Invasive Ductal Carcinoma Detection In Breast Histology Images Using Dilated Depthwise Separable Convolutions

Extended Abstract:

Breast cancer is now the most frequently diagnosed cancer and leading the global cause of cancer death in women. Among them Invasive ductal carcinoma (IDC), which is also known as the infiltrating ductal carcinoma, is the most regular form of breast cancer. Due to this, Many scholars in the field of healthcare are interested in the classification of breast cancer. Over the past few years, there has been a rise in using deep learning for breast image analysis such as CNN, deep convolutional neural network. But deep convolutional neural network models for large image classification can result in the layout of network architectures with a large number of learnable parameters and tuning of those varied parameters can considerably grow the complexity of the model. To address this problem, this paper introduces an ultra - light neural network using Dilated Depthwise Separable Convolutional Network (DDSCNet) to minimize the network's attributes and computational burden throughout the convolution process. Fig.1 illustrates the block diagram of the proposed model. In order to reduce the network's parameters and processing complexity during convolution operations, the suggested model uses depthwise separable convolution. Additionally, the receptive field is expanded during convolution while keeping the number of convolution parameters using dilated convolution, which can extract more high-level global semantic features and increase categorization accuracy. The performance of the study is measured with respect to accuracy, sensitivity, specificity. Two CNN models using depthwise separable convolution and standard convolution have also experimentally tested to compare with the proposed model. The results reveal that the DDSCNet attained the maximum accuracy, sensitivity, specificity of 96.15%, 99.71%, and 99% respectively.

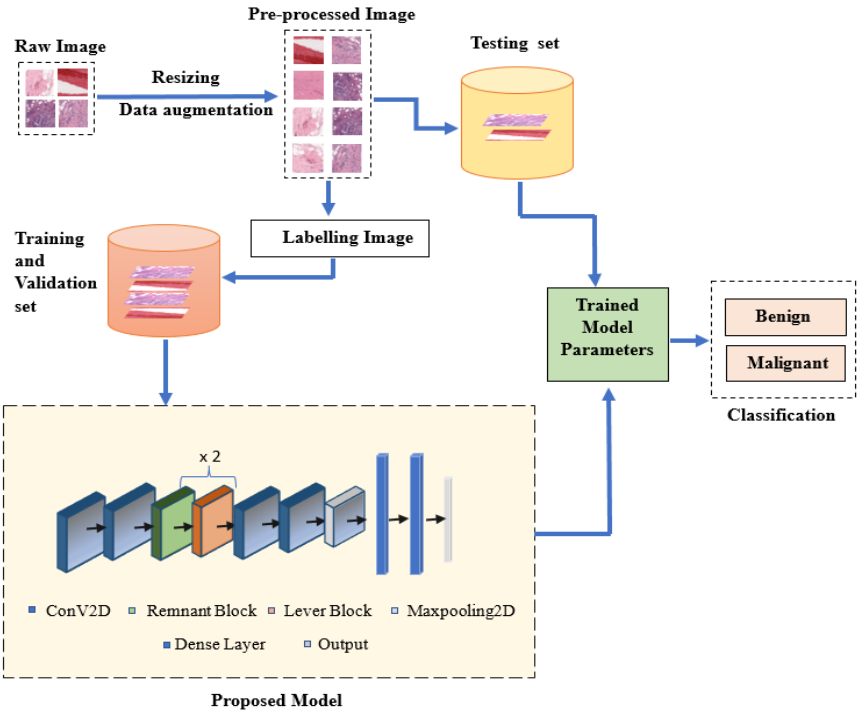

Fig. 1. Block Diagram of Proposed Model