

# A COMPUTER BASED DETECTION OF LUNG NODULES IN CHEST RADIOGRAPHS



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## Introduction

- Lung cancer is the leading cause of cancer death in the United States.
- Lung cancer usually exhibits its presence with the formation of pulmonary nodules.
- Nodules are round or oval-shaped growth present in the lung.
- Chest radiographs are used by radiologists to detect and treat such nodules, but nodules are quite difficult to detect with human eye .
- Computer Aided Detection (CAD) applied to such data would be very essential and will be of valuable help in lung cancer screening.
- FlyerScan [1] developed at UD serves as the benchmark to this research and its performance results in competition ANODE09 are shown in [2].
- In this poster, we present facets of our proposed algorithm.

## FlyerScan CAD Algorithm

The algorithmic steps of the CAD system include :

- Local contrast enhancement
- Automated anatomical segmentation
- Detection of nodule candidates
- Feature extraction
- Candidate classification

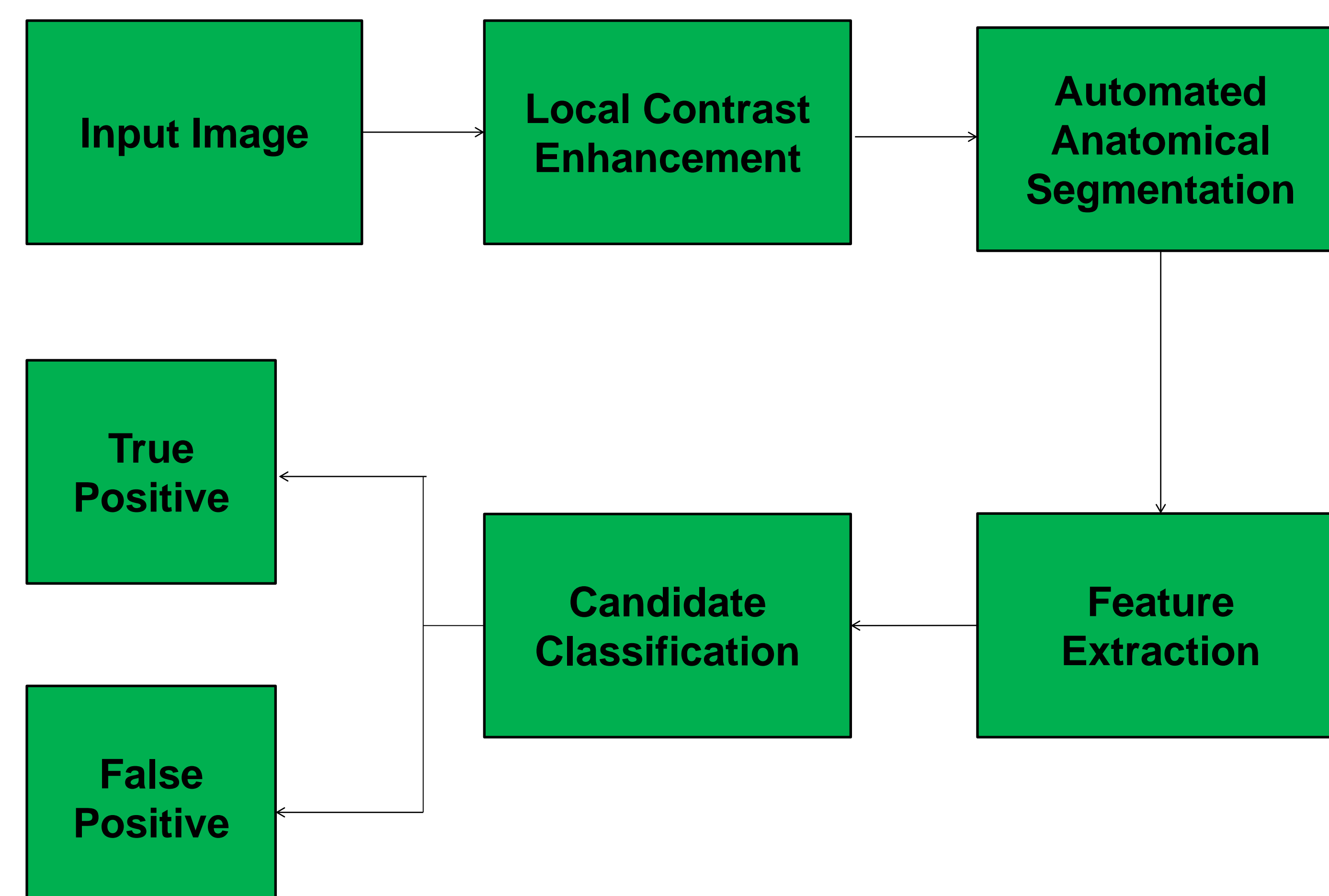


Figure 1 : CAD System block diagram

## Methodology

- Here, proposed FlyerScan algorithm is implemented for Lung Image Database Consortium (LIDC)- Image Database Resource Initiative (IDRI).
- Algorithm is trained and tested using specific sets from the LIDC-IDRI database.
- CAD system is trained based on the centroid of nodules provided by at least one of four board certified radiologists.
- In this research, we later explore into new set of classes and features.

## Results

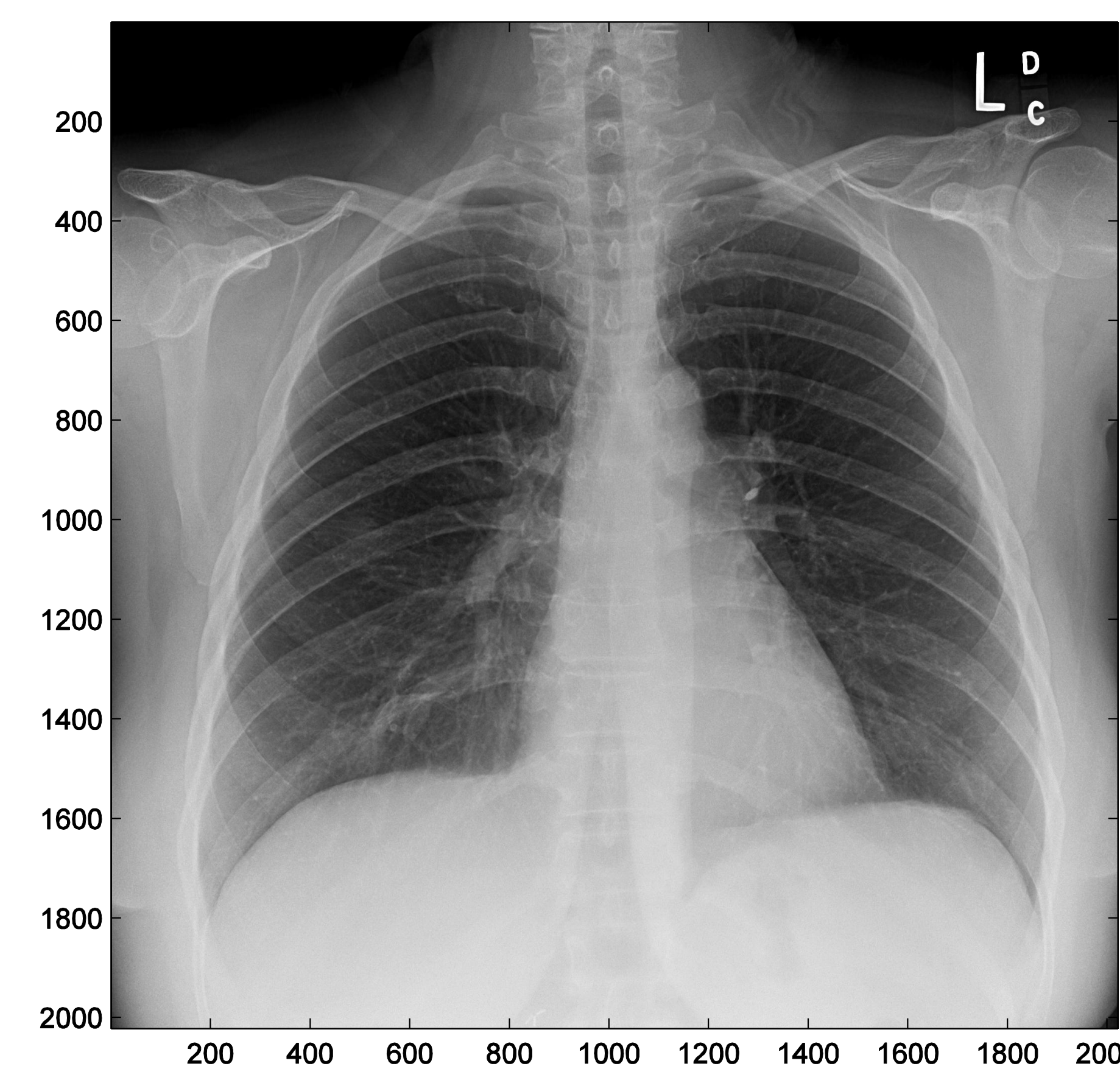


Figure 2: Original chest radiograph

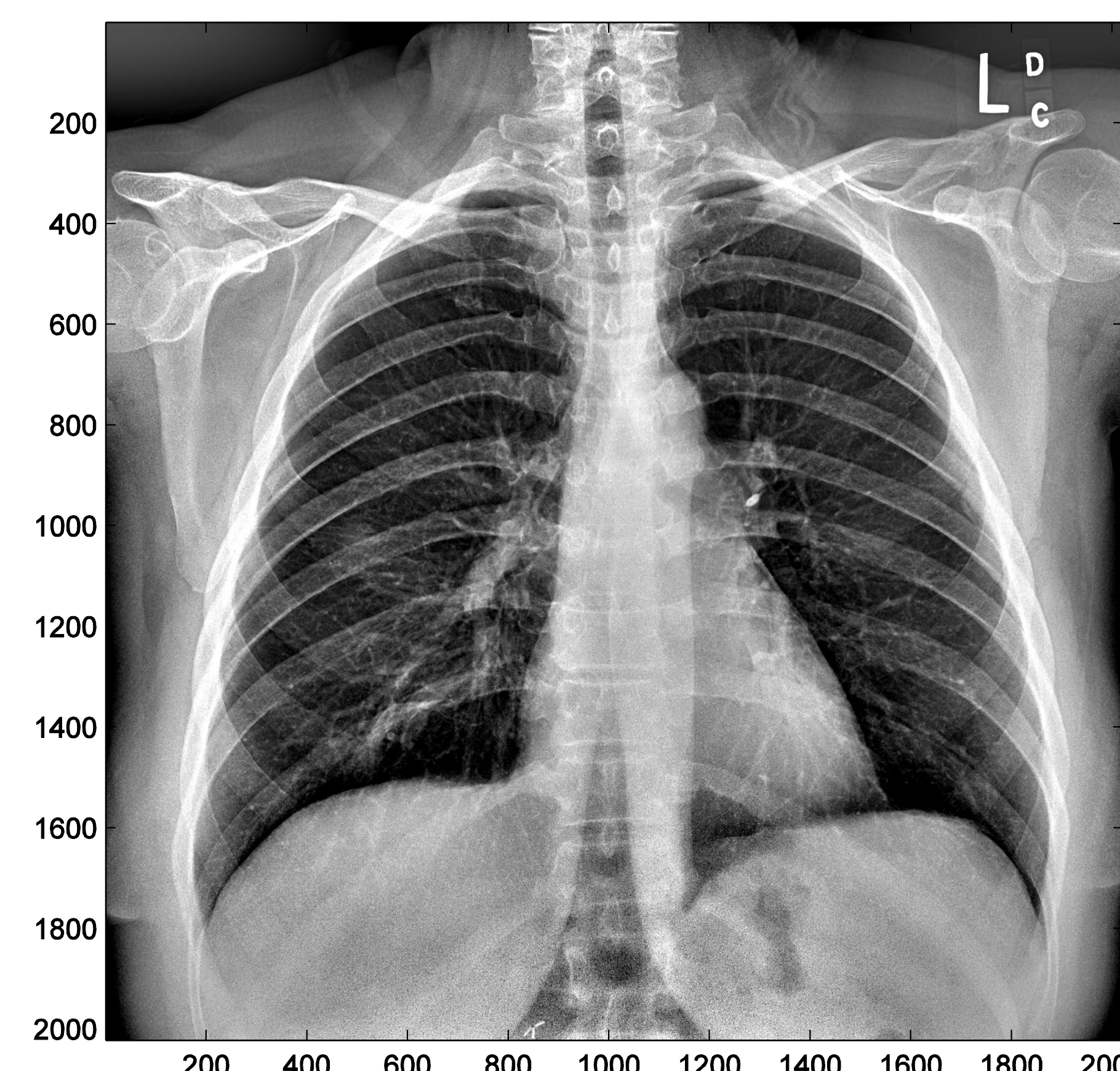


Figure 3: Local Contrast Enhancement on original chest radiograph

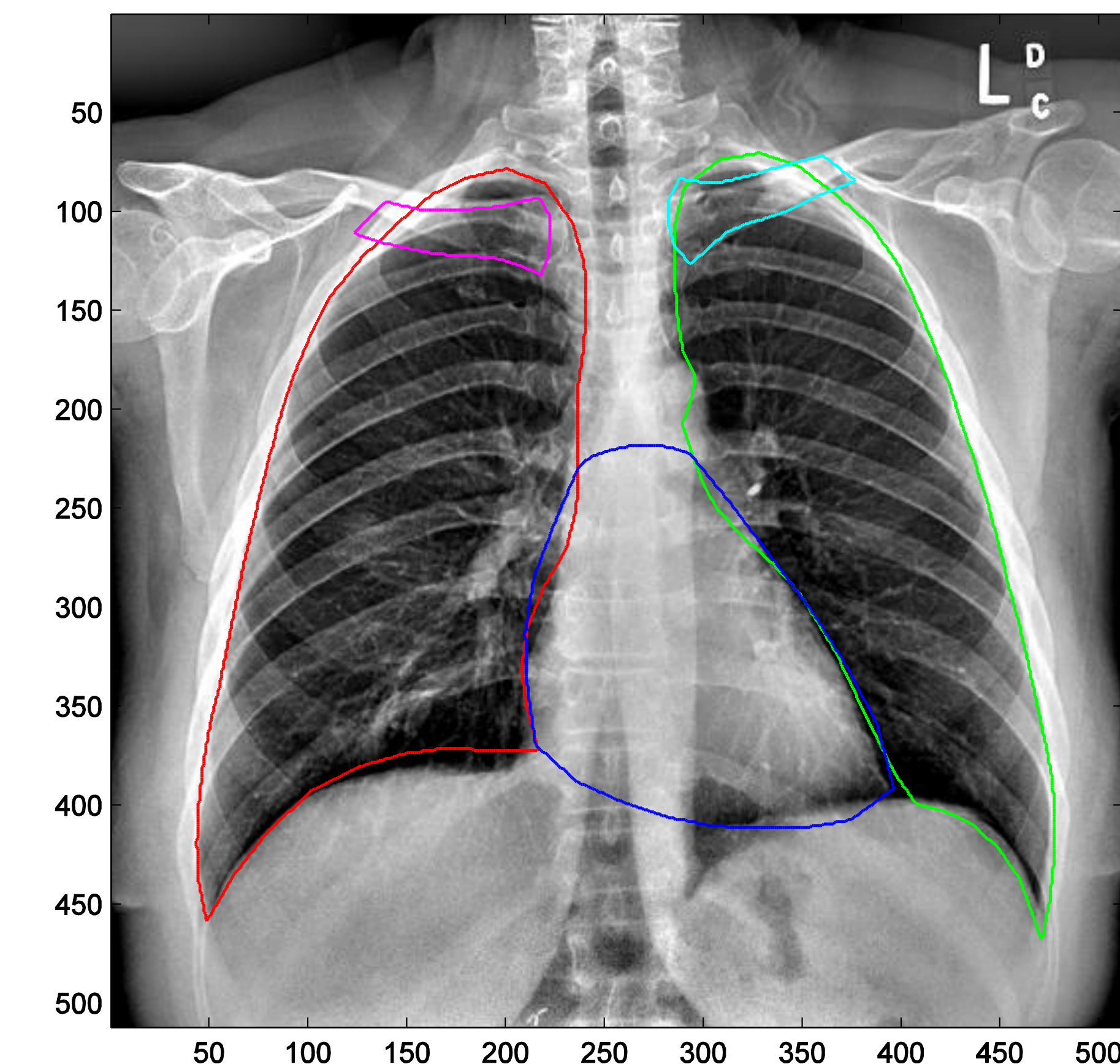


Figure 4: Lung Segmentation applied on Local contrast enhancement image

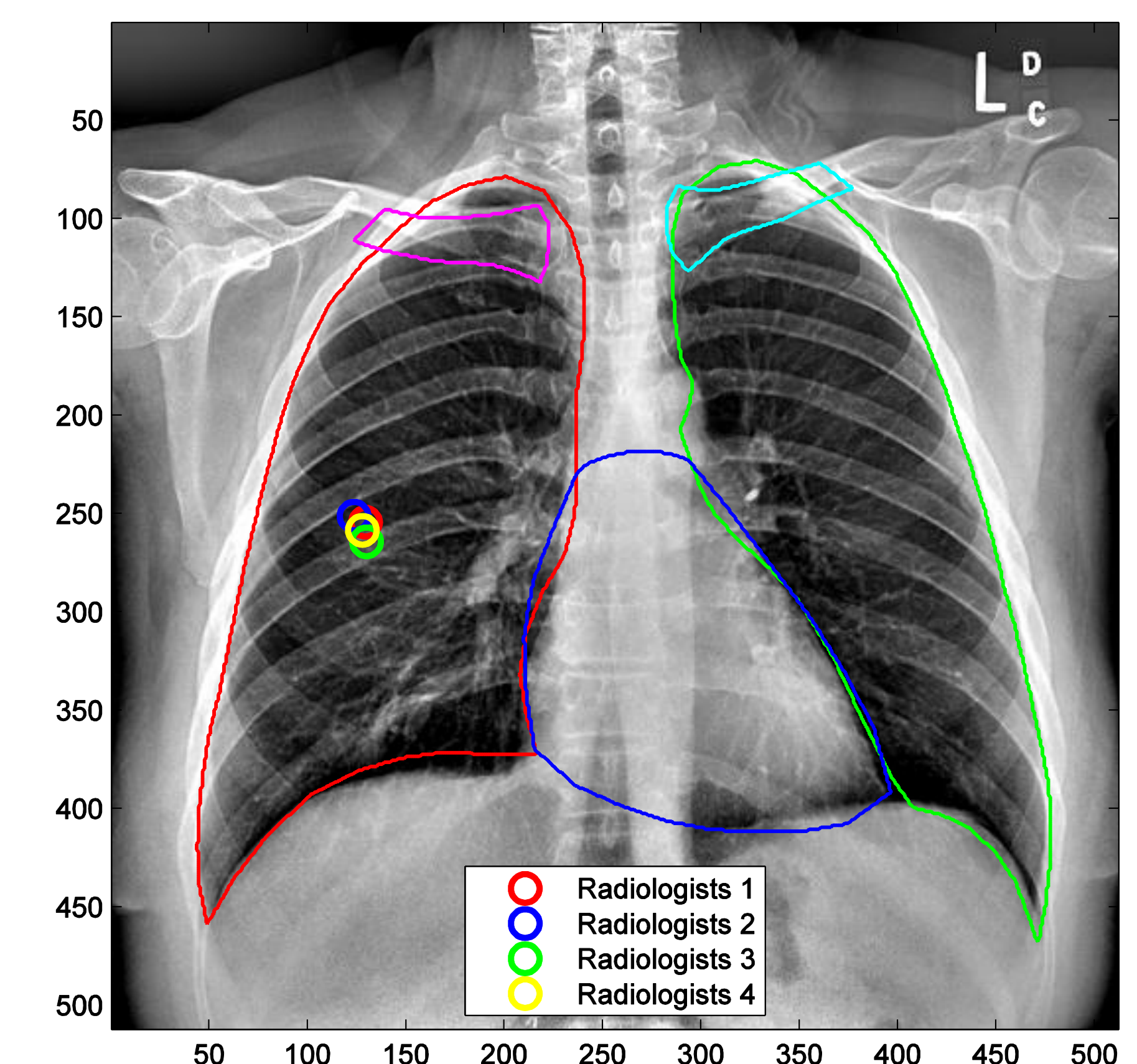


Figure 5: Lung segmentation with centroid of nodules provided by radiologists

## Future Work

- To explore into a new set of features and classes that would aid in nodule classification for each patient.
- To improve the efficiency of existing FlyerScan CAD algorithm

## References

1. Temesguen M.Kebede , Russell C. Hardie, Steven K. Rogers , "A new computationally efficient CAD system for pulmonary nodule detection in CT imagery", *Medical Image Analysis*, Vol. 14, No. 3 , June 2010, Pages 390-406.
2. <http://anode09.grand-challenge.org/results/>