

Lung Cancer Detection Using Convolutional Neural Network

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Abstract-

In all the disease that have life in humankind lung cancer has appear as one of the most data one time and again. Also, it is one of the most general and offering to deaths amidst all of the cancers. Cases of lung cancer are increasing fastly. There are nearly 80,000+ cases per year in India. The diseases has a currently to be asymptomatic generally in its quickly stages thus making it nearly impossible to detect.

the aim will be focussed onto list, discuss, compare and analyse some methods in image segmentation, feature extraction as well as various techniques to classify and detect lung cancer in there quick stages.

Keywords- Convolutional neural network (CNN), Chest ct imageprocessing, Deep learning ,LUNA16, Data Science Bowl 2017.

1.INTRODUCTION

Lung cancer is a cancer that starts in the cells that drum up, the lungs . There are many other types of cancer, such as kidney or breast, lung can spread to the lungs[1]. Lung cancer is divided into 2 types non-small cell lung cancer and small cell lung cancer. These types are grow and spread differently. Lung cancer, like all cancers, can act differently in each person, depending on the kind of lung cancer it is and the stage it is in. But when lung cancer diffuse outside the lungs, it frequently goes to the same places[2]. The first place lung cancer usually spreads to is the lymph nodes in the center of the chest. In its later stages, lung cancer may spread (metastasize) to distant parts of the body, like the liver, brain, or bones[3]. Convolutional Neural networks can

identify and classify lung cancer types with greater accuracy in a shorter period. This research paper has considered using Convolutional Neural Network (CNN) architecture to classify the benign, cancer, and non cancer[4].

2.LITERTAURE SURVEY

In a different research team model comparison in their convolutional neural network-based for lung nodule achieved a lower accuracy of 97.62% in comparison to the CNN model, mainly because no image augmentation and feature selection technique was used before the CNN architecture used the mRMR technique to achieve a model accuracy of 99.51% [1].

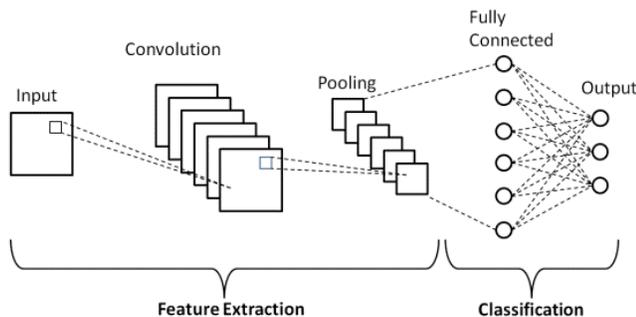
The Convolutional neural network are used for classification by using 1006 images of LIDC dataset [2], 95% of accuracy results found with 80% training and 20% of testing images. Identification of the lung nodules by applying computed tomography images is proposed by the author [3] where it produces the sensitivity results of 95%, thereby patient survival rate becomes higher. The region of interest are retrieved by using methods such as filter, Blur, image slicing. The nodule size of 3mm is obtained to predict lung cancer in the first stage.

In 2017, Wafaa Alakwaa et al. [4] proposed a 3D CNN-based approach to detect lung cancer. Kaggle Data Science Bowl and LUNA16 datasets were used. LUNA16 one was to train the U-Net model to detect lung nodules as lung nodules were not labeled in the Kaggle dataset. Segmentation,

downsampling, Normalisation, and Zero Centering were performed in the image pre-processing phase. The pixel values of the CT images were first translated to Hounsfield units and then for segmentation, thresholding was used.

In 2020, S. Shanthi et al. [5] proposed a system consisting of a stochastic diffusion search algorithm and classification algorithms such as Neural networks to detect lung cancer. 280 images (150 normal and 130 abnormal) from a dataset named TCGA were acquired and used.

3. Algorithm



In neural networks, Convolutional neural network is one of the main division to do images recognition, images classifications. Objects detections, recognition faces etc. CNN image classifications takes an input image, process it and classify it under certain categories (Eg., cancer ,non cancer). Computers seen an input image as array of pixels and it depends on the image resolution. Based on the image resolution, it will see $h \times w \times d$ (h = Height, w = Width, d = Dimension). Eg., An image of $6 \times 6 \times 3$ array of matrix of RGB (3 refers to RGB values) and an image of $4 \times 4 \times 1$ array of matrix of grayscale image.

Technically, deep learning CNN models to train and test, each input image will pass it through a series of convolution layers with filters (Kernels), Pooling, fully connected layers (FC) and apply Softmax function to classify an object with probabilistic values between 0 and 1.

4. Summery

- Provide input image into convolution layer.
- Choose parameters, apply filters with strides, padding if requires. Perform convolution on the image and apply ReLU activation to the matrix.
- Perform pooling to reduce dimensionality size.
- Add as many convolutional layers until satisfied.
- Flatten the output and feed into a fully connected layer (FC Layer).
- Output the class using an activation function (Logistic Regression with cost functions) and classifies images.

5.FUTURE WORK

Additionally research and studies are to be conducted and validation of the proposed models of convolutional neural networks has to be performed. Validation of the offer models is required for the practical application of these in the screening procedure of lung cancer and thereby increasing the detection in quickly stages. More research and trials are to be managed utilizing the technological advancements and the doctors have to take up the challenge to extemporized and implement them.

6.CONCLUSION

One of the most diseases to have existed is lung cancer. This disease unfortunately is extremely tough to treat after having spread upto an extent or reaching a serious stage. Image enhancement, Image processing are a few methods used to improve the accuracy and aid the process. For training, the most popular datasets used are LUNA16, Super Bowl Dataset 2016, and LIDC-IDRI. By the means of this review paper, we aim to list out all the major researches that have been done over the past years and can be improved upon to achieve better results.

7. REFERENCE

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