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DEEP CONVOLUTIONAL NEURAL NETWORK APPROACH FOR DIAGNOSING INVASIVE DUCTAL BREAST CARCINOMA BASE ON BREAST CANCER HISTOPATHOLOGICAL IMAGES

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Abstract

Great concern has continued to been shown not only in the alarming rate of death due to Breast Cancer (BCa) cases, but the methods through which the pathologist use to diagnose BCa. Recent attempts to capture the Whole Slide Image (WSI) of Invasive Ductal Carcinoma (IDC) breast biopsy tissue with Medical Imaging techniques showed positive results. As the size of WSI are accumulating, attempts to analyze WSI based on Image Recognition Techniques (IRT) to assist the pathologist in diagnostic tasks is becoming has become a source of relief to histopathological processes. Since the victory of the team that use Deep Learning at ImageNet Large Scale Visual Recognition Competition 2012, DL framework has replaced most of the IRT. This is also the case for Breast Cancer Histological Images. This study proposes a Deep Convolutional Neural Network Framework (DCNNF) to enhance the architecture of the state-of-the-art CNN framework to be able identify Quantitative Semantic Features by leveraging on the kernel selection methods, optimization techniques and hy-per-parameters tuning. To evaluate the performance of the proposed approach, we shall build a DCNN model base on the proposed DCNNF using the IBM Data Scientist Workbench (IDSW) to utilize the cloud GPU services provided by IBM. The model will be evaluated with BHI as benchmark dataset. Comparative analysis between the proposed and the state-of-the-art approach would done base on classification accu-racy, specificity, sensitivity, precision, recall, ROC and F-Score.

Keywords: *Deep learning, quantitative semantic features, breast cancer, digital histology. Com-puter Vision.*