Advancements in Breast Cancer Detection: Exploring Machine Learning Techniques for Accurate Diagnosis and Early Detection

MASD Munasinghe[1#] and WJ Samaraweera[1]

[1]Faculty of Computing, General Sir John Kotelawala Defense University, Ratmalana, Sri Lanka

[#]37-it-0039@kdu.ac.lk

Abstract

One of the most prevalent illnesses affecting women worldwide is breast cancer. It increases in countries where the majority of cases are discovered in the late stages. The Machine Learning (ML) technique that is used in this paper to detect breast cancer is retrieved from a digitized mammogram image. It Aimed to evaluate and compare the performance of various machine-learning algorithms such as Convolutional Neural Networks (CNN), Random Forest, Support Vector Machine, Logistic Regression, and K-Nearest Neighbours for breast cancer detection. Using a comprehensive dataset of "RSNA Screening Mammography Breast Cancer Detection", these mammographic images and clinical information are divided into training and testing phases to implement the ML algorithms. The objective was to determine which algorithm yielded the highest accuracy in predicting breast cancer, as this is a critical factor in early detection and successful treatment. Research highlights the CNN gives 95.2% accuracy as the most effective machine learning algorithm for breast cancer prediction. CNN's ability to learn intricate patterns from mammographic images and its superior accuracy make it a valuable tool in early breast cancer detection. These findings have significant implications for improving patient outcomes and the overall effectiveness of breast cancer screening and diagnosis. CNNs revolutionize computer vision, enabling accurate breast cancer diagnosis and detection through automatic learning and feature identification in medical imaging tasks. website's backend will employ the algorithm that produces the best results, and the model will categorize cancer as benign or malignant.

Keywords: *Breast cancer detection, Machine learning, Convolutional Neural Network*