective organization of diagnostic processes in the medical field. The need for scientific research and the introduction of new technologies to improve the role and capabilities of neural networks in medicine is emphasized.

Neural networks are artificial systems that have the ability to self-learn and are capable of generating complex representations from large amounts of data. These networks consist of many "neurons" (or nodes) and their interconnections, and are used to process and analyze data.

In modern medicine, early and accurate disease detection is essential to improve patient health, make treatment effective, and reduce mortality. However, traditional medical methods, such as visual examinations and laboratory tests, can sometimes be time-consuming and error-prone. Therefore, artificial intelligence (AI) and machine learning technologies, especially neural networks, are emerging as effective tools for disease detection. Neural networks are computer systems that work in a manner similar to the human brain, and they are widely used in medicine to analyze, detect, and predict data.

In disease detection, neural networks are usually divided into the following main types.

Feedforward Neural Networks. These networks pass data from the previous layer to the next layer, and the nodes in each layer are interconnected. They are used to perform simple tasks in disease detection, such as assessing the risk of disease based on patient data. The advantage of using these networks is that they are simple and efficient, but they are only useful for analyzing specific and simplified cases.

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Convolutional Neural Networks (CNN). CNNs are mainly used in analyzing medical images. For example, medical images such as X-rays, MRIs (magnetic resonance imaging), and CT scans detect diseases, including tumors and nodules. These networks help to automatically identify and classify features from images. CNNs can be used to. Cancer detection: For example, in mammography or early detection of skin cancer. Breast and lung tumor detection: Using computed tomography (CT) or X-ray images.

Recurrent Neural Networks (RNNs). RNNs are effective at analyzing sequential data and are used to detect diseases that change over time. For example, they are used to predict heart disease by analyzing a patient's daily status or heart rate changes over time. RNNs have the ability to learn from data that changes over time, which is important when monitoring patients' vital signs and analyzing changes.

Deep Neural Networks (DNN). These networks, which are based on deep learning, have many layers and perform complex and high-precision analyses. DNNs are used to detect complex systems, for example, to identify unknown diseases or to analyze large data sets. They are used to analyze medical images or genomic data, for example, to detect cancer and other serious diseases.

Application of Neural Networks in Disease Detection. Neural networks are used in medicine to detect and diagnose various diseases. Technologies based on neural networks are widely used in the following areas.

Oncology. Neural networks are used to analyze images and detect various tumors and cancers. For example, by analyzing mammography images or skin images, diseases such as skin cancer can be detected at an early stage. CNNs are effective in detecting breast tumors, the presence of nodules in the lungs, and other tumors.

Cardiology.Neural networks, especially RNNs, are used in the prediction of heart disease. They can detect heart disease early by analyzing a patient's electrocardiogram (ECG) or heart rate. RNNs are effective in analyzing heart rhythm and other biometric data, taking into account changes over time.

Neurology. Neural networks can also help in detecting Parkinson's, Alzheimer's, and other neurodegenerative diseases. Early signs of the disease can be

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detected by analyzing brain images or cognitive test results. In the diagnosis of Alzheimer's disease, neural networks can analyze the structure of the brain and help detect signs of this disease at an early stage.

Endocrinology. Neural networks are used, for example, in the detection of diabetes. Diabetes risk can be predicted based on a patient's blood sugar level, body weight, and other parameters. Machine learning systems can help identify future risks based on patients' biometric data.

Infectious Diseases. Neural networks are also used to identify the infectious nature of a disease. For example, neural networks can be used to analyze a patient's symptoms and medical history to identify COVID-19, influenza, or other infectious diseases. These systems can play an important role in quickly identifying symptoms of diseases and preventing their spread.

Advantages of Neural Network-Based Disease Detection. Accuracy and Speed: Neural networks can quickly analyze large amounts of data, which allows for early and high-accuracy disease detection.

Automation. Makes doctors' work easier and saves time by automating medical examinations.

Personalized Treatment. Neural networks help create an individualized treatment plan based on the unique characteristics of each patient.

Limitations and Challenges. Data Quality and Availability: Neural networks need large amounts of high-quality data to function properly. Insufficient or incorrect data can lead to the networks being trained incorrectly.

Understandability. Neural networks sometimes behave like "black box" systems, meaning it can be difficult to understand how the network made a decision. This can make it difficult for medical professionals to validate decisions.

Privacy and Information Security. Ensuring the security and confidentiality of patient data is of paramount importance. If the data is misused or leaked, it can lead to serious legal and ethical issues.

Neural network-based disease detection technologies are revolutionizing the medical field. These technologies enable early detection of diseases, improve

treatment, and provide high-quality services to patients. However, for these technologies to be widely implemented, attention must be paid to data quality, understandability, and security. With new scientific research and medical collaborations, neural networks are expected to become even more effective in disease detection.

REFERECEN:

1. Daminova B. E., Bozorova I. J., Jumayeva N. X. FORMATION OF TEXT DATA PROCESSING SKILLS //Экономика и социум. – 2024. – №. 4-2 (119). – С. 110-119.

2. Daminova B. E. et al. USE OF ONLINE ELECTRONIC DICTIONARIES IN ENGLISH LANGUAGE LESSONS //Экономика и социум. – 2024. – №. 5-1 (120). – С. 193-196.

3. Daminova B. E. et al. ADVANTAGES OF USING MULTIMEDIA RESOURCES IN ENGLISH LANGUAGE LESSONS //Экономика и социум. – 2024. – №. 5-1 (120). – С. 207-210.

4. Daminova B. E. et al. SCIENTIFIC AND METHODOLOGICAL SUPPORT OF EDUCATIONAL INFORMATION INTERACTION IN THE EDUCATIONAL PROCESS BASED ON INTERACTIVE ELECTRONIC EDUCATIONAL RESOURCES: USING THE EXAMPLE OF TEACHING ENGLISH //Экономика и социум. – 2024. – №. 5-1 (120). – С. 233-236.

5. Daminova B. E. et al. THE ROLE AND FEATURES OF THE USE OF INFORMATION TECHNOLOGY IN TEACHING A FOREIGN LANGUAGE //Экономика и социум. – 2024. – №. 5-1 (120). – С. 184-188.

6. Daminova B. E. et al. USING THE GOOGLE CLASSROOM WEB SERVICE AND PREPARING INTERACTIVE PRESENTATIONS //Экономика и социум. – 2024. – №. 5-1 (120). – С. 216-225.

7. Daminova B. E., Bozorova I. J., Jumayeva N. X. CREATION OF ELECTRONIC LEARNING MATERIALS USING MICROSOFT WORD PROGRAM //Экономика и социум. – 2024. – №. 4-2 (119). – С. 104-109. 1. – S. 1169-1172.

8. Daminova B. E. et al. APPLICATION OF MODERN INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHING ENGLISH //Экономика и социум. – 2024. – №. 5-1 (120). – С. 197-201.

9. Daminova B. E. et al. SOFTWARE TOOLS FOR CREATING MULTIMEDIA RESOURCES IN TEACHING ENGLISH //Экономика и социум. – 2024. – №. 5-1 (120). – С. 202-206.

10. Daminova B. E. et al. THE MAIN ADVANTAGES, PROBLEMS AND DISADVANTAGES OF USING MULTIMEDIA IN TEACHING FOREIGN LANGUAGES //Экономика и социум. – 2024. – №. 5-1 (120). – С. 189-192.

11. Даминова Б. Э. и др. ОБРАБОТКА ВИДЕОМАТЕРИАЛОВ ПРИ РАЗРАБОТКЕ ОБРАЗОВАТЕЛЬНЫХ РЕСУРСОВ //Экономика и социум. – 2024. – №. 2-2 (117). – С. 435-443.

12. Daminova B. E. GAUSS AND ITERATION METHODS FOR SOLVING A SYSTEM OF LINEAR ALGEBRAIC EQUATIONS //Экономика и социум. – 2024. – №. 2 (117)-1. – С. 235-239.

13. Daminova B. E., Oripova M. O. METHODS OF USING MODERN METHODS BY TEACHERS OF MATHEMATICS AND INFORMATION TECHNOLOGIES IN THE CLASSROOM //Экономика и социум. – 2024. – №. 2 (117)-1. – С. 256-261.

14. Daminova B. E. et al. USE OF ELECTRONIC EDUCATIONAL RESOURCES IN THE PROCESS OF TEACHING A FOREIGN LANGUAGE //Экономика и социум. – 2024. – №. 5-1 (120). – С. 230-232.

15. Daminova B. E. et al. USING COMPUTER PRESENTATIONS IN TEACHING FOREIGN LANGUAGES //Экономика и социум. – 2024. – №. 5-1 (120). – С. 211-215.

16. Daminova B. E. et al. USING DIGITAL TECHNOLOGIES IN FOREIGN LANGUAGE LESSONS //Экономика и социум. – 2024. – №. 5-1 (120). – С. 226-229.