Lung cancer classification using EFFICIENTNET series

Lung cancer is the leading cause of cancer deaths worldwide. symptoms of lung cancer typically occur when the disease is advanced. Early diagnosis permits patients to have treatment options and increase survival rate. In this project, we have developed various deep learning based models for the detection and classification of lung cancer from histopathological images.

Dataset Description

The study is conducted using Lung and Colon Cancer Histopathological Image Dataset (LC25000) from Kaggle. . The images are 768 x 768 pixels in resolution. Dataset consists of three classes, Benign, adenocarcinomas, and squamous cell carcinomas.

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EfficientNet

Efficient Net is convolution neural network architecture, and scaling method. It is based on scaling along all dimensions using compound coefficients. As the name implies, are extremely efficient in terms of computation, and they also obtained state-of-the-art performance on the ImageNet dataset. Figure 1 shows performance of Efficientnet series compared with other deep learning models.
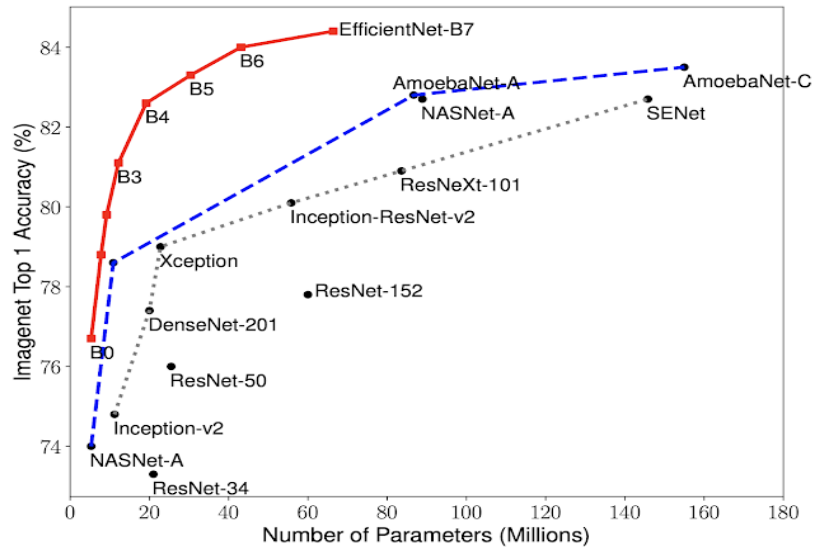
Figure 1 Performance of EfficientNet compared with other Deep Learning Models.

Table 1 shows shows the number of trainable parameters in EfficientNet0, EfficientNet1, EfficientNet2 and EfficientNet3

Table 2.1 : Number of trainable parameters in EfficientNet series

Model	Number of Parameters	FLOPS
EfficientNet0	5.3M	0.39B
EfficientNet1	7.8M	0.7B
EfficientNet2	9.2M	1B
EfficientNet3	12M	1.8B

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We have implemented models ranging from EfficientnetB0 through EfficientnetB3. The results obtained are shown in the Table 2

Table 2.6 : Performance of Efficientnet models

Model	Time for 1 epoch	Training Accuracy	Validation Accuracy	Training stopped at
EfficientNet-B0	85 secs	0.9856	0.9508	16 epochs
EfficientNet-B1	115 secs	0.9890	0.9444	20 epochs
EfficientNet-B2	119 secs	0.9921	0.9584	20 epochs
EfficientNet-B3	150 secs	0.9475	0.8341	14 epochs