Early Breast Cancer Detection and Diagnosis Using Deep Learning Methods

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Abstract:

Breast cancer remains a significant cause of mortality within the realm of cancer-related fatalities. The critical imperative lies in early detection, as it often holds the key to improved outcomes. To address this pivotal concern, a multitude of Machine Learning methodologies are harnessed, offering a range of techniques for breast cancer diagnosis. This research paper introduces an innovative Deep Learning model designed to facilitate the automated diagnosis of breast cancer. The core framework of this model leverages Convolutional Neural Networks (CNN) as the primary classifier. In addition, the study undertakes a comparative analysis of seminal backbone networks, including Resnet-50, DenseNet201. This thorough investigation aims to unveil the most effective model for accurate diagnosis. The experimental evaluation is executed using the several Datasets such as INbreast, MIAS, DDSM. The performance evaluation criteria revolve around essential metrics such as accuracy and precision, which are fundamental in assessing the model's capability to provide reliable diagnoses. To further enhance predictive accuracy, advanced activation functions, such as Rectified Linear Unit (ReLU), are integrated to offer insightful probabilistic insights into breast cancer diagnosis. This research contributes significantly to the ongoing efforts to enhance early detection and diagnosis of breast cancer, offering a comprehensive evaluation of Deep Learning techniques and their potential impact on improving patient outcomes and healthcare.

Keywords:

Breast cancer, dataset, CNN, Resnet-50, ReLU, deep learning, accuracy.