Lung cancer detection using image processing and machine learning techniques

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Abstract: Lung cancer is a dangerous cancer and one of the most serious body problems in the world. The death rate of it is highest compared to other cancers. In the medical field, computer tomography scan images are the best imaging technique to diagnose. Therefore computer-aided diagnosis can be helpful for doctors to identify the cancer cell with more accuracy. Many researchers have done research using image processing techniques and machine learning models implemented for detecting lung cancer cells. This research aims to study the various computer-aided techniques and analyze the current best techniques, and then find out their limitations and drawbacks, and finally propose a new model with improvements. In this study, we propose a deep transfer learning approach for the detection of three main types of lung cancer and non-cancer (adenocarcinoma, squamous cell carcinoma, and large cell carcinoma). The proposed approach is evaluated on the Kaggle CT images dataset. In this study, we propose a deep transfer learning-based approach for Lung cancer detection using CT scan images. The $EfficientNet$, $ResNet$, and $DenseNet$ pre-trained model is utilized to transfer the learned classification knowledge with the images and finally selected the best-pre-trained model. We pre-processed the images using Contrast Limited adaptive histogram equalization. Then using filters (Gaussian, Median) remove noises. Then checked the accuracy with each image processing step and applied the best image set to the final model. Finally, will classify as normal or abnormal. Experimental results demonstrate proposed work outperforms the state-of-the-art approaches with a classification accuracy of 94%.

Keywords: Adenocarcinoma, CT scan image, Deep transfer learning, $EfficientNet$, Large cell carcinoma, Squamous cell carcinoma