Automated Identification of Malignant Breast Lesions: A Convolutional Neural Network Perspective

Accurate diagnosis and prognosis are crucial for the effective treatment of breast cancer. To improve diagnostic accuracy and reduce human error, this study presents a novel approach using deep neural networks (DNNs) to detect cancerous lesions in microscopic specimens from the breast. In this paper, I examine the performance of convolutional neural network (CNN) model as well as CNN-based hybrid models in relation to traditional image classification methods such as SVC, Random Forest and KNN. The proposed model used a WSI dataset of 100 patients diagnosed with invasive ductal carcinoma (IDC), from which 80 slides were randomly selected for training and validation and 20 slides for testing. By harnessing the power of convolutional neural networks, I achieved a significant improvement in accuracy and F-score compared to traditional methods. While my study shows significant progress, it is important to acknowledge certain limitations. The representativeness of the dataset and potential biases may affect the generalizability of the model. Further research and clinical trials are needed to validate the model in real-world settings.

Keywords: machine learning, breast cancer, convolutional neural network, image classification

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