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CHENNAI

# DETECTION OF LUNG CANCER AND COVID AFFECTED LUNG

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## OBJECTIVES

Our main objective is to research and develop a model to:

- Detect lung cancer correctly from lung scans so that it can be diagnosed and treated correctly.
- Detect COVID correctly from lung scans so that it can be diagnosed and treated correctly.
- To work on developing a model that can distinguish and detect lung cancer or COVID accurately.
- To develop the model to detect the disease correctly from similar kinds of image input without getting confused between lung cancer or COVID

The results of this study will aid in the creation of a trustworthy and precise method for the diagnosis of lung cancer and lung disease caused by COVID. By using this approach, professionals will be able to make better decisions and treat patients more effectively. It can also be utilized as a screening tool for early detection, which is essential for the successful therapy of many disorders.

## INTRODUCTION

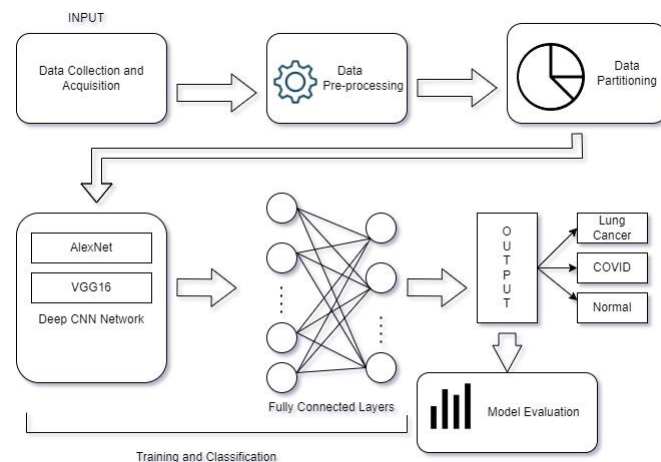
This study focuses on the use of imaging methods and machine learning algorithms to identify lung cancer and lung that has been impacted by COVID. Covid-19 and lung cancer are both severe respiratory conditions that can have a major impact on morbidity and mortality. For these disorders to be successfully treated, early identification is essential

Many machine learning-based methods for the diagnosis of lung cancer and COVID-affected lung using medical pictures have been proposed to overcome these limitations. In this study, we present a novel method for the precise detection and classification of lung cancer and COVID-affected lung using lung scans that combines the use of two cutting-edge deep learning algorithms, VGG16 and AlexNet.

## METHODS AND MATERIALS

Deep learning techniques are used in the suggested method to analyze lung images. The collection and pre-processing of a dataset containing CT images of lungs with COVID-affected lungs and lung cancer will be done. The dataset will be split into training and testing sets, with the training set being used to train the models and the testing set being used to evaluate them.

The deep learning models will receive the pre-processed photos and extract and classify features from them. Based on a number of evaluation measures, including accuracy, sensitivity, specificity, and f1-score analysis, the VGG16 and AlexNet models' performance will be evaluated. The results of this study will aid in the creation of a dependable and precise method for the early identification and diagnosis of lung cancer and lung disease caused by COVID.



## RESULTS

VGG-16 proved to be the best model for our final classification i.e. classifying lung scan images to lung cancer, COVID or normal.

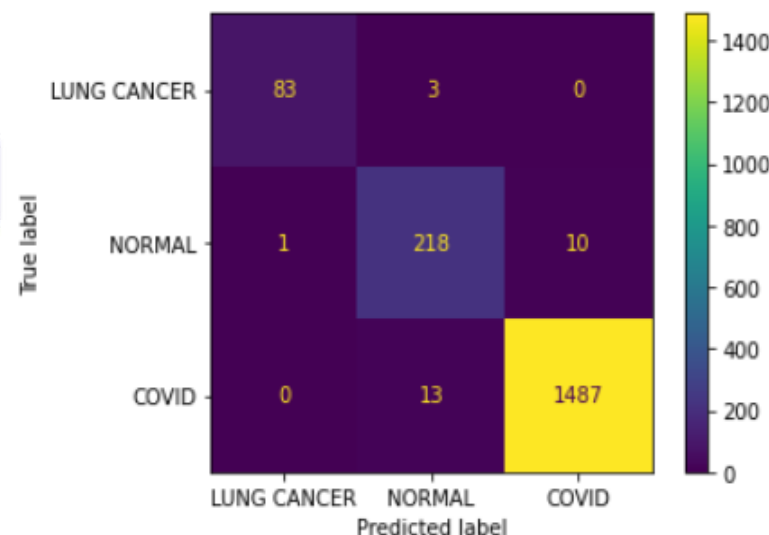
Given below are the metrics and results of our final classification along with some metrics of AlexNet model as well:

Data	VGG-16	AlexNet
Training	99.26 %	92.58 %
Validation	98.41 %	92.41 %
Testing	98.51 %	98.12 %

Performance Metrics	VGG-16	AlexNet
Precision	0.971013	0.916148
Recall	0.969472	0.962843
F1-score	0.970160	0.935337

Now since VGG-16 model was the best, hence sensitivity metric values for each class and confusion matrix for the same showing performance of VGG-16 model:

Class	Specificity
Lung Cancer	0.99942
Normal	0.98991
COVID	0.96825



## CONCLUSION

In conclusion, we developed and evaluated two deep learning models, AlexNet and VGG16, for the task of lung cancer, COVID-19, and normal classification using lung scan images. Our study demonstrates that deep learning models such as AlexNet and VGG16 can effectively detect lung cancer, COVID-19, and normal cases with high accuracy, precision, recall, and F1-score. The results of our work show that deep learning models have the capacity to effectively classify lung scan pictures into a variety of categories, including those that are related to respiratory disorders.

Overall, these findings imply that deep learning models can be an important tool for the early detection and precise diagnosis of COVID-19 and lung cancer, potentially improving patient outcomes.

## FUTURE RESEACRH

Based on the results of this study, there are various possible lines of further research.

- One option is to investigate the use of additional deep learning models or perhaps hybrid models to recognize COVID-19 and lung cancer from lung scan pictures. Also, the accuracy and resilience of the models can be increased by using larger and more varied datasets.
- Investigating the application of transfer learning for this task is another possible avenue for future research.
- In order to increase classification accuracy, it may also be worthwhile to look into the use of additional imaging techniques, such as MRI or CT scans, in addition to chest X-rays.

## REFERENCES

- [1] Eali Stephen Neal Joshua, Midhun Chakkravarthy, Debnath Bhattacharyya (2020): "An Extensive Review on Lung Cancer Detection Using Machine Learning Techniques: A Systematic Study"
- [2] M. A. Cifci (2020): "Deep learning model for diagnosis of corona virus disease from CT images"

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