BREAST CANCER DETECTION & SEGMENTATION USING DEEP LEARNING

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Abstract

Breast cancer is the most lethal cancers among women. Early stage diagnosis may reduce the mortality associated with breast cancer subjects. Diagnosis can be done with screening mammography. The main challenge of screening mammography is that it is associated with high risk of false positives and false negatives. Our project proposes a system for detection of breast cancer using 5 CNN models and segmentation of the same using U-Net. This system will improve the efficient screening of mammograms which will be an asset to radiologists. The datasets used in this work are DDSM and MIAS which are popular and freely available.

Methodology - Detection
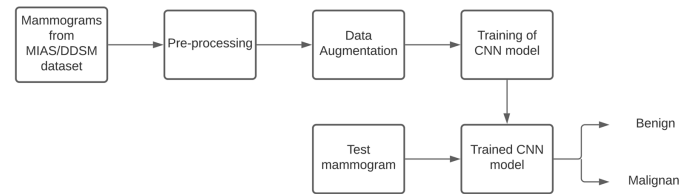
Results

Name of Model	Number of Layers	Validation Accuracy (%)	Precision	Recall	F1 Score
Alex Net	8	61.00	0.65	0.71	0.67
VGG-16	16	82.00	0.78	0.81	0.79
EfficientNet	17	82.72	0.81	0.77	0.78
Google Net	22	91.36	0.85	0.81	0.82
Resnet50	50	79.00	0.79	0.80	0.79

DETECTION RESULTS ⬅

SEGMENTATION RESULTS ➡

| Accuracy	99.72
Validation Accuracy	97.42
DSC(Dice Similarity Coefficient)	0.82
IOU/Jaccard Index	0.98

Background Information

Breast cancer disease has the second most noteworthy death rate in women. According to the global cancer statics, the number of new cases in 2018 was estimated to be 18,078,957 and deaths 9,555,027 (52.85%) globally. The cases of breast cancer amounts to 2,088,849 (11.55%) and the deaths is estimated to be 626,679 (6.56%). Sixty percentage of the deaths occur in low income developing countries like Ethiopia. If the cancer is detected early, it increases expectancy of survival rate/mortality of patient. Many presentations like masses, areas of symmetry and distortion, micro-calcifications may reveal the existence of breast cancer.

Methodology - Segmentation
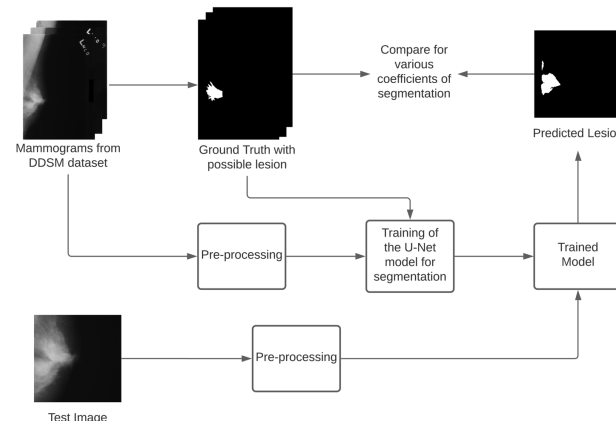
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