Lobe Segmentation Outline

**Introduction**

* The anatomical structure of lung lobe.
* The importance of lung lobe identification in clinical applications.
* The challenges in lung lobe segmentation
* an overview of the published works on lobar segmentation (lung segmentation and fissure detection)
* The advantages of our method compares to other methods (a brief introduction of our method)

**Method**

1. Subjects and ethics
2. Overview

A flow diagram of our method, introduce each step

C. Lung segmentation

A brief introduction of lung segmentation process: threshold, region growing, connected component

D. PCA deformation

* Training data acquisition: manual digitized fissure points and lobe surface fitting
* PCA average model generation
* PCA average model deformation (fissure prediction)

E. Hessian matrix fissure detection

* Introduction of Hessian matrix: Hessian matrix can detect plane-like structure using eigenvector analysis. Introduce the equations, calculate the fissureness probability of each voxel (use multi-scale size filter)
* Remove vesselness points
* Use PCA initial prediction to narrow searching region
* Use 2D and 3D eigenvector connected component filter to remove small connected noise
* Select maximum fissureness points as candidate fissure points
* Fissure surface fitting to get the fissure lines

F. User-interactive interface

* User control input plugin: search region, connected component size and the selection of these parameter values.
* Manual correction

**Results**

Segmentation results of some cases (healthy cases and IPF cases)

**Evaluation**

Mean difference, Root mean square error, Maximum difference, Percentile accuracy

**Discussion**

* Discuss the results, compare to other methods
* Advantages:

Don’t need to rely on anatomical structures, show some cases which are difficult to use airway branch classification to initially locate the fissure.

Use a multi-scale filter to make sure a variety of sizes of fissure/vessel can have maximum response.

Use an user-interactive interface to control the whole segmentation process

* Limitations:

Need to build up more PCA modes of different group people