

AN EFFICIENT COMBINED INTELLIGENT SYSTEM FOR SEGMENTATION AND CLASSIFICATION OF LUNG CANCER COMPUTED TOMOGRAPHY IMAGES

ABSTRACT

Nowadays, people's shifting lifestyles have led to a surge in interest towards lung cancer in recent times. Human lung cancer patients may have a higher probability of surviving if the disease is discovered early. Medical imagery evaluation is a useful tool in the diagnosis of various types of specific cell tumor when using Computer Aided Diagnosis (CAD). Numerous strategies have been put out to deal address this problem, primarily drawing influence from deep learning techniques. However, the approaches now in use typically fail to distinguish well, and it is particularly difficult to classify and segment the lung cancer. To overcome this issue, Canny-Based Expectation Maximization (CEM) and Machine Learning Algorithm¹ was proposed for lung cancer segmentation and classification. This study looks at how computed tomography images can be used to classify lung cancer. Researcher suggested Edge Sharpening based CLAHE approach for pre-processing, Canny-based EM technique for segmenting the filtered images, and PCA technique for extracting GLCM and Daubechies wavelet features. Then, using the collected features, logistic regression classifiers completed the classification process. Moreover, Segmentation faces a number of challenges, including varying shapes, sizes, and intricate surrounding tissues. Therefore, an ADBN-Optimized LightGBM model was proposed for efficient lung cancer classification and segmentation from computed tomography images. Pictures are gathered for test evaluation using LUNA 16, KDSB, CIA, and regional databases. There are three categories for the database of images:

validation, testing, and training. Following data gathering, efficient filtering and histogram equalization methods are used to reduce distortion and improve the picture quality. The impacted area of the lung picture is then divided into multiple layers of a network so that every pixel may be examined. The divided area is carefully examined in order to detect malignancy, and numerous enormously significant features are also extracted. Ideal features will be selected using spiral parameters and a compromise method, appropriately reducing the dimensionality of the system. Optimized LightGBM, which correctly differentiates between aberrant and normal cancer pictures, improves the characteristics.

Keywords: Machine learning, preprocessing, feature extraction, segmentation, optimization, and evaluation metrics