LUNG TUMOR DETECTION USING DEEP LEARNING

Literature Review:

1.A generalized framework for lung Cancer classification based on deep generative models :

The paper introduces a new framework for lung cancer detection and classification using two types of deep models. The first model is a generative model that synthesizes CXR images to balance the dataset, allowing for automatic conversion of small unbalanced datasets to larger balanced ones. The second model, ResNet50, is trained on the balanced dataset for cancer classification. The framework achieves 98.91% overall detection accuracy, 98.85% AUC, 98.46% sensitivity, 97.72% precision, and 97.89% F1 score. The classifier takes 1.2334 seconds on average to classify a single image using a machine with 13GB RAM.

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2. Lung Cancer Detection: A Deep Learning Approach:

We present an approach to detect lung cancer from CT scans using deepresidual learning. We delineate a pipeline of preprocessing techniques to highlightlung regions vulnerable to cancer and extract features using UNet and ResNet models. The feature set is fed into multiple classifiers, viz. XGBoost and Random Forest, andthe individual predictions are ensembled to predict the likelihood of a CT scan beingcancerous. The accuracy achieved is 84% on LIDC-IRDI outperforming previous attempts.

3.Lung cancer detection from CT image using improved profuse clustering and deep learning instantaneously trained neural networks:

The paper addresses the challenge of automatic lung disease detection by emphasizing the importance of preprocessing lung cancer images. It focuses on tasks like edge detection, resampling, image enhancement, and denoising to improve image quality. The study uses the Cancer Imaging Archive dataset, applies weighted mean histogram equalization, and employs an improved profuse clustering technique for segmentation. Spectral features from the affected region are used with deep learning-based neural networks to predict lung cancer. The system achieves 98.42% accuracy with a minimum classification error of 0.038.

4.A pipeline for lung tumor detection and segmentation from CT scans using Dilated Convolutional Neural Networks:

The paper introduces an automated pipeline for lung tumor detection and segmentation from 3D lung CT scans, focusing on early detection of lung cancer. It proposes a novel dilated hybrid-3D convolutional neural network architecture for tumor segmentation, incorporating 3D structural information. The model outperforms other contemporary models, achieving average and median dice coefficients of 65.7% and 70.39%, respectively, on the test set

5.Detection of lung cancer on chest CT images using minimum redundancy maximum relevance feature selection method with convolutional neural networks

The study focuses on early detection of lung cancer using deep learning models such as LeNet, AlexNet, and VGG-16. Convolutional neural networks (CNNs) are employed for feature extraction and classification from computed tomography (CT) images. Image augmentation techniques are applied to enhance classification accuracy. The combination of AlexNet and k-nearest neighbor (kNN) classifier achieves an accuracy of 98.74%. Further feature selection using the mRMR method boosts accuracy to 99.51%. This proposed model offers a consistent and efficient diagnosis for lung cancer detection using chest CT images.

6.Early diagnosis of Lung Cancer with Probability of Malignancy Calculation and Automatic Segmentation of Lung CT scan Images

Computer aided detection system was developed to identify the pulmonary nodules to diagnose the cancer cells. Main aim of this research enables an automated image analysis and malignancy calculation through data and CPU infrastructure. Our proposed algorithm has improvement filter to enhance the imported images and for nodule selection and neural classifier for false reduction. The proposed model is experimented in both internal and external nodules and the obtained results are shown as response characteristics curves.

7. Diagnosis of Lung Cancer Based on CT Scans Using CNN

Lung cancer is one of the most lethal cancer types; thousands of peoples are infected with this type of cancer, and if they do not discover it in the early stages of the disease, then the chance of surviving of the patient will be very poor. For the suggested reasons above and to help in overcoming this terrible, early diagnosis with the assistance of artificial intelligence procedures most needed. Through this research, a Computer-aided system introduced for detecting lung cancer in a dataset collected from the Iraqi hospitals by using a convolutional neural network technique with AlexNet architecture for helping with the diagnosis of the patient's cases: normal, benign, or malignant. The proposed model gives high accuracy ups to 93.548%. The other performance metrics comes with high values such as 95.714% for sensitivity and 95% for Specificity.

8.Deep learning for lung Cancer detection and classification

The study addresses the significant issue of lung cancer-related deaths using Computed Tomography (CT) scans. It focuses on detecting cancerous lung nodules and classifying lung cancer severity. Deep learning methods, along with advanced feature extraction techniques like HoG, wavelet transform-based features, LBP, SIFT, and Zernike Moment, are employed. The features are selected using the FPSO algorithm and classified using a novel FPSOCNN, reducing computational complexity. Experimental results demonstrate the superior performance of FPSOCNN compared to other techniques, validated on real-time data from Arthi Scan Hospital.

9.A generalized framework for lung Cancer classification based on deep generative models

The paper presents a new framework for lung cancer detection and classification using generative and ResNet50 models. The generative model balances small, unbalanced datasets by synthesizing diverse CXR images. The ResNet50 model, trained on a large balanced dataset, achieves high accuracy with 98.91% overall detection accuracy, 98.85% AUC, and other impressive metrics. The classifier processes a single image in 1.2334 seconds on a machine with 13GB RAM.

10.Performance evaluation of deep learning techniques for lung cancer prediction

Due to the increase in pollution, the number of deaths caused by lung disease is rising rapidly. It is essential to predict the disease in earlier stages by means of high-level knowledge and acquaintance. Deep learning-based lung cancer prediction plays a vital role in assisting the medical practioners for diagnosing lung cancer in earlier stage. Computer-Aided diagnosisis considered to bring a boost to the field of medicine by tying it to automated systems. In this research paper, several models are experimented by using chest X-ray image or CT scan as an input to detect a particular disease. This research work is carried out to identify the best performing deep learning techniques for lung disease prediction. The performance of the method is evaluated using various performance metrics, such as precision, recall, accuracy and Jaccard index

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