ABSTRACT

Lung cancer is more common than other types of cancer around the world. In this research, two important medical complications related to Lung organs – Lung cancer and Pneumonia are investigated. Pneumonia is another disease of the lung organ that causes various serious medical complications like the recent COVID-19. Pneumonia can cause a patient's condition to deteriorate to the point of death. As a result, early identification of pneumonia increases the number of days that patients survive. X-ray being the common imaging modality to detect Pneumonia. Chest X-ray image were pre processed. For data augmentation, picture modification and DCGAN techniques are used. With the help of a Deep Convolutional Neural Network, this research will train the model using these procedures. This study looked at the VGG19 deep neural network, which is a well-known pre-trained deep learning method. The VGG19 model outperforms the others for the provided hyper parameters. This compares the VGG19 network against other techniques such as Alexnet, Resnet, InceptionV3net and VGG16 after training. VGG19 network performed well among different transfer learning techniques. As a result, the VGG19 network was proposed as a Deep Convolutional Neural Network.

Lung cancer is a disease in which healthy cells in the body gradually convert into tumor cells, resulting in a variety of medical issues. A standard dataset exists for lung cancer. With the rising incidence of lung cancer and the exponential growth of CT pictures, having a quick and effective way to evaluate CT scans can help physicians or surgeons develop an early treatment plan. In this research, two approaches are investigated for lung cancer prediction. One approach is based on training machine learning model on the features extracted from image processing techniques. And the

other approach involves deep learning models for lung cancer detection.Computed Tomography (CT) pictures are useful for determining the stage of lung cancer in a patient. As a result, CT images of the lung region are explored in this study by constructing a content-based image retrieval system using various machine learning and deep learning techniques. For medical photos, texture analysis is critical. There are two types of it namely statistical analysis and structural analysis. This method will extract crucial elements from texture analysis to determine the presence of lung cancer. It used a dimensionality reduction technique after extracting the features. This method was utilized to lower the number of dimensions as well as the amount of time it took to compute. To reduce the dimensionality, PCA and t-SNE were used. This will train the different machine learning models after pre-processing, feature extraction, and dimensionality reduction. In this research, both training and comparison were used to find the optimal model for feature extraction. Random forest, SVM, and XG Boost are examples of models. The Random Forest model performed well in Validation. Using the Random Forest model, high level of accuracy is achieved. This'll utilize the output from the Random Forest model to retrieve and extract images for the query image. The next phase of the study focuses on picture retrieval using a query image. This was employing a deep learning technique. When compared to machine learning, deep learning was far superior. To compare, VGG16 and Resnet were employed. Here use two different types of optimizers to do binary classification. Adam and RMS Prop are their names. The pre-processing procedure was employed again. After that, several filtering techniques like the median filter, denoising, and so on are used. The noise was removed from medical photos using the denoising approach. The segmentation process was then carried out. To analyze the specific images, time consumption, and extract the lung region, segmentation was used. Then go on to feature extraction after extracting the lung region

from the complete CT image. The lung region is extracted using a segmentation method. As a result, algorithms such as the K-Means clustering method and morphological operations such as erosion, dilation, and so on are used. As a result, the restored features produced by training the VGG16 network on the pre-processed image are treated further with the KNN technique to produce images that are identical to the input query image.