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Deep Neural Network Based Disease Prediction Analysis

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ABSTRACT: With the rapid development of social and economic construction as well as medical informatization, the medical industry has gradually entered the era of big data and artificial intelligence, using the medical big data accumulated in the hospital information system for pooling, modeling, analysis, and the use of neural networks can predict and determine the type of patient's disease and the source of the cause, which can not only reduce the complexity of the disease diagnostic test but also achieve the effect of predictive diagnosis, and provide theoretical basis and practical experience for the establishment, improvement and practical application of the intelligent medical system. It provides theoretical basis and practical experience for the establishment, improvement and practical application of intelligent medical system.

KEYWORDS: neural network,Disease Prediction,big data technology,artificial intelligence (AI) technology,intelligent medical care

I. INTRODUCTION

A healthy body is people's greatest asset and core competitiveness. With the continuous improvement of the material living standard, people pay more and more attention to their own health and have higher and higher requirements for medical services. People's needs have gradually changed to early detection and early treatment, and disease prevention should be done well.That is to say, medical services can quickly detect the health status of the body, provide personalized health advice and guidance, and prevent problems before they occur. However, according to statistics, the current level of medical resources and medical services cannot meet the growing needs of the people.

In order to meet people's needs, artificial intelligence is applied in the medical field, based on artificial intelligence technology and database systems, recording a huge amount of information on medical services, and creating an intelligent intelligent diagnostic system to support the provision of testing, analyzing, and evaluating the individual's physical condition as well as giving the cause of the disease and the means of treatment.In order to solve the current problem of limited medical resources and improve the level of medical services, so as to meet the growing demand for personalized diagnosis. Therefore, it is of great significance to study the prediction of disease symptoms.

II. RESEARCH STATUS

With the rapid development of intelligent information processing technology, the traditional statistical, analytical, and predictive technologies have gradually failed to meet the needs of the industry, and the medical industry has gradually entered the era of big data and artificial intelligence, where the medical big data accumulated in the hospital information system is used to pool, model, and analyze the known types of unknown data that can be predicted and determined.In practical application, through the existing medical big database, it can provide rich practical reference value for medical diagnosis. Through the algorithm description to get a simpler distinction between different diseases of the decision tree model, can be based on the decision tree final feature value for the test indicators for collection, reducing the useless or not very relevant to the disease indicator collection process, can reduce the disease diagnosis test complexity, can achieve the effect of diagnosis prediction and auxiliary diagnosis, using the model for different diseases to take empirical analysis, to derive the disease suffered by the patient, has a high accuracy rate, basically meet the diagnostic requirements.

III. RESEARCH CONTENT

A. Ensure the security and reliability of the database

Intelligent diagnostic system is the digital information generated by medical personnel in medical activities using medical information system, which records various health-related physiological test indicators throughout the life process of human beings, and contains a huge amount of valuable medical knowledge and health information. In order to ensure the security of the database, corresponding security strategies are formulated according to the actual situation, from clarifying the content and storage location of the data, security awareness training, carrying out data risk assessment, installing antivirus software and regular scanning and regular backup of important and sensitive data, controlling the access to the database, encrypting the database, and real-time monitoring and recording of the database to ensure the security of the database.

B. Modeling to classify different diseases through neural network technology

Four prediction task datasets were produced by analyzing the ICU clinical medical database through big data modeling to categorize the conditions for prediction. In response to the requirements of rich data volume and wide applicability, the open MIMIC-III database was selected as the data source, and datasets for the current meaningful and urgently needed disease prediction and analysis tasks were produced respectively: the deterioration prediction dataset and the disease classification prediction dataset. Deep neural networks are applied to medical prediction, and a medical prediction model based on deep neural networks is proposed.The clinical medical prediction model based on PNN, which considers the combination of all physiological test indicators of the patient, can avoid ignoring some combinations of indicators that are very important in determining the patient's physical conditionThe use of deep neural networks to automate the extraction of cross-features, and the full consideration of the combination of the patient's physiological test indicators, can be more accurately predict the patient's current physical condition and provide personalized diagnosis and prediction services.

C. Utilizing models to accurately hypothesize the cause and source of disease through patient-supplied symptoms

Medical diagnosis is an important part of the process of seeking medical treatment. In addition to tests and examinations through instruments, daily medical diagnosis is to a large extent an experience-based determination method, whereby the diagnosis of common diseases is derived through long-term symptom analysis and experience accumulation of cases, and then the method is applied to new cases to obtain an initial judgment of the type of disease based on the information of established symptoms exhibited by the new cases. Medical big data is all the complex big data related to life sciences generated by healthcare organizations. The neural network algorithm models used in the field of medical big data are regression analysis, decision trees, kernel-based algorithms, reduced dimensionality algorithms, and so on. On the basis of healthcare big data, disease diagnostic methods can be expressed through decision tree models and modeled and analyzed to get data classification models for predicting and determining known types of unknown data. Through the patient to provide the disease plus the use of existing neural network models to accurately speculate on the cause and source of the disease, targeted to the patient to give scientific treatment advice.

IV. SUMMARY AND OUTLOOK

The research in this paper is about disease prediction based on deep neural networks and proposing a model based on deep deep networks, during the research we can find that there are some limitations to this idea:

A. Limitations of the data itself

The first is the limitation of the data source, the medical data used in this thesis comes from the MIMIC-III database, although the number of statistics is large enough, but the record of most of the characteristics of the disease is not detailed and complete, lacks some important indexes, and the update of the data collection has a certain lag, so the indexes for its survival prediction are limited in their selection, which may lead to the failure to comprehensively and objectively grasp the disease during the specific experimental The selection of indicators for survival prediction is limited, which may lead to the inability to comprehensively and objectively grasp the disease pattern during the specific experiments and affect the final prediction accuracy.

B. Limitations on the method of use

The hospital big data provides the realization basis for analyzing the disease, in the process of selecting some samples for experimentation, a more simplified decision tree model for distinguishing different diseases is obtained through the description of the algorithm, and the use of the model to test its historical cases has a high accuracy rate and basically meets the diagnostic requirements. Through the construction of medical diagnostic analysis model, it can be used for automatic preliminary prediction of diseases, auxiliary information means of disease diagnosis for non-medical personnel, and index formulation of medical test items, which has certain feasibility and guiding significance. However, a variety of issues such as how to find better data

preprocessing methods, how to discover better optimization methods, how to complete decision-making more efficiently and quickly, and how to predict different diseases more accurately need to be investigated in future studies.

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REFERENCES

1) New AI Algorithm Accurately Predicts and Diagnoses Alzheimer's Disease [J]. Clinical OMICs, 2020, 7 (3): 4-4
2) Baseer K ,Sivakumar K ,Veeraiah D , et al. Healthcare diagnostics with an adaptive deep learning model integrated with the Internet of medical Things (IoMT) for predicting heart disease [J]. Biomedical Signal Processing and Control, 2024, 92 105988-.
3) Li X ,Wang Z ,Zhao W , et al. Machine learning algorithm for predict the in-hospital mortality in critically ill patients with congestive heart failure combined with chronic kidney disease. [J]. Renal failure, 2024, 46 (1): 2315298-2315298.
4) Şaylık F ,Kümet Ö ,Sarıkaya R , et al. Bendopnea Predicts High SYNTAX Score in Patients With Coronary Artery Disease: A Bayesian Approach. [J]. Angiology, 2024, 33197241235957-33197241235957.