

Methods to Detect Abnormal Cell Growth in Lungs for Cancer Prediction: A Review

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Abstract

Lung cancer is a generally find in, so many countries of the world world. The late digmosis situation of detecting the lung cancer case is the concern. Due to late detection, the mortality rate is high. The medication and treatment differeintiate according to the type and the finding in the particular body part any symptoms. We Can save so many lives by detecting lung cancer at early stages. It's required to devlop the some tools, so that early detection possible. The number of softwares are created to increase the accuracy of detection. The deep research is needed in the area of artificial neural network, which may give the better result compared to exsting methodologies. The created tool should have better accuracy of detecting the lung cancer. In this paper we will through light on the different approaches of detecting lung cancer.

Keywords: CNN, VGG-16, FC, SVM, CT

1. Introduction

The mortality rate of peoples in the world due cancer has increased tremendously. According to the survey of global cancer observatory the different cancer cases reported like breast, Prostate, cervix uteri, stomach, liver and lung. Observing the fig no.-1 [19] declaired by Globocon in 2020, we can predict that though the reported cases of brest and prostate are more compared to lung but the mortality rate of lung is more among all the cancer decieses. The early detection of cancer can increase the survival rate of people, because due to the less knowledge of medical filed and right treatment for symptoms the mortality rate increased. The abnormal growth of cells in lungs of a person will cause the lung cancer. There are many reasons of cause of lung cancer due to smoking, pollution, different radioactive gases available in environment. There are various methods to detect the lung cancer, still it needs more research to predict accurately. The involvement of technology has increased in the medical field. In this paper we will discuss various methods and the use of artificial neural network to detect the lung cancer.

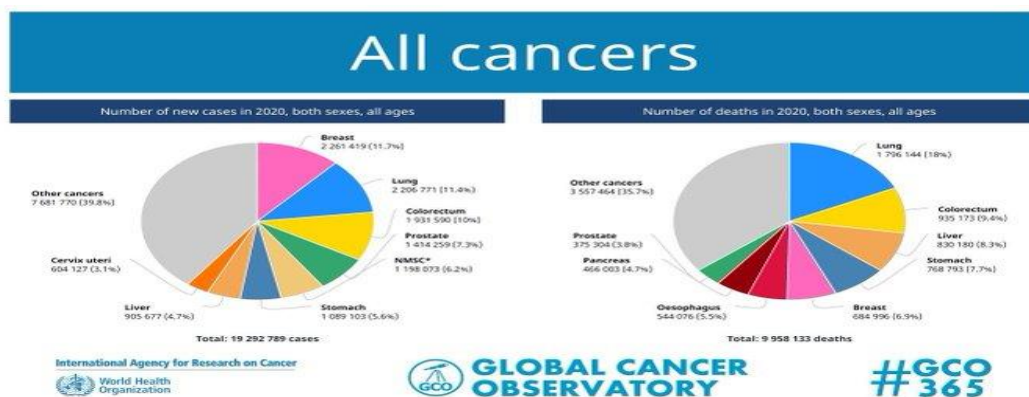


Fig:-1 The Pie Chart All Cancer

2. Method To Detect

A.CNN and Google net

In this method, the Visual Geometry Group16 and Googlenet are pre trained and this trained neural network applied on collected dataset for lung cancer detection. The output in terms of performance, will be measured by accuracy, precision and sensitivity. The two NN layer, mainly convolution and normalization are used to compare on the obtained values. The next layer pooling layer is used after this two layers. Based on the output obtained, we can predict adenocarcinoma, squamous cell carcemnoma from the images of lung.[1].

In Fig No. 2 Author [20] suggest the collected images of X-ray & CT dataset is applied to preprocessing for augementaion ,resizing and normalization. The output of dataset preprocessing is applied to deep learning module of VGG19-CNN, Resnet. The output of deep learning modle is input to traning and classification layers. and this fully connected layer gives the output as the what type of disease.

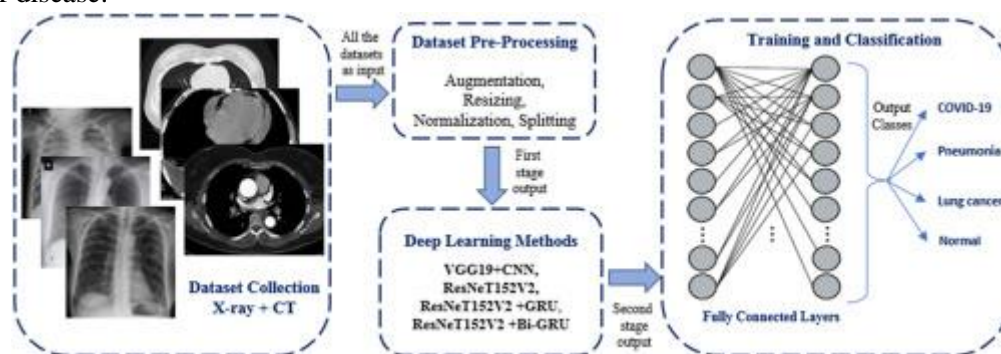


Fig No.-2 Detection of disease [20]

B.VGG16

The VGG16 contains the 16 layers out of these 16 layers, the thirteen convolution layers followed by Rectified Linear Unit layers, max- pooling layers of five and three fully-connected layers with softmax layer. The softmax layer decides the probability that the person having lung cancer or not. It is considered as robust method for feature extraction for new images.[2]

C.Inception V3

In this method the different types of convolution neural network and filters are used to detect the lung cancer.The Inception V3 is used for analyzing the images and detecting any object. The lung images obtained are applied to layers of convolution and max pooling layer and finally the output is applied to fully connected neural network[4][17].

D. ResNet50

The Residual Network50 model consist of fifty layers of neural network out of these fifty layers, the fourty eight are convolution network, one max pool and one average pool layer. This has much accuracy compared to ResNet30. It has more number of trainable parameters which make it better for lung image recognition.[18]

E.AlexNet: It is the faster training model it consist of 5 convolutional layers, 3 max-pooling layers, 2 normalization layers, 2 fully connected layers, and 1 softmax layer. It is better for classifying the captured lung images for analysis.[5]

F.Data augmentation

The histological images of lungs will help to view the cells in different angles without influencing the diagnosis process. It is advantages to use data augmentation, by using the rotation method for

diagnosis process. Another advantage of data augmentation is that it enlarge the size of dataset being use and increase in size of dataset does not impact on quality of images as input.[16]

G. Support Vector Machine

The SVM model is also the better choice for lung cancer detection due to his accuracy and classification of images. The convolution layer is important layer, which extract the features from the supplied input iamges. The operations are done on convolution layer, the use of filters are required. Apply the convolution operations on collected images for detection. The produced output is considered as feature map or activation map.[15]. In the fig. no.-3 Author [22] discuss about collecting about the dataset and preprocessing done on it, the output is supplied to extract the fetures and optimize them. The output of this then trained to store in database. The uploading the testing data and compared and then output of this is analyzed for classification.

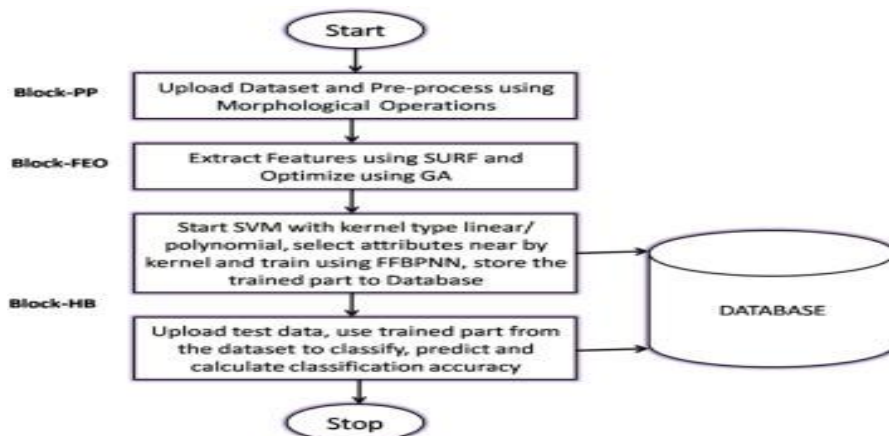
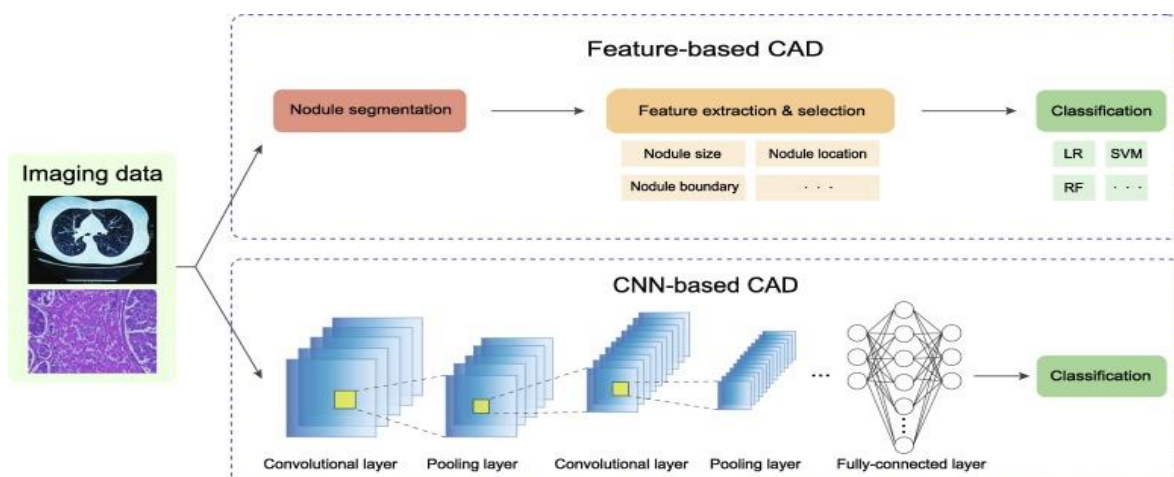


Fig No.3 SVM using hybrd algorithm [21]

H. Deep Learning

In deep learning, the use Convolution Neural Network and preprocessing pipeline for enchancing the accuracy of processes. It enchances the quality of smooth and unsmooth lung images for better understanding. The use of image processing technique in medial filed has also helped with CNN for enchancing image quality. The use deep learning layers with CNN and image processing algorithm will detect the small spots in Computed tomography images.[2][6][7] .



In fig no.-2 Author [21] discuss about supplying the imaging data convolution layer , the output of convolution layer is given to pooling layer , then the output of pooling layer is given to fully connected layer and the output we observe as the classification of imaging data.

I. Transfer learning

It is machine learning method, in which, we use the pre-trained model on input data as first process. The output of first process is optimized for modeling next task on input images. Using the transfer learning on the lung cancer images will result in good performance on less data. It is easy compared to other model for detecting the lung cancer from images.[3]

3. Comparison

Sr. No.	POINTS	TECHNIQUE
1	VGG16	First tuned block is 5 th block
2	Inception V3	Backward tuning from 10 th block
3	ResNet50	Contain 5 convolution layers and three fully connected layers
4	DEEP LEARNING	Uses the VGG16 with 16 convolution layers
5	ALEX NET	It uses 8 deep layers
6	SUPPORT VECTOR MACHINE	Use hyperplane to separate the data into classes
7	IMAGE PROCESSING	Operation on image to get image details
8	DATA AUGMENTATION	Adding New data to artificially derived from existing trained data
9	TRANSFER LEARNING	Transfer large knowledge to smallest model

Table No.-1 Comparison of methods

4. Conclusion

Paper describes the various methods suggested by authors, to detect the abnormal growth of tissue in lung , to predict the lung cancer . The different methods have different approaches. The Artificial Neural Network can be the best approach, for detection compared to other method and manual detection.

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