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(54) Title of the invention : A HYBRID APPROACH FOR ANALYSING OF EARLY-STAGE DETECTION AND PREVENTION OF LUNG CANCER USING ADVANCED MACHINE LEARNING AND DEEP LEARNING ALGORITHMS

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(57) Abstract :
A hybrid Approach for analysing of Early-stage detection and prevention of Lung Cancer Using Advanced Machine Learning and Deep Learning Algorithms ABSTRACT: Cancer is a highly prevalent disease that has witnessed an increase in its fatality rate in recent years. Lung cancer constitutes the most prevalent malignancy among both males and females. The condition is caused by the uncontrolled proliferation of lung cells. Two distinct categories of cells are distinguished: benign and malignant. In contrast to malignant tumors, which potentially metastasize to other cells in the body and generate an atypical carcinogenic mass, benign tumors are typically non-threatening, non-metastatic, and have a consistent and regular morphology. Detection of lung cancer at an early stage permits effective treatment. Lung cancer symptoms typically become apparent in the terminal phase of the disease, but advanced technology and computer-assisted systems enable early detection. Currently, an assortment of conventional and machine learning techniques are utilized in automated detection systems to detect the initial stages of lung cancer. Nevertheless, these systems fail to provide accurate detection, and the processing time required to detect lung cancer is excessively long. As a result, a novel method is proposed for identifying lung cancer through the application of deep learning techniques; this method guarantees accurate detection while decreasing computational time. CT images are utilized in this study as a result of their reduced noise interference in comparison to X-ray and MRI images. Patch processing and median filtering are utilized to improve the image quality of CT imaging. Following this, a clustering segmentation procedure is applied to the pre-processed images, which divides the image and provides it to a CNN classifier. The CNN architecture is employed to facilitate the extraction and classification of features. Extracted during the subsequent extraction phase are an extensive variety of low-level and high-level characteristics. The function of the classification layer is to ascertain whether the image being processed contains a malignant, benign, or normal tumor. Furthermore, this study involved the calculation and integration of statistical parameters including MSE, PSNR, Accuracy, Sensitivity, Specificity, and others, into the preexisting system.

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