

# Lung Cancer Types Classification Using Pre-Trained Inception-Net

## Abstract

Lung Cancer Type Classification based on histopathological images is one of the trending subjects in medical image analysis. In this task we create a classification pipeline from dataset gathering from Kaggle website, loading data and split it into train, test and validation segments, training the Inception Net with our training data and finally validation phase.

## Dataset

The dataset used in this task is Lung and Colon Cancer Histopathological Images dataset on Kaggle website. It Contains 15000 images with size of 768 \* 768 pixels jpeg format that we resized them into 256 \* 256 pixels as Inception Net input size. We did this task on just lung image set not colon image set. In next stage target datas converted into one hot encoded vectors. We splited this data with a split factor of 0.2. as dataset consist of 15000 images of lung cancer, training size is 12000 and test size is 3000 images.

## Method

We used the InceptionNet pretrained network implemented in keras package of tensorflow. An Adam optimizer is used to optimize network during training process. Batch size of data is 64 and We trained network for 10 epochs but we embedded some callbacks in our model due to accelerate our training stage including EarlyStopping, LRDecay and stop train if model achieve val\_accuracy more than 0.9 percent. To Approve that we Know how

the InceptionNet works, we provided pytorch implementation of it's architecture in our document folder that is also available in my BackBone Implementation repository on GitHub. Unlike the other task (lung tumor detection) we implemented this task using tensorflow to demonstrate our programming skills.

## Results

After 10 epochs of training whole training set, the model achieved precision score of 0.96, 0.98 and 0.83 and recall score of 0.99, 0.79 and 0.95 on test dataset for each class. you can see more details of evaluation stage of model in Fig1. Dataset, and code is available in my GitHub page.

	precision	recall	f1-score
lung_n	0.96	0.99	0.97
lung_scc	0.98	0.79	0.88
lung_aca	0.83	0.95	0.88
accuracy			0.91
macro avg	0.92	0.91	0.91
weighted avg	0.92	0.91	0.91

*Figure 1, Result of evaluation of model on test dataset*

## References

**Dataset link:** <https://www.kaggle.com/datasets/andrewmvd/lung-and-colon-cancer-histopathological-images>

**GitHub Page:** [Github.com/pr1266/](https://github.com/pr1266/)  
[https://github.com/pr1266/medical\\_image\\_processing](https://github.com/pr1266/medical_image_processing)

**Backbone Implementation Repo:**

**[https://github.com/pr1266/BackBone\\_Implementation\\_PyTorch](https://github.com/pr1266/BackBone_Implementation_PyTorch)**