

Convolutional Neural Networks versus Radiomic Analysis for Classification of Breast Mammogram

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Abstract : Breast Cancer (BC) is a common type of cancer among women. Its screening is usually performed using different imaging modalities such as magnetic resonance imaging, mammogram, X-ray, CT, etc. Among these modalities' mammogram is considered a powerful tool for diagnosis and screening of breast cancer. Sophisticated machine learning approaches have shown promising results in complementing human diagnosis. Generally, machine learning methods can be divided into two major classes: one is Radiomics analysis (RA), where image features are extracted manually; and the other one is the concept of convolutional neural networks (CNN), in which the computer learns to recognize image features on its own. This research aims to improve the incidence of early detection, thus reducing the mortality rate caused by breast cancer through the latest advancements in computer science, in general, and machine learning, in particular. It has also been aimed to ease the burden of doctors by improving and automating the process of breast cancer detection. This research is related to a relative analysis of different techniques for the implementation of different models for detecting and classifying breast cancer. The main goal of this research is to provide a detailed view of results and performances between different techniques. The purpose of this paper is to explore the potential of a convolutional neural network (CNN) w.r.t feature extractor and as a classifier. Also, in this research, it has been aimed to add the module of Radiomics for comparison of its results with deep learning techniques.

Keywords : breast cancer (BC), machine learning (ML), convolutional neural network (CNN), radionics, magnetic resonance imaging, artificial intelligence

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