

X	CT				
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X	CT				
CT				CT	
X	CT				87%
X	CT				

## Automated Classification of Pulmonary Artery and Vein from Chest X-ray CT Images by Tree Structure Analysis

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**Abstract** In this paper, we propose an improvement method to classify pulmonary artery and vein in chest X-ray CT images automatically. When a doctor discriminates between benign or malignant of lung tumors, kind of pulmonary blood vessels which are involved in tumors is very important. However there is no difference on CT values. So it is difficult to classify vessels based on CT values. Our method uses anatomical positional relations between bronchus and each vessel, and analyzes tree structure of vessels to generate appropriate vessels groups. We applied this method to three X-ray CT images. The experimental result showed that about 87% of pulmonary artery and vein were classified correctly.

**Keyword** pulmonary artery, pulmonary vein, segmentation, chest X-ray CT image

- |    |    |     |
|----|----|-----|
| 1. |    | [1] |
| CT | 3] | [4] |

Computer Aided Diagnosis, CAD  
CAD

[4][5]

[6]

2.

( )  
[4] 2  
 $D_b$

3  
[7]  
 $D_v$   
 $D_v$

1

3.

### 3.1. 血管芯線抽出

3 X CT

2mm -400H.U.

4mm

N  $V = \{V_1 \dots V_N\}$

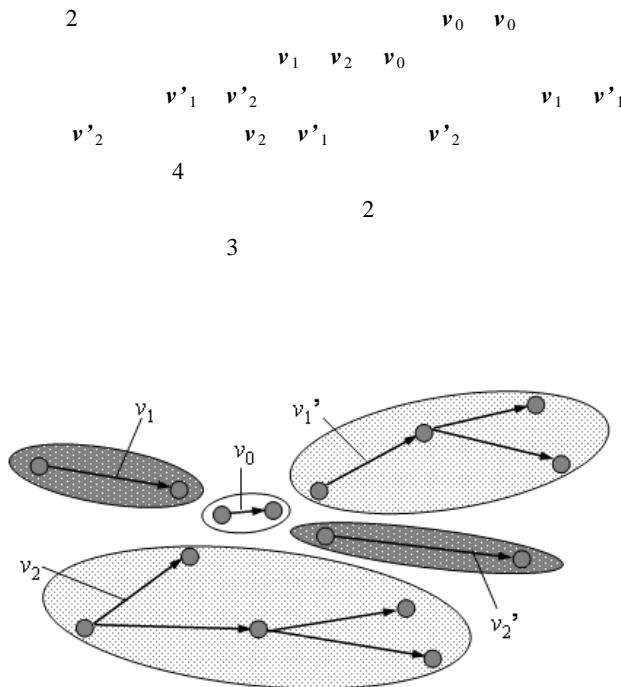
$D_b \not\subset D_v$

$D_{\bar{v}}$

4.

### 5.1. 結果

2 4 Data2  
3



(a) Data1	
( )	( )
296/311 (95.2%)	225/245 (91.8%)
293/311 (94.5%)	
(a) Data2	
( )	( )
336/380(88.4%)	321/371 (86.5%)
327/380(86.1%)	322/371 (87.0%)
(a) Data3	
( )	( )
343/417 (82.5%)	418/520 (82.0%)
339/417 (81.3%)	412/520 (80.8%)

### 5.2. 考察

1%  
5 6

6.

X CT

%  
83% 95% 82% 92%

	Data1	Data2	Data3
512 × 512			
	330	156	160
[mm]	0.625	0.625	0.61
[mm]	2	1	1
[mm]	1		

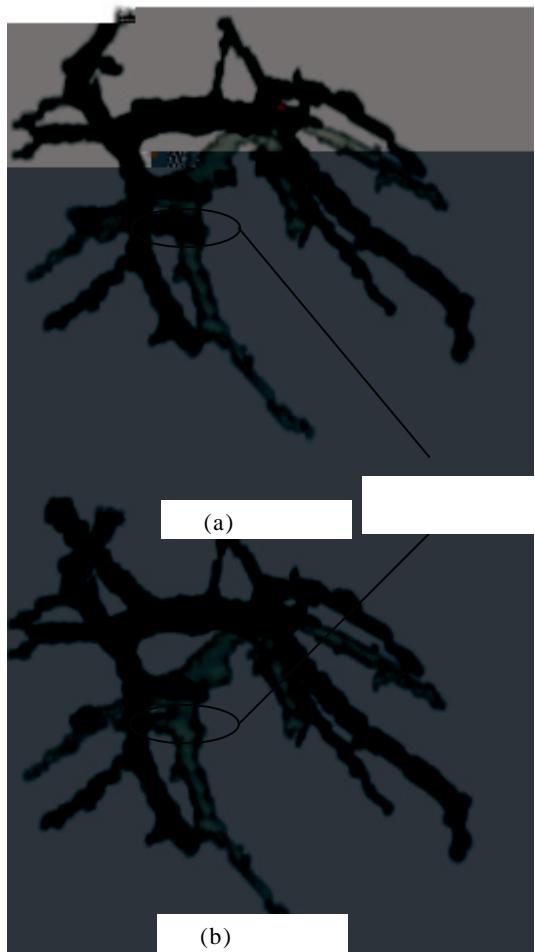
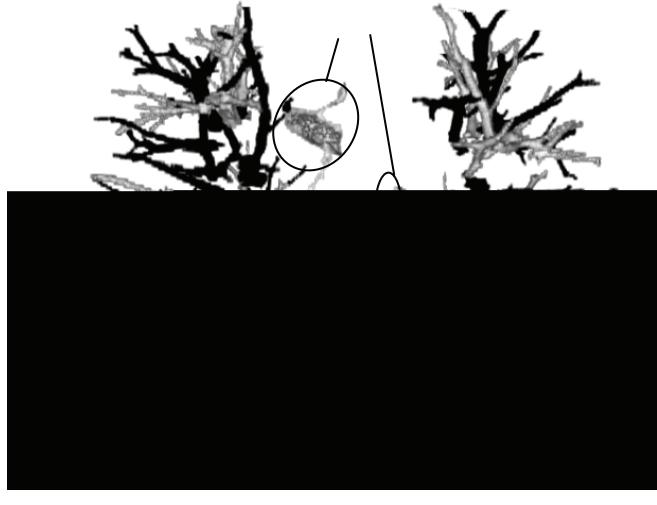
5.

15 30cm

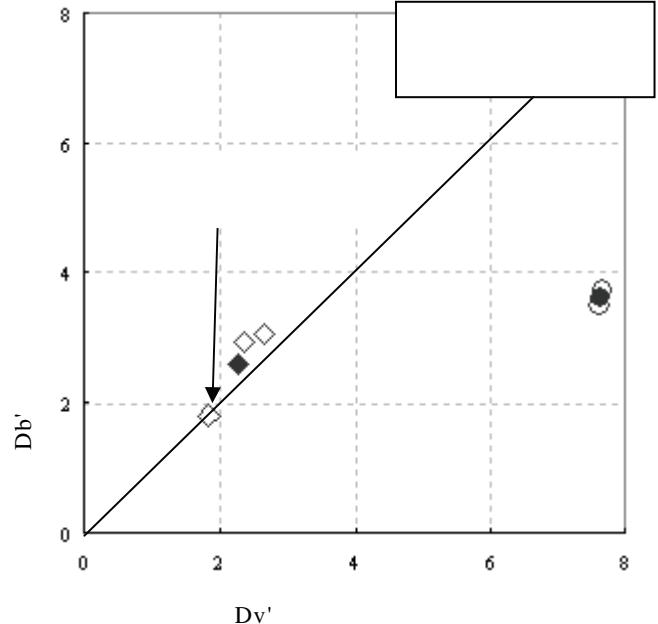
X CT 3

1

HRC



6 (a)  
(b)



( )

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