

Lung Cancer Detection using Convolution Neural Network Deep Learning Technique

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Abstract -- Timely diagnosis and determination to the type of lung cancer diseases has important clinical significance. Generally, it requires multiple imaging methods to complement each other to obtain a comprehensive diagnosis. Various learning methods, such as conventional clustering and classification, have been applied in diagnosing diseases to categorize samples based on their features. Artificial intelligence based machine learning techniques provides accurate prediction model of the various biomedical diseases. This paper presents CNN deep learning technique for prediction of lung cancer diseases.

Index Terms – Machine, Features, Lung, Classification, Diagnosis, CNN, Deep Learning.

I. INTRODUCTION

Lung diseases identification based on analysis and processing of medical images is important to assist medical doctors during the diagnosis process. In this context, this work proposes a new feature extraction method based on human tissue density patterns, namely Analysis of Human Tissue Densities in Lung Diseases [1]. To counter the outbreak of corona, the accurate diagnosis of suspected cases plays a crucial role in timely quarantine, medical treatment, and preventing the spread of the pandemic. Considering the limited training cases and resources (e.g, time and budget), we propose a Multi-task Multi-slice Deep Learning System (M³ Lung-Sys) for multi-class lung pneumonia screening from CT imaging, which only consists of two 2D CNN networks, i.e., slice- and patient-level classification networks. The former aims to seek the feature representations from abundant CT slices instead of limited CT volumes, and for the overall pneumonia screening, the latter one could recover the temporal information by feature refinement and aggregation between different slices [2].

Automatic screening and diagnosis of lung abnormalities from chest X-ray images has been recently drawing attention from the computer vision and medical imaging communities. Previous studies of deep neural networks have predominantly demonstrated the effectiveness of lung disease binary classification procedures.

However, large numbers of medical images-which can be labeled with a variety of existing or suspected pathologies-are, required be interpreting and reporting upon daily by an individual radiologist; this poses a challenge in maintaining consistently high diagnosis accuracy. In this work, we present a competitive study of knowledge distillation (KD) in deep learning for classification of abnormalities in chest X-ray images [3].



Figure 1: Lungs Sample (google image)

Chest computed tomography (CT) becomes an effective tool to assist the diagnosis of coronavirus disease. Due to the outbreak of corona worldwide, using the computed-aided diagnosis technique for lungs diseases classification based on CT images could largely alleviate the burden of clinicians. In this work, we propose an Adaptive Feature Selection guided Deep Forest (AFS-DF) for lungs diseases classification based on chest CT images. Specifically, we first extract location-specific features from CT images. Then, in order to capture the high-level representation of these features with the relatively small-scale data, we leverage a deep forest model to learn high-level representation of the features. Moreover, we propose a feature selection method based on the trained deep forest model to reduce the redundancy of features, where the feature selection could be adaptively incorporated with the lungs diseases classification model [4].

II. PROPOSED METHODOLOGY

The Proposed work can be understand using followings flow chart-

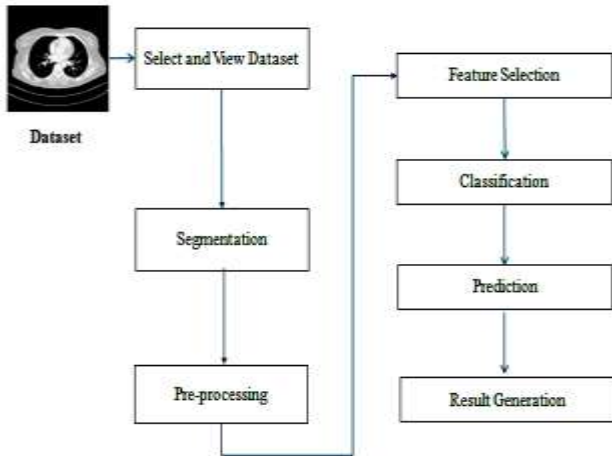


Figure 2: Flow Chart

The following steps are involved to complete the methodology-

- Data Selection and Loading
- Segmentation
- Preprocessing
- Feature Selection
- Classification
- Prediction
- Result Generation

The proposed model is introduced to overcome the disadvantages that arise in the existing system. It can be concluded that this system giving the accurate result. As we are using large dataset which will ensures the better performance. System will get output for the disease. The threshold segmentation process is the advantages of predicting tumor region in lung CT scan image. The classification using deep learning algorithm like convolution Neural Network is applied. Finally the deep learning algorithm is used to predict the lung cancer using CT scan images. The prediction result based on accuracy, precision, recall, and f1-measure.

III. SIMULATION AND RESULTS

The simulation work is performed using the python spyder IDE 3.7 software.

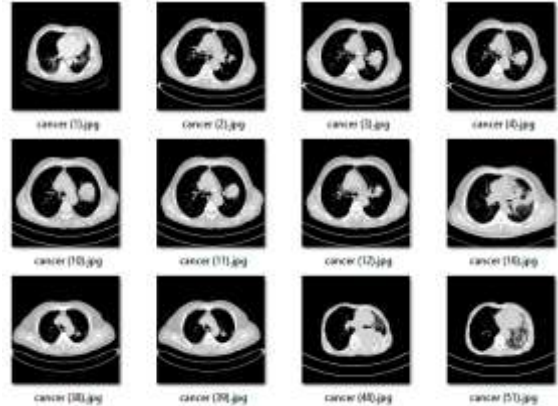


Figure 3: Dataset

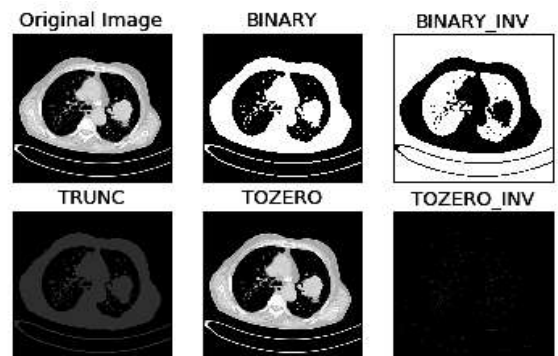


Figure 4: Image processing

Figure is 4 is showing input image processing, the original image is converted into the binary then binary inversion.

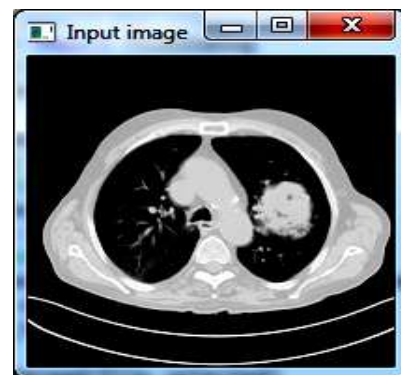


Figure 5: Input image



Figure 6: prediction

Figure 5 and 6 are showing the selection of the input image and it is predicted accurately. The Cancer image is predicted through selection of this.

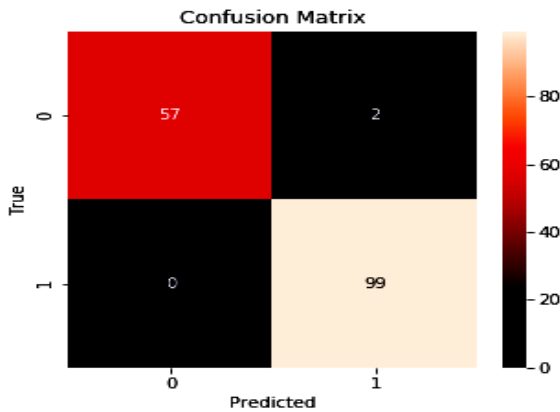


Figure 7: Confusion matrix values

Figure 7 is showing confusion matrix of the prediction model the values is as following-

True Positive = 57, False Negative = 0

False Positive = 2, True Negative = 99

**Table 1:
Result Comparison**

Sr. No.	Parameters	Previous Work [1]	Proposed Work
1	Classification Approach	Support vector Gray Level Co-occurrence	Convolution neural network
2	F_Measure	96%	99%
3	Accuracy	95.8 %	98.73 %
4	Error Rate	4.2 %	1.27 %

IV. CONCLUSION

Lung diseases or cancer remains the main source of disease related mortality for both men and women and its frequency is expanding around the world. Lung disease is the uncontrolled development of irregular cells that begin off in one or both Lungs. The earlier detection of cancer is not easier process but if it is detected, it is curable. This paper proposed a CNN deep learning technique for prediction of lung cancer diseases. The overall accuracy achieved by the proposed work is 98.73% while previous it is achieved 95.8%.

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