

Medical DeepFake Prediction Using Deep Learning (False Lung Cancer Image Detection)

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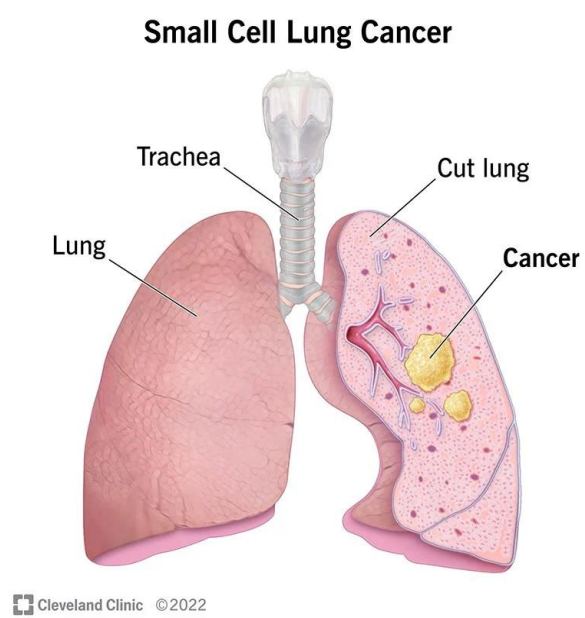
1

Introduction

- The goal of this study is to classify lung cancer using deep learning methods.
- For testing and generalization of the deep learning approach, two convolutional neural network (CNN) models and a residual neural network (ResNet) model were developed using the publicly accessible dataset.
- Google Colab and Jupyter Notebook has been used to write code.
- The models has overall accuracy of 99% (ResNet50), 97% (MobileNetv2) and 83% (DenseNet).

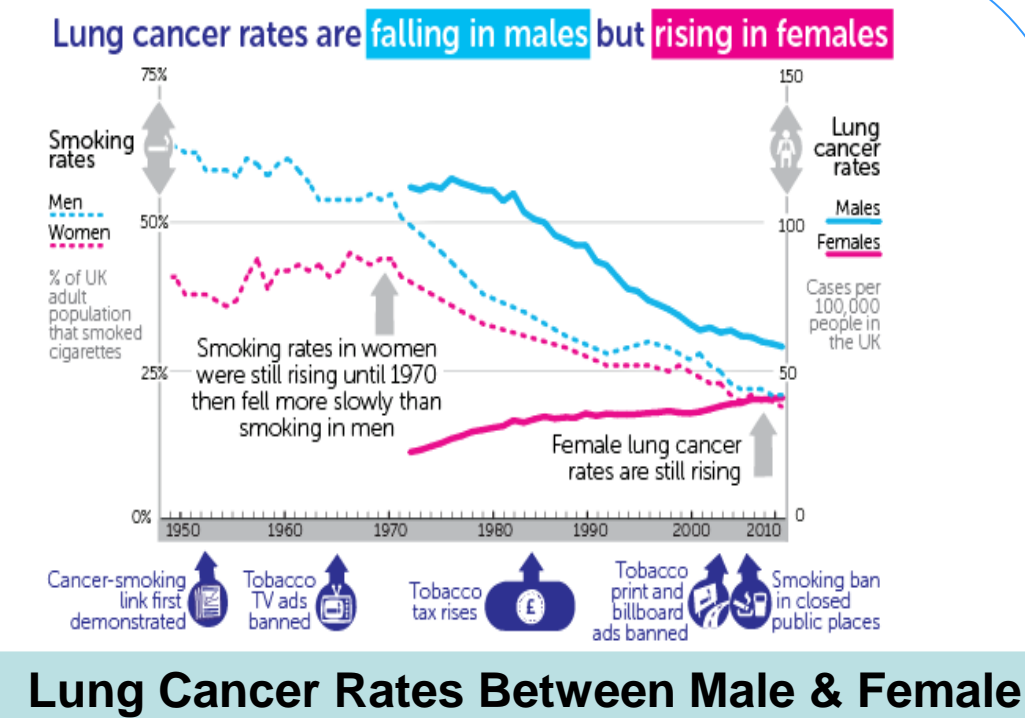
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Background



Lung cancer is a tumor that develops in any part of the lung. It is difficult, widespread cancer with a higher death ratio.

To detect Lung cancer we used deep learning method. Deep learning is a sort of machine learning and artificial intelligence (AI) that simulates how humans acquire certain types of knowledge.



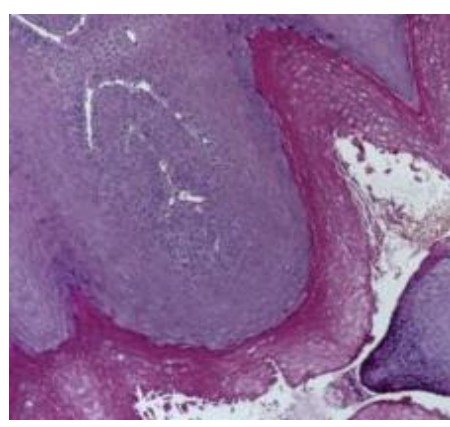
Lung Cancer Rates Between Male & Female



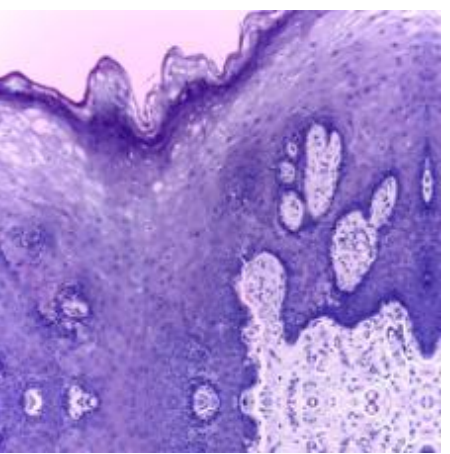
Annual Global Cancer Mortality

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Dataset and System Architecture

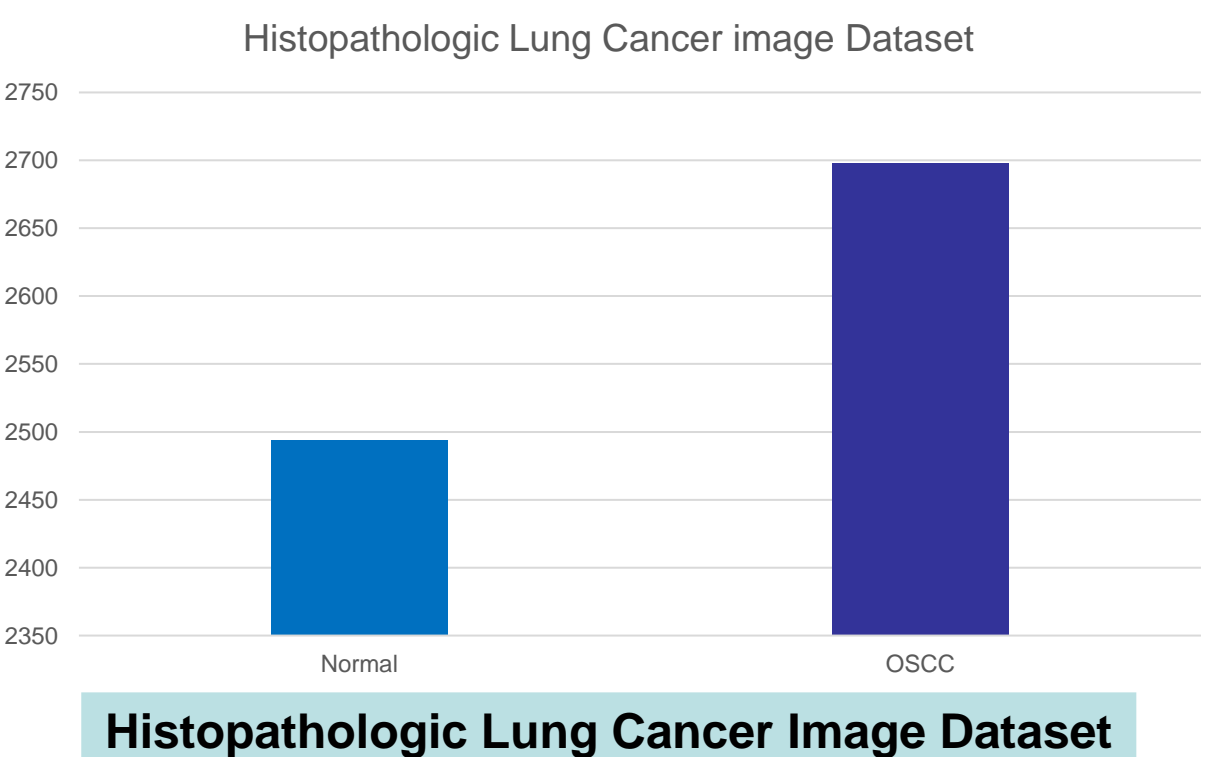


Histopathologic Lung Cancer Effected Image



Histopathologic Normal Image

- This System's dataset contains 22800 Histopathologic images.
- 2494 of Normal Histopathologic images and 2698 images of lung cancer effected Histopathologic images were used on this system.
- Data were spitted in three sections 70% for training, 20% for validation and 10% for testing.



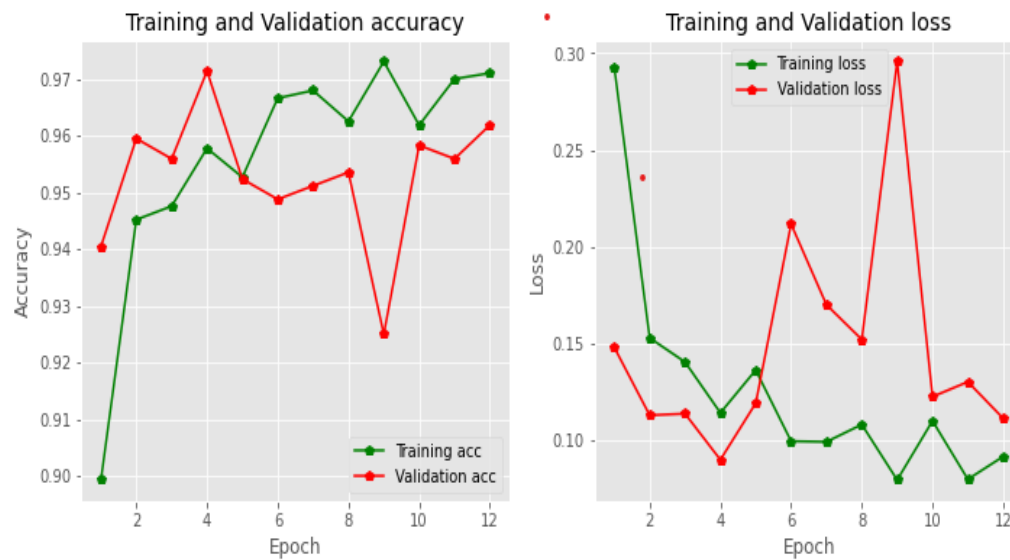
Histopathologic Lung Cancer Image Dataset



System Architecture of the Pre-trained Model

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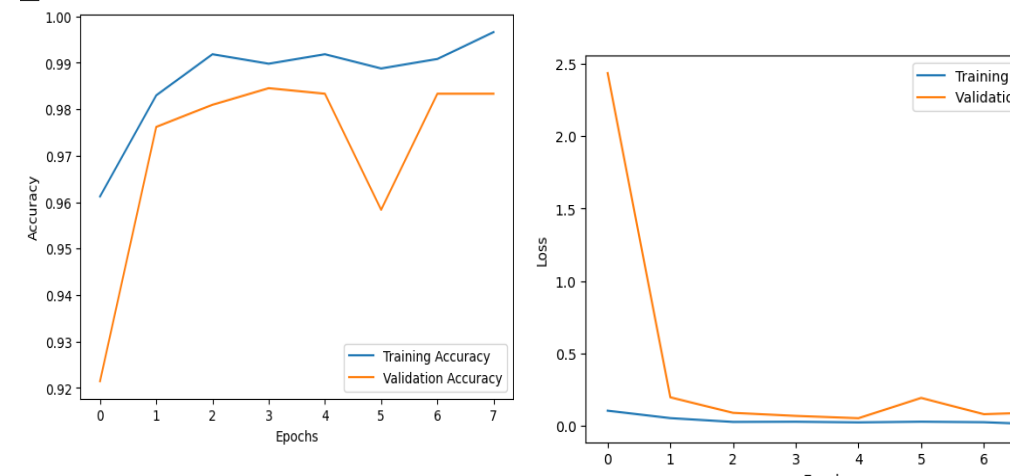
Results and Analysis



MobileNetV2 – Training and Validation Accuracy and Loss

	precision	recall	f1-score	support
Fake	0.97	0.99	0.98	350
Real	0.95	0.87	0.91	71
accuracy			0.97	421
macro avg	0.96	0.93	0.95	421
weighted avg	0.97	0.97	0.97	421

MobileNetV2 Accuracy = 97%



ResNet50 – Training and Validation Accuracy and Loss

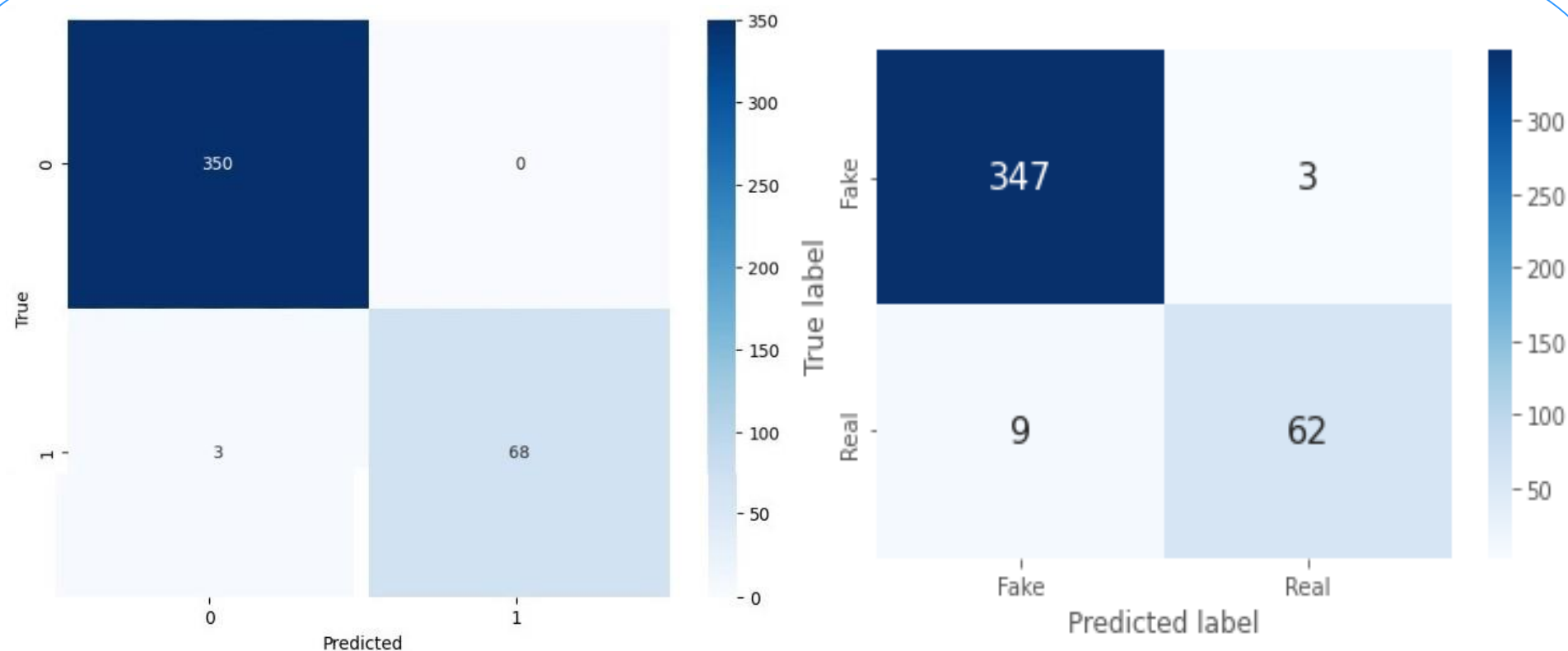
	precision	recall	f1-score	support
Real	0.99	1.00	1.00	350
Fake	1.00	0.96	0.98	71
accuracy			0.99	421
macro avg	1.00	0.98	0.99	421
weighted avg	0.99	0.99	0.99	421

ResNet50 Accuracy = 99%

- Following the implementation of the MobileNetV2, we achieved a 97% accuracy and ResNet50, we achieved 99% accuracy.
- Validation accuracy is higher than training accuracy, and training loss is less significant than validation loss.

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Confusion Matrix



Confusion Matrix of ResNet50

Confusion Matrix of MobileNetV2

- Deep learning performs in complicated tasks that frequently demand dealing with large amounts of unstructured data, such as picture classification, natural language processing, or audio recognition, among others.
- The pre-trained model was generated using RestNet50 and MobileNetV2, with minor modifications to the final layers, and a head model was developed from the basic model.

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Conclusions

- This study therefore will be valuable for the artificial intelligence research community to develop effective methods for tackling deepfakes.
- ResNet50 and MobileNetV2 model performed brilliantly on the dataset.
- We have claimed 99% accuracy on our system.
- Our system can rapidly detect the lung cancer and patient can take precaution at early stages.