Computer Aided Analysis of Breast Based Diagnostic Problems from Mammograms Using Image Processing and Deep Learning Methods

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Abstract : This paper presents the analysis, evaluation, and pre-diagnosis of early stage breast based diagnostic problems (breast cancer, nodulesorlumps) by Computer Aided Diagnosing (CAD) system from mammogram radiological images. According to the statistics, the time factor is crucial to discover the disease in the patient (especially in women) as possible as early and fast. In the study, a new algorithm is developed using advanced image processing and deep learning method to detect and classify the problem at earlystagewithmoreaccuracy. This system first works with image processing methods (Image acquisition, Noiseremoval, Region Growing Segmentation, Morphological Operations, Breast BorderExtraction, Advanced Segmentation, ObtainingRegion Of Interests (ROIs), etc.) and segments the area of interest of the breast and then analyzes these partly obtained area for cancer detection/lumps in order to diagnosis the disease. After segmentation, with using the Spectrogramimages, 5 different deep learning based methods (specified Convolutional Neural Network (CNN) basedAlexNet, ResNet50, VGG16, DenseNet, Xception) are applied to classify the breast based problems.

Keywords : computer aided diagnosis, breast cancer, region growing, segmentation, deep learning

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