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"Lung Cancer Detection"

Abhijeet Shimple **Rachit Sardar** **Shivam Raj** **Yash Badodekar**

(Students,Department of Computer Engineering, SAE Kondhwa,Pune)

ABSTRACT

Detection of lung cancer is the most interesting research area of researcher's in early stages. The proposed system is designed to detect lung cancer in premature stage in two stages. The proposed system consists of many steps such as image acquisition, preprocessing, binarization, thresholding, Segmentation, feature extraction, and neural network detection. At first Input lung CT images to the system and then passed through the image preprocessing stage by using some image processing techniques. In first stage, Binarization technique is used to convert binary image and then compare it with threshold value to detect lung cancer. In second stage, segmentation is performed to segment the lung CT image and a strong feature extraction method has been introduced to extract the some important feature of segmented images. Extracted features are used to train the neural network and finally the system is tested any cancerous and noncancerous images. The Lung cancer is a disease of abnormal cells multiplying and growing into a tumor. Cancer cells can be carried away from the lungs in blood, or lymph fluid that surrounds lung tissue. Now several systems are proposed and still many of them are conceptual design. Efficient Net based Classification and detection system of lung cancer.

Keywords- Conventional Neural Network (CNN), Computed Tomography, Efficient Net, and Small Cell Lung Cancer.

I. INTRODUCTION

Due to large prevalence of smoking and air pollution around the world, lung cancer has become one of the most common and deadly disease in recent decades. It often takes long time to develop and most people are diagnosed with the disease within the age bracket 55 to 65. Early identification and treatment is the best available option for the infected people. Reliable identification and classification of lung cancer requires pathological test, namely, needle biopsy specimen and analysis by experienced pathologists. However, because it involves human judgment of several factors and a combination of experiences, a decision support system is desirable in this case. Recent developments in image processing, pattern recognition, dimensionality reduction and classification methods has paved the way for alternate identification and classification approaches for lung cancer. A number of machine learning (ML) algorithms including artificial neural network (CNN), support vector machine (SVM), discriminant analysis, decision trees and ensemble method addresses the diagnosis and classification of lung cancers through image processing and pathological identifiers. In addition to these ML approaches, deep learning through restricted BoltzmCNN machine in the form of auto encoders has shown promising success in classification tasks in different domain including acoustics, sentiment classification, and image and text recognition. Motivated by the success of deep learning in relevant fields, a deep learning based classification method is investigated in this work.

II. Literature Survey

Lilik Anifah, Haryanto, Rina Harimurti, Zaimah Permatasari, et al. [1], this research focuses on detection of lung cancer using Artificial Neural Network Back-propagation based Gray Level Co-occurrence Matrices (GLCM) feature. The lung data used originates from the Cancerimagingarchive Database, data used consisted of 50 CT-images. CT-image is grouped into 2 clusters, normal and lung cancer. The steps of this research are: image preprocessing, region of interest segmentation, feature extraction, and detection of lung cancer using Neural Network Back-propagation. The results shows system can detect CT-image of normal lung and lung cancer with accuracy of 80%. Hopefully use to help medical personnel and research to detect lung cancer status.

Prof. Anuradha S. Deshpande, Dhanesh D. Lokhande, Rahul P. Mundhe, Juilee M.Ghatole, et al. [2], In the Lung cancer detection system, we have detected various stages of cancer by using Support vector machine classifier (SVM). The watershed segmentation is used in this system which is the most effective segmentation technique. Using MATLAB software, we have designed Graphic User Interface (GUI) and it is used to perform all the processes of the system. Our goal is to obtain more accurate and precise results of the different stages of cancer by using various techniques. We have performed the fusion of CT and MRI scanning. This technique improves the quality of the data. Thus, we get the appropriate stage.

Rachid Sammouda et al. [3], in this paper an enhanced method of Hopfield Artificial Neural Network Classifier model is proposed to segment extracted lung regions from human chest Computer Tomography images. The images are acquired using Computer Tomography imaging techniques from normal subjects and others as candidates for lung cancer diagnosis. A combination of bit-planes of each pixel is used to enhance edges' detection of lung region lobes. Three diagnostic rules are verified as well defined filters of candidate cancerous regions from the status of candidate to false or true positive status.

Syed Moshfeq Salaken, Abbas Khosravi, Amin Khatami, Saeid Nahavandi et al. [4], In this work, a deep auto encoder classification mechanism is proposed which first learns deep features and then trains an artificial neural network with these learned features. Experimental results show the deep learned classifier outperforms all other classifiers when trained with all attributes and same training samples. It is also demonstrated that the performance improvement is statistically significant. The contribution of this work is two folds. Firstly, it is shown for the first time, deep learning methods can outperform existing works on small dataset for lung cancer classification. Secondly, architecture of deep auto-encoder network for lung cancer classification is proposed which outperforms other methods and also show that the performance improvement is statistically significant.

Swati Mukherjee, Prof. Sneha Bohra et al. [5], in this system we will develop Lung Cancer detection system based on machine learning and neural network. It decreases the chances of getting harm to human by early detection of cancer. In recent past, there has been a lot of progress on data mining and machine learning techniques to predict the various types of diseases. The proposed model is a tool which will take input as the CT scan images and it will predict the possibilities of the disease and its stages. Thus we will try to provide a direction to medical practitioners to make quick intelligent clinical decisions which can help in prophylaxis of the disease and thereby reduce any treatment costs.

III. Proposed Methodology

In a proposed system, we propose a novel Lung detection and Stage prediction mechanism is proposed which first learns deep features and then trains an artificial neural network with these learned features. Experimental results show the deep learned classifier outperforms all other classifiers when trained with all attributes and same training samples. It is also demonstrated that the performance improvement is statistically significant. Classification of lung cancer using a low population, high dimensional dataset is challenging due to insufficient samples to learn an accurate mapping among features and class labels. Current literature usually handles this task through handcrafted feature creation and selection Deep learning is found to be able to identify the underlying structure of data through the use of Efficient-Net.

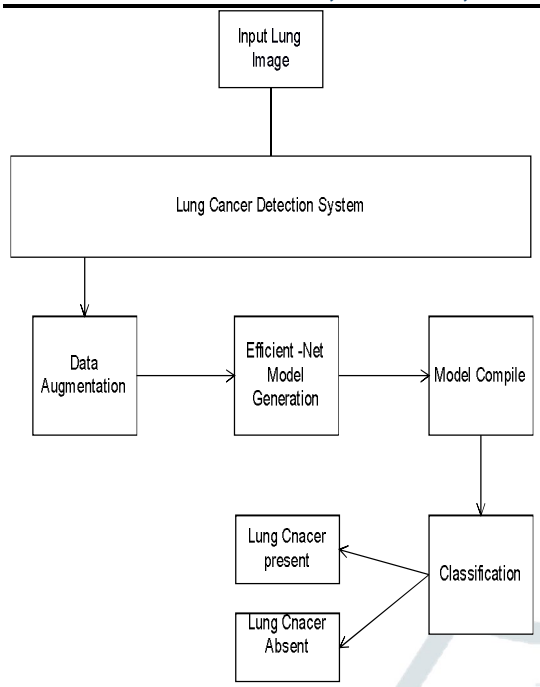

Figure1: Proposed Architecture

IV. Conclusion:

This shows that application of deep learning has the potential to significantly detect and classify with almost accuracy for the low population, high dimensional lung cancer dataset without requiring any hand-crafted, case specific features.

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