Performance Analysis of Lung Cancer Detection using Deep Learning Techniques

Lung cancer remains the leading cause of cancer-related deaths worldwide. Stating that lung cancer accounts for 5.9% of all cancers and 8.1% of all cancer-related deaths in India. Lung cancer impact on both men and women is substantial, and its mortality rates are a cause for concern. Efforts to reduce its prevalence and improve outcomes include public health campaigns, smoking cessation programs, and advancements in early prediction, detection and treatment methods. Raising awareness about the risks associated with smoking and the importance of timely screenings is essential to address this serious health issue. Cancer is the second leading cause of death globally and among all the cancers, Lung cancer is the major reason for cancer-related deaths. Detecting lung cancer at early stages can improve the survival rate, but it is a difficult task as lung cancer shows very few symptoms. To diagnose lung cancers at an earlier stage, Computed Tomography (CT) images are used. Nowadays medical decision-making is performed using only CT scan images and an automatic assessment of Computer-Aided Diagnosis (CAD) system. CAD system is a medical diagnosis tool that is very useful for today's medical imaging practicality. Computer-aided detection (CADe), also called computer-aided diagnosis (CADx), are systems that assist doctors in the interpretation of medical images. Imaging techniques in X-ray, MRI, Endoscopy, and ultrasound diagnostics yield a great deal of information that the radiologist or other medical professional has to analyze and evaluate comprehensively in a short time. CAD systems process digital images or videos for typical appearances and to highlight conspicuous sections, such as possible diseases, in order to offer input to support a decision taken by the professional. The primary aim of this work is to develop an advanced computer-aided diagnosis (CAD) system using deep learning algorithms that will efficiently extract data from CT scan images and provide precise and timely diagnosis of lung cancer. The work is divided into three phases - segmentation, feature extraction and classification. The CT scan images are segmented using (OTSU) Thresholding. This work focuses on utilizing the deep learning techniques, namely Convolutional Neural Network (CNN) for feature extraction and recurrent neural network (RNN-LSTM) for lung cancer classification and obtain high accuracy.

Keywords - CT scan Images, Convolutional Neural Network, Recurrent Neural Network and Long Short Term Memory.