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Cancer detection in breast cells using a hybrid method based on deep complex neural network and data mining

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Abstract

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Introduction

Diagnosis of cancer in breast cells is an important and vital issue in the field of medicine. In this context, the use of advanced methods such as deep complex neural networks and data mining can significantly improve the accuracy and speed of diagnosis. A hybrid approach that can be effective in breast cancer diagnosis is the use of deep complex neural networks and data mining. Due to their powerful nonlinear capabilities in extracting complex features from data, deep neural networks have a very good ability to detect patterns related to cancer. By analyzing millions of data related to breast cells and recognizing common and unusual patterns in them, these networks are able to diagnose cancer with high accuracy. Also, the use of data mining method plays an important role in this process.

Methodology

Using data mining algorithms and techniques, useful information can be extracted from the available data and the characteristics of healthy and cancerous cells can be separated. This information can be given as input to the deep neural network to achieve more accurate diagnosis. Another method to diagnose breast cancer is the use of thermography, which we use in this research along with data mining and deep learning.

Results

Thermography uses an infrared camera to record the temperature of the target area. This method of breast cancer imaging is less expensive and completely safe compared to other methods. A total of 187 volunteers including 152 healthy people and 35 cancer patients were evaluated. Each person had ten thermographic images, resulting in a total of 1870 thermographic images. Four alternative deep complex neural network models, namely ResNet18, ResNet50, VGG19, and Xception, were used to identify thermal images, including benign and malignant images.

Conclusion

The evaluation results showed that the use of a combined method based on deep complex neural network and data mining in the diagnosis of cancer in breast cells can bring a significant improvement in the accuracy and speed of diagnosis of this important disease.