Lung Cancer Detection from Image using Python

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Synopsis Report

Title

Lung Cancer Detection from Images using Python

Abstract:

The World Health Organization (WHO) states that Cancer is the leading cause of death worldwide and accounts for nearly 10 million deaths in 2020 alone. Out of all the different possible types of Cancer, Lung cancer was the most common cause of cancer death in 2020, accounting for about 1.80 million deaths.

Lung cancer occurs when cells of the lungs start dividing uncontrollably without dying off. This causes the growth of tumors which can reduce a person's ability to breathe and spread to other parts of the body.

Introduction:

Lung Cancer is the most common cancer among men and the third most common cancer in women. Cancer is the growth of abnormally and uncontrolled cells. It can damage the surrounding tissue spread far from its origin.

Malignant cause death and it could grow from every cell type in the human body. The prognosis of the disease has not been very favorable and this is largely due to the latens in detecting the presence of the malignancy. It has been reported that patients who had lung cancer treated at stage 1 have a better survival rate than those who are at the advanced stage of the disease.

Deep learning is use for the classification of CT Scan Images as cancerous/non-cancerous. The process of a feature extraction in Convolution Neural Networks is such that features are defined and computed by the algorithm itself. During the training stage, input and an output label are provided. Based on the given data, the algorithm analyses the features/patterns and for a training data, forms a set of parameters and feature extraction.

Problem Statement:

Early detection of lung nodule is of great importance for the successful diagnosis and treatment of lung cancer. Many researchers have tried with diverse methods, such as thresholding, computer-aided diagnosis system, pattern recognition technique, backpropagation algorithm, etc. Recently, convolutional neural network (CNN) finds promising applications in many areas.

Medical professionals use histopathological images of biopsied tissue from potentially infected areas of lungs for diagnosis. Most of the time, the diagnosis regarding the types of lung cancer is error-prone and time-consuming. Convolutional Neural networks can identify and classify lung cancer types with greater accuracy in a shorter period, which is crucial for determining patients' right treatment procedure and their survival rates.

Methodology/ Implementation:

The methodology/ Implementation involves:

- Understanding the problem statement
- Finding solution using pertinent techniques
- Finding image dataset
- Building a model using Deep learning and TensorFlow libraries
- Training the model using Convolutional Neural Network
- Validating the model on the split dataset
- Predicting the images retrieved from the split dataset
- Predicting images manually.

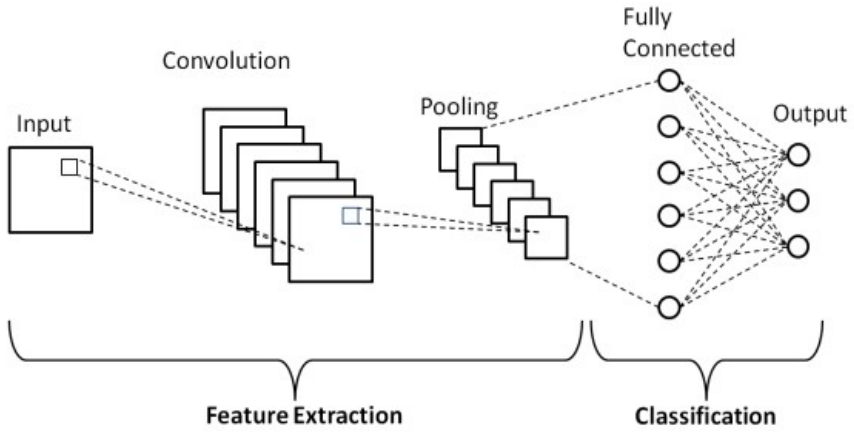

Figure: Schematic Diagram of a Basic Convolutional Neural Network.

Status of Work:

Lung Cancer is the most common cancer among men and the third most common cancer in women. Cancer is the growth of abnormally and uncontrolled cells. It can damage the surrounding

- Concepts of Machine Learning and Deep Learning has been implemented from scratch to learn and acquaint from the topic. Major code is written inpython and implemented using various libraries of python. Python and its libraries (numpy, matplotlib, etc.) has been learned and used.
- Tensor Flow and Keras libraries has been used to import CNN models.
- Loss function, optimizer, train and test split of dataset has been used usingthe mentioned libraries.
- Data augmentation is being implemented to increase the size of thedataset and strengthen the robustness of the model so that it can predictsheared, clipped and transformed and rotated images too.