PANIMALAR ENGINEERING COLLEGE

Department of Electronics and Instrumentation Engineering

DIAGNOSIS OF PNEUMOTHORAX USING DEEP LEARNING

Batch No: 24

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ORGANIZATION

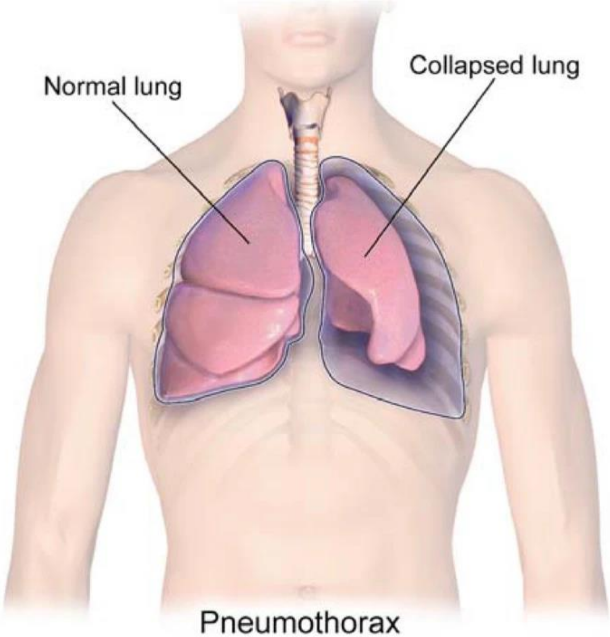
- Objective of the Project
- Introduction
- Existing System/ Literature Survey
- Problem Identification
- Proposed system - Block Diagram
- Algorithm Explanation
- Software Requirements
- Experimental Process
- Results & Discussions
- Conclusion And Future Work
- References

OBJECTIVE OF THE PROJECT

To identify Pneumothorax by Deep Learning Technique with the help of LENET and ALEXNET of CNN Architecture.

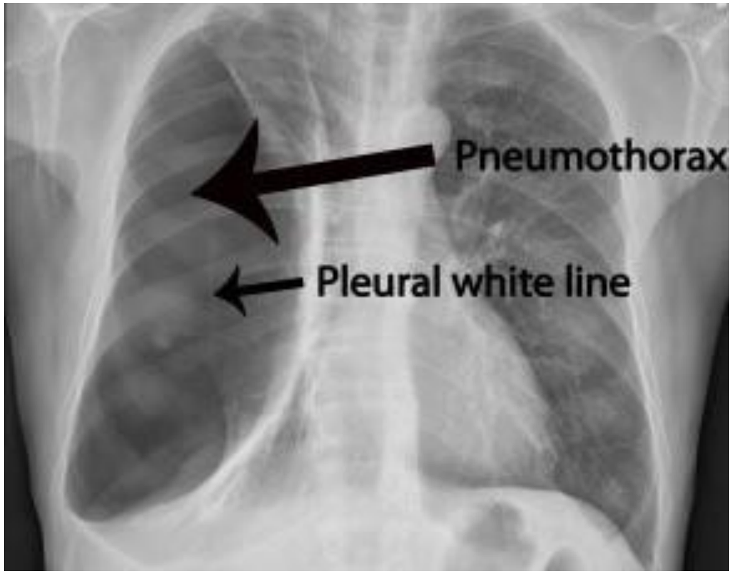
INTRODUCTION

- A **pneumothorax** is an abnormal collection of air in the pleural space between the lung and the chest wall. Symptoms typically include sudden onset of sharp, one-sided chest pain and shortness of breath.

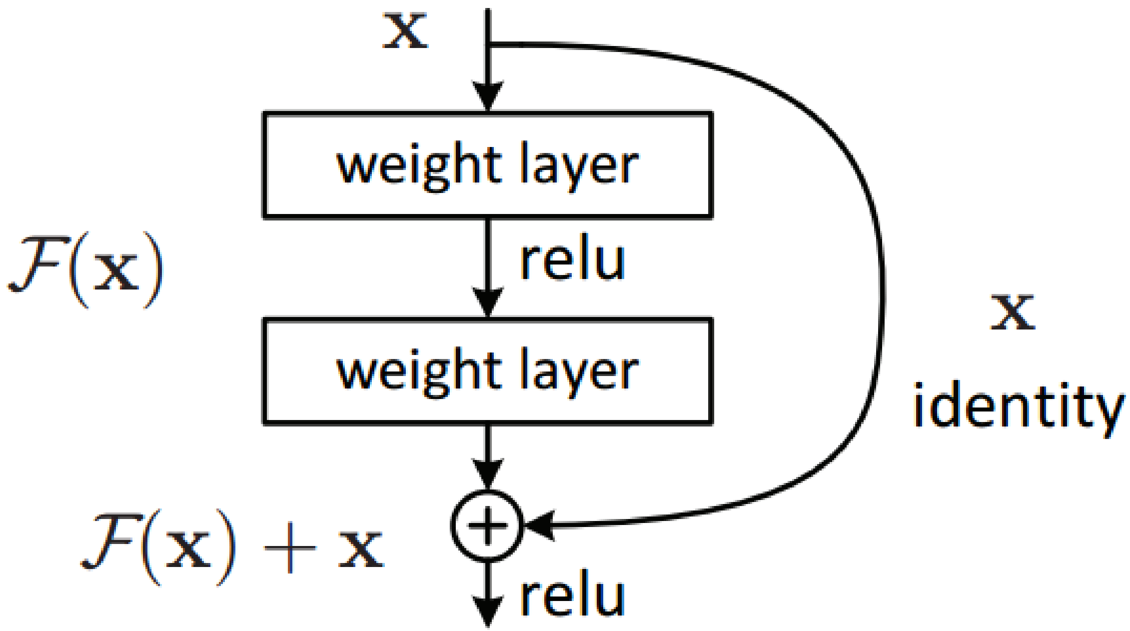


INTRODUCTION

- In a minority of cases, a one-way valve is formed by an area of damaged tissue, and the amount of air in the space between chest wall and lungs increases; this is called a tension pneumothorax.



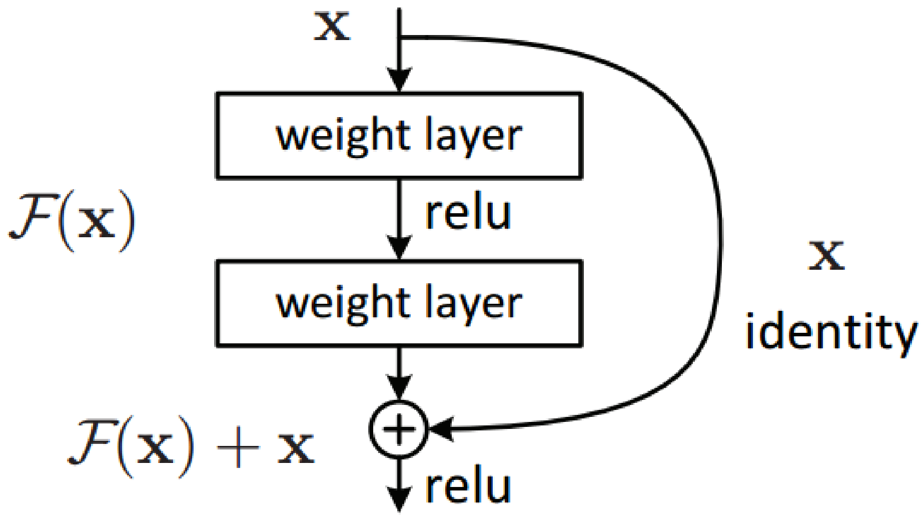
BLOCK DIAGRAM OF PROPOSED SYSTEM



LITERATURE SURVEY

Author & Year	Title	Algorithms Used/ Achievements	Limitations
ErdiÇallı , EcemSogancioglu, Bramvan Ginneken,Kicky G.van Leeuwen, KeelinMurphy(2021)	Deep learning for chest X-ray analysis: A survey	Using deep learning on chest radiographs published before March 2021, categorizing works by task: image-level prediction (classification and regression), segmentation, localization, image generation and domain adaptation.	model may be complex and also inherits the disadvantages of wrapper model
Priyanka Malhotra , Sheifali Gupta , Deepika Koundal , Atef Zaguia , Manjit Kaur and Heung-No Lee.(2022)	Deep Learning-Based Computer-Aided Pneumothorax Detection Using Chest X-ray Images	The present work compares the operation of the proposed MRCNN model based on ResNet101 as an FPN with the conventional model based on ResNet50 as an FPN. The proposed model had lower class loss, bounding box loss, and mask loss as compared to the conventional model based on ResNet50 as an FPN	More Error rate

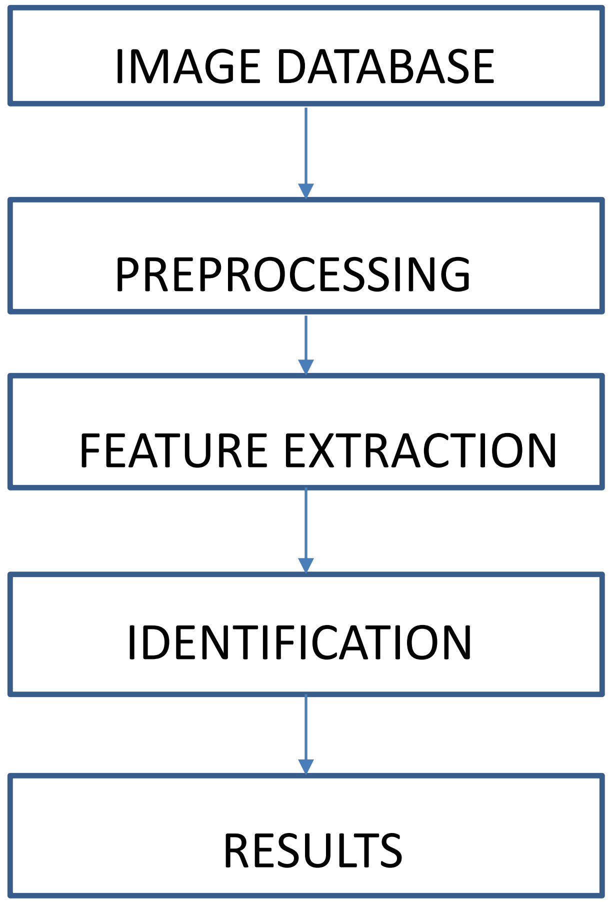
BLOCK DIAGRAM OF EXISTING SYSTEM



PROBLEM IDENTIFICATION/ LIMITATIONS OF EXISTING SYSTEM

- Lesser efficiency.
- High run-time.
- Complex in process.
- The Error rate in RESNet-50 is more.

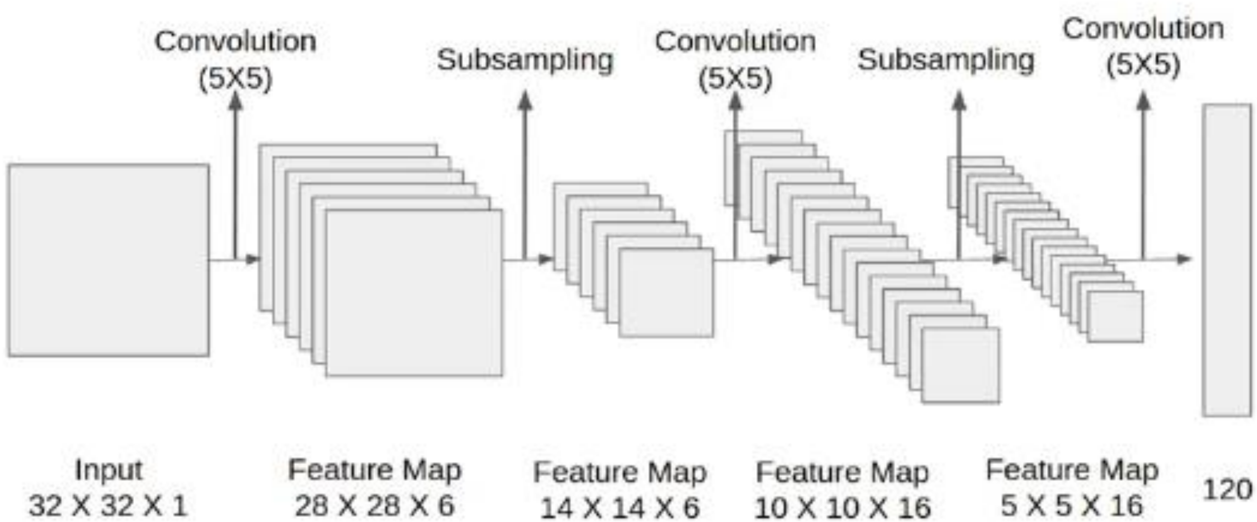
OVERVIEW OF THE PROPOSED WORK



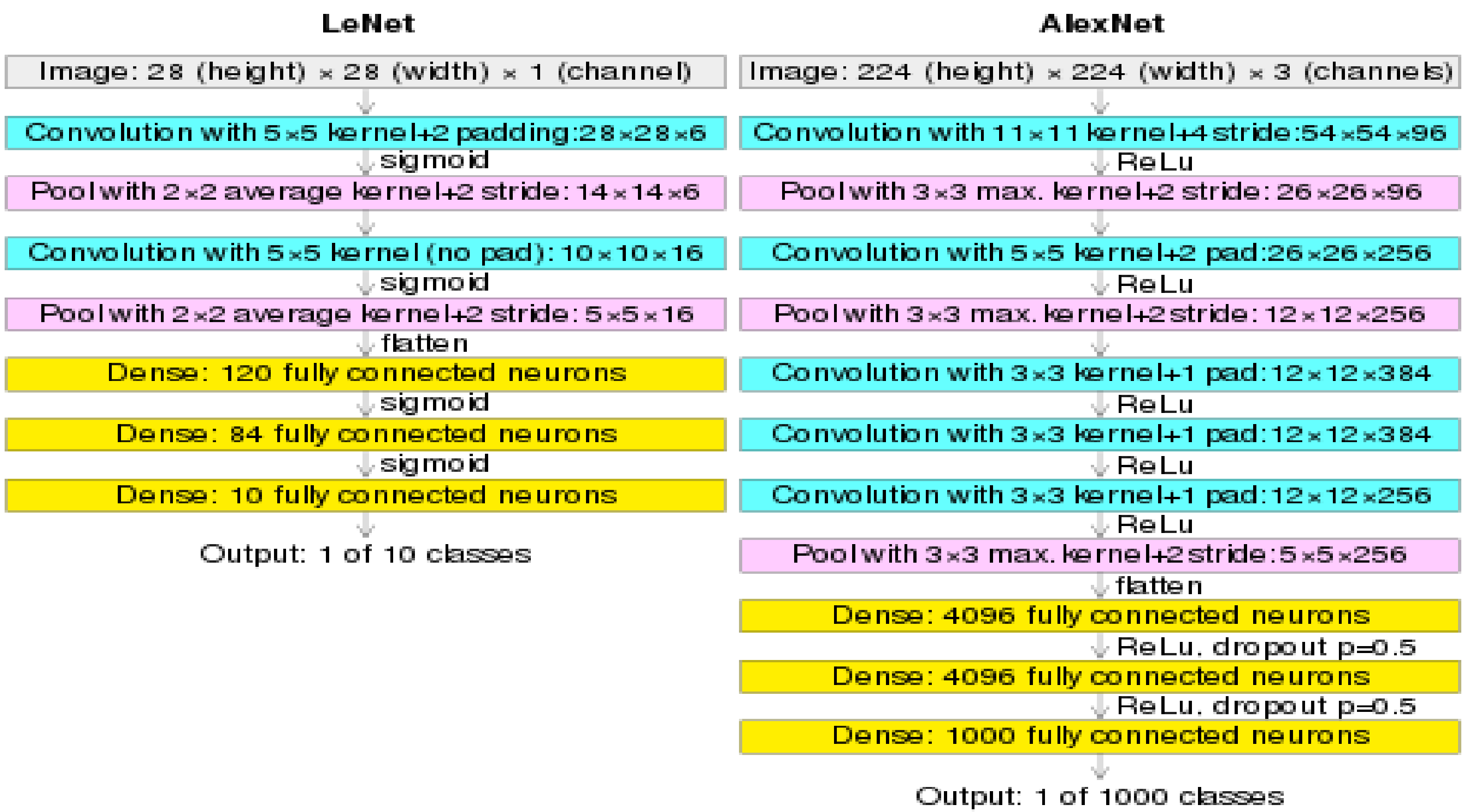
BLOCK DIAGRAM OF PROPOSED SYSTEM

AlexNet Block Diagram

Input Data → Input Layer → Hidden Layers → Output Layer → Output Data



BLOCK DIAGRAM OF PROPOSED SYSTEM



PROPOSED SYSTEM

- We are proposing recognition framework based on the structured **two dimensional Convolutional Neural Networks (CNNs) type of AlexNet and LENET** to identify the Pneumothorax and improve the accuracy of workflow.

- The proposed method for this project is to train a Deep Learning algorithm capable of identifying and data preprocessing and visualizing the image then feature extracting to build **LENET CNN** using Pneumothorax image dataset. we classify it such as Pneumothorax or Normal this system using CNN model.

- It is predicted that the success of the obtained results will increase if the CNN method is supported by adding extra feature extraction methods and classify successfully Pneumothorax. We have demonstrated the efficacy and potential of using deep CNN to images.

ALGORITHM EXPLANATION

- Lenet is a convolutional neural network that is 7 layers.
- You can load a pretrained version of the network trained images from the ImageNet database.
- The pretrained network can Identify images of 1000 CT scan and can show whether it is Pneumothorax diesease or normal.
- AS a result, the network has learned rich feature representations for a wide range of images.
- The network has an image input size of 225-by-225

SOFTWARE REQUIRMENTS

HARDWARE REQUIREMENT:

- **Processor**: Pentium Dual Core 2.3 GHz Processor
- **Hard Disk:** 250 GB or Higher
- **RAM:** 2 GB (Minimum)

SOFTWARE REQUIREMENT:

- **Operating System:** Windows 7 or Higher
- **Languages used:** Python (OpenCV and CNN)
- **Tools:** Anaconda, Jupyter Notebook, Pycharm

EXPERIMENTAL PROCESS

STAGE 1 :
To increase the accuracy, We trained with number of images with ALEXNET model.
For Training :
Dataset : 917 images

For Testing :
Dataset: 217images

The **Accuracy for images is 0.60**

EXPERIMENTAL PROCESS

STAGE 2 :

To increase the accuracy, We trained with number of images with LENET-5 model.

For Training :

Dataset : 917 images

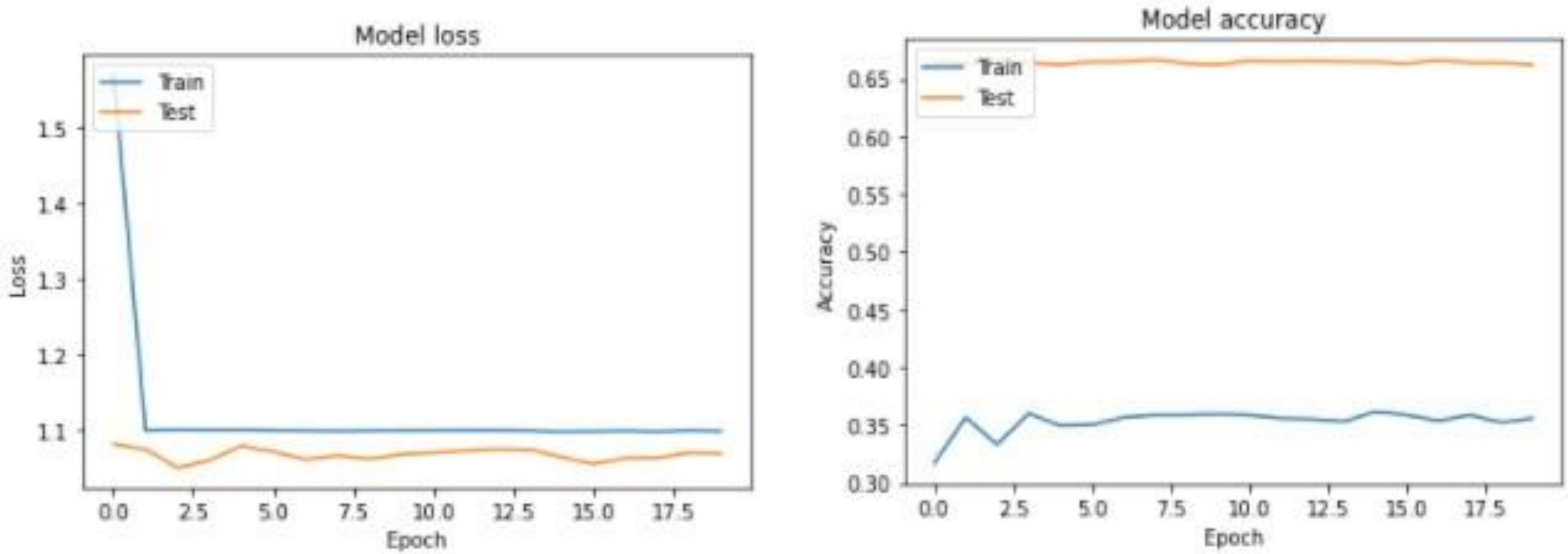
For Testing :

Dataset: 217images

The **Accuracy for images is 0.90**

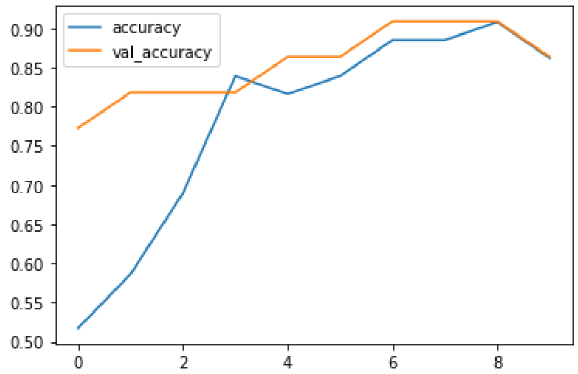
RESULTS & DISCUSSIONS

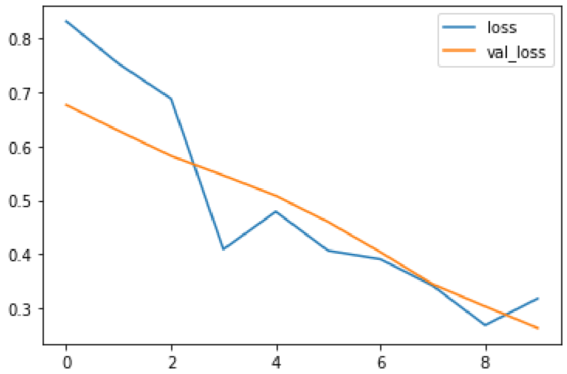
GRAPHS FOR TRAINED ALEXNET MODEL :



RESULTS & DISCUSSIONS

GRAPHS FOR TRAINED LENET MODEL :





RESULTS & DISCUSSIONS

FOR MORE IMAGES :

Comparison of Evaluation Matrices:

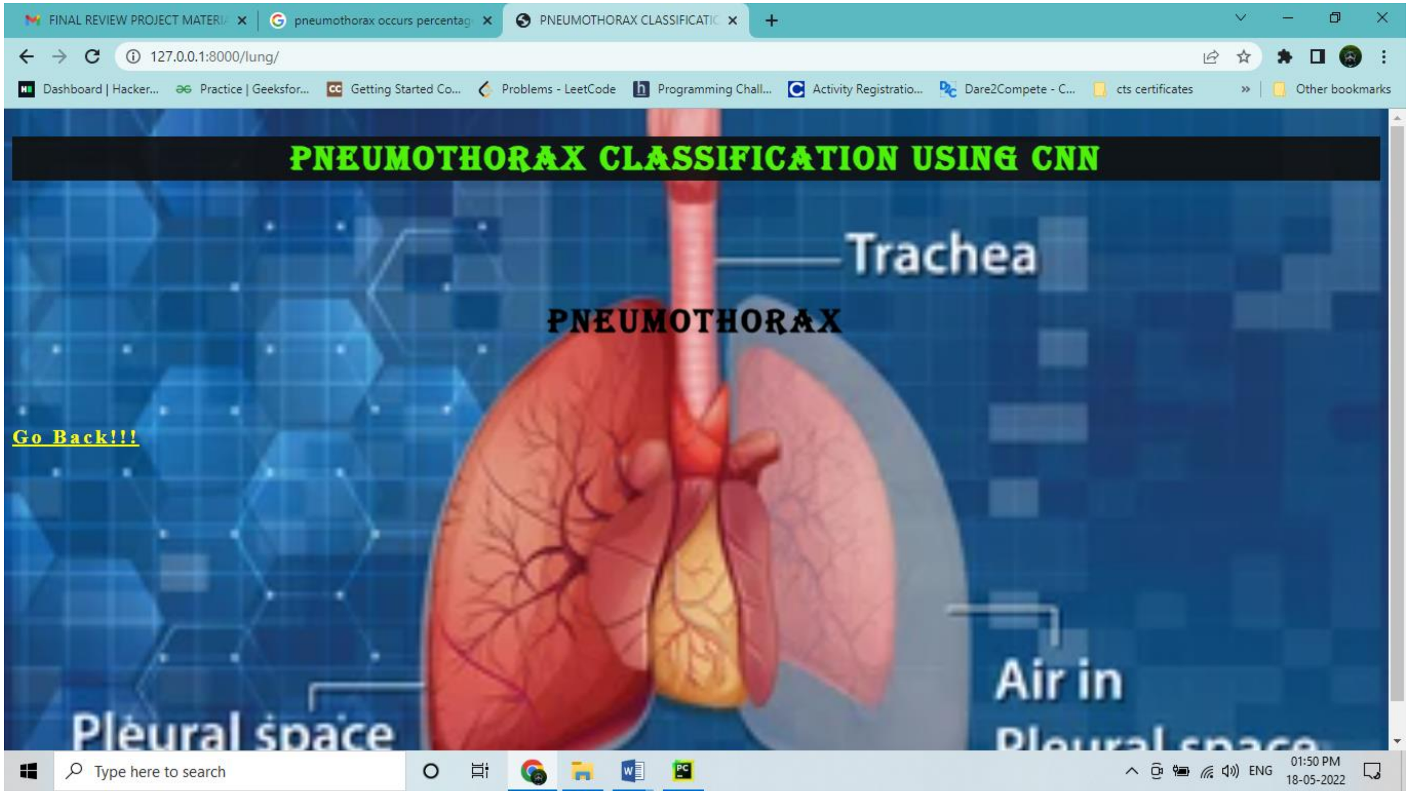
ARCHITECTURE	AUC	Sp(%)	Acc(%)
ALEX NET	58	60.01	61.08
LENET	90	|89.03	88.02

Advantages:

- The large amount of chest x-ray data can be train on artificial neural network.
- It is best model for deep learning technique to easily identifying Pneumothorax

RESULTS & DISCUSSIONS

OUTPUT IMAGE :



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CONCLUSION AND FUTURE WORK

Conclusion:

It focused how image from given dataset (trained dataset) and past data set used to predict the pattern of pneumothorax disease using CNN model. This brings some of the following insights about pneumothorax disease prediction. The major benefit of the CNN classification framework is the ability to classify images automatically. The pneumothorax diseases mainly contribute to misshape and often can't be remedied because the patients are diagnosed too late with the diseases. We observed that deep learning is capable of achieving a relatively high diagnosis accuracy, is very much in agreement with human diagnostic performance, but still inferior to experienced radiologists in difficult-to-analyze cases.

In this study, we have discussed the overview of methodologies for detecting the abnormalities in pneumothorax images which includes collection of pneumothorax image data set, preprocessing techniques, feature extraction techniques.

Future Work:

Medical department wants to automate the detecting of pneumothorax disease from eligibility process (real time).

To optimize the work to implement in Artificial Intelligence environment.


Thank you