Chapter 5
Machine Learning for Prediction of Lung Cancer

Nikita Banerjee
College of Engineering and Technology, Rourkela, India

Subhalaxmi Das
College of Engineering and Technology, Bhubaneswar, India

ABSTRACT

This work is focused on lung cancer prediction using machine learning technique. Lung cancer is one of the widespread diseases due to the growth of irregular cell in both the lungs as a result of which this irregular cell starts growing into tumour, and this tumour can be cancerous as well as non-cancerous. In the traditional approach CT scan images has been used based on the report image segmentation has been done to remove the noise so that a clear picture can be generated to detect the location of tumor. Once the location is known then classification or clustering approach can be used to predict the stage of cancer. Previously supervised machine learning algorithm has been used to predict lung cancer. In this work a prediction model is proposed that is based on the median filter, watershed segmentation, and then feature extraction has done like texture and region. And on the extracted feature classification technique was applied for prediction of cancer.

INTRODUCTION

Cell division is one of important part of a life, every time an old cell dies and gets replaced with new one in controlled fashion. But when there is abnormal growth of cell occur it lead to cancer, and a mask of abnormal cell is called tumor. At the same

time every tumor are not cancerous, a tumor has been divided into two categories one is benign which is also called as non-cancerous tumor that means it does not spread to other part of the body and other one is malignant or the cancerous tumor which spread through the blood vessel to other part of the body. There is various type of cancer like leukemia, lymphoma, carcinoma, sarcoma, and melanoma. Out of all this type carcinoma is one the common type of cancer; Carcinomas are cancers that occur in epithelial tissues in the body. They comprise 80% to 90% of all cancers. Most breast, lung, colon, skin, and prostate cancers are carcinomas. This class includes the two most common skin cancers, basal cell carcinoma and squamous cell carcinoma. Also in this class is the glandular cancer adenocarcinoma (Stoppler, n.d).

Among the carcinoma cancer lung cancer has become one of the root cause of death from a survey done by national cancer institute it has been estimated as 23.5% of death from all other cancer. The main cause of lung cancer is smoking and other causes are second hand smoking, explore to radon gas, asbestos fiber etc. Basically lung cancers are of two type's small cell lung cancer and non small cell lung cancer, and this can be distinguished based on the tumor size. A small cell lung cancer occur to those who smoke it has spread to other part of the body very rapidly whereas non small cell lung cancer is the most common type of lung cancer which can be further divided into other type based on the cancer cell found the tumor. Symptoms of lung cancer are cough that produce blood, shortness of breath, unexpected weight loss, change in the appearance of finger, persistent cough etc (Cancer treatment center of America 2020). Diagnosis of lung cancer at early stage is very crucial so that based on the diagnoses report stage of cancer can be detected and based on that treatment can be given at early stage, the diagnosis process include Computed tomography, X-Ray of chest, Magnetic Resonance Imaging, Blood test etc.

In prediction of cancer CT scan report is basically used. But CT scan report is full of noise which cannot be seen by human eye for that reason various digital image processing plays a important role to get a noise free image. Digital image processing is the process where the analysis and manipulation of image is used to extract some useful information from the image. Digital image processing involve various step like image pre-processing where we can enhance the image using histogram equalization, spatial filter etc. Then image restoration can be done where various kind of noise like salt and pepper noise, Gaussian noise etc are applied and filter like median filter, mean filter can be applied on the pre-processed image. After that color conversions is applied only if the image is colored image then convert it to gray level.

Image segmentation is a process which divides the image into several segment based on the pixel, once the image segmentation is over the feature extraction can be applied. Feature extraction is a type of dimensionality reduction where a set of raw

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