

Computer aided analysis of breast based diagnostic problems from mammograms using image processing and deep learning methods

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This paper presents analysis, evaluation and pre-diagnosis of early stage breast based diagnostic problems (breast cancer, nodules or lumps) 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 this study, a new algorithm is developed using advanced image processing and deep learning methods to detect and classify the problem at early stage with more accuracy. This system first works with image processing methods (Image acquisition, Noise removal, Region Growing Segmentation, Morphological Operations, Breast Border Extraction, Advanced Segmentation, Obtaining Region Of Interests (ROIs) etc.) and segments the area of interest of breast and then analyzes the separately obtained area for cancer detection/lumps in order to diagnosis the disease. After segmentation, with using the Spectrogram images, 5 different deep learning based methods (specified Convolutional Neural Network (CNN) based AlexNet, ResNet50, VGG16, DenseNet, Xception) are applied to classify the breast based problems.

Keywords: Computer aided diagnosis, Breast Cancer, Region Growing, Segmentation, Deep Learning

Biography

Berkan URAL, completed his B.Sc. from TOBB ETU from Electrical Electronics Engineering in 2012. Then, he has been working as a Research Assistant in Gazi University since September 2014. He completed the MSc program from Electrical Electronics Engineering/Biomedical from Gazi University in January 2016. Then, he completed the PhD program from Electrical Electronics Engineering/Biomedical from Gazi University in May 2021. Indeed, he has been working in Kafkas University in Electrical Electronics Engineering; Biomedical, Circuits and Systems since July 2021. His research interest includes Circuits and Systems, Biomedical Electronics and Systems, Image Processing, Deep Learning, Machine Learning, Pattern Recognition, Artificial Intelligence, Bioinformatics, Sleep Studies, Biomedical Signal Processing, Cancer Diagnosis and Computer Aided Diagnosis (CAD) and softwares, C, C++, MATLAB.

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