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Assignment 1 Summer 663

1. Open the file, s048r.txt, provided with this assignment (tab delimited). This file contains a verification test result. It contains two columns, test.subject and test.out. test.subject is the true label, and test.out is the prediction result. You may use any tools or language you would like including excel. Answer the following questions based on the prediction result in this file. *Note that the positive class here is s048

- a. Construct a confusion matrix (10px)

See excel file to view work.

Pred\Ture	TRUE	FALSE
TRUE	156	48
FALSE	6	194

- b. What is the accuracy of this model? Is this a useful measure to evaluate the model?
Accuracy is: 0.866337. Yes, I think accuracy is a good measure for evaluating this model.
- c. Compute FMR, FNMR, Precision, and Recall. (10pt)

FMR: 0.03

FNMR: 0.235294

Precision: 0.962963

Recall: 0.764706

2. Answer the following questions in your own words.

- a. How are singularities used in fingerprint recognition? (10pt)

They are used for the main points of interest used to classification and alignment.

- b. What is the thinning process in fingerprint feature extraction? And what benefit do they have? (10pt)

You make the ridges one pixel wide by finding the range of how wide the pixels are. By removing the redundant pixels from the image this helps remove the amount of data needed for processing and/or saving.

- c. Why do we need to find local ridge orientation and frequency earlier on in the processing of fingerprint image? (10pt)

For enhancement and how to subsample the images.





3.

Question number 3				
k	Θ	δ	Δ	
0	80	10	10	
1	90	170	-10	
2	260	-210	-30	
3	50	60	60	
4	110	160	-20	
5	270	-140	40	
6	130	50	50	
7	180	-100	80	
			180	



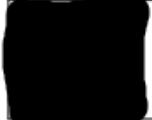
180 the singularity will be a loop/

4.

a. a bifurcation point:

	b_3	b_4
b_1		
	b_7	b_6

b. A non-minutiae point:

b_2	b_3	b_4
b_1		
	b_7	b_6

5.

Binarization using a threshold 0 values stay 0, 1 and greater are 1s.

0	0	1	1	0	0	0	1	1	0
0	0	1	1	0	0	1	1	0	1
0	1	1	0	0	1	0	0	0	1
1	1	0	0	1	0	0	1	1	1
0	0	0	1	0	0	0	1	1	0
0	0	0	0	0	1	1	1	1	0
0	1	1	1	1	1	1	0	0	0
1	1	0	0	0	1	0	0	0	1
1	0	0	0	1	1	0	0	1	0
1	0	0	1	1	1	0	1	0	0

After thinning

1	1	1	1	1	1	0	1	1	0
0	0	1	1	0	0	1	1	0	1
1	1	1	0	1	1	1	0	1	1
1	1	1	1	1	1	0	1	1	1
1	1	0	1	0	0	1	1	1	0
0	0	1	0	1	1	1	1	1	1
1	1	1	1	1	1	1	1	0	0
1	1	1	1	0	1	1	0	1	1
1	1	0	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1	0	0

Termination minutiae center at (2,9)

1	1	1	1	1	1	0	1	1	0
0	0	1	1	0	0	1	1	0	1
1	1	1	0	1	1	1	0	1	1
1	1	1	1	1	1	0	1	1	1
1	1	0	1	0	0	1	1	1	0
0	0	1	0	1	1	1	1	1	1
1	1	1	1	1	1	1	1	0	0
1	1	1	1	0	1	1	0	1	1
1	1	0	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1	0	0

Termination minutiae center at (4, 8)

1	1	1	1	1	1	0	1	1	0
0	0	1	1	0	0	1	1	0	1
1	1	1	0	1	1	1	0	1	1
1	1	1	1	1	1	0	1	1	1
1	1	0	1	0	0	1	1	1	0
0	0	1	0	1	1	1	1	1	1
1	1	1	1	1	1	1	1	0	0
1	1	1	1	0	1	1	0	1	1
1	1	0	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1	0	0

Termination minutiae (5, 3)

1	1	1	1	1	1	0	1	1	0
0	0	1	1	0	0	1	1	0	1
1	1	1	0	1	1	1	0	1	1
1	1	1	1	1	1	0	1	1	1
1	1	0	1	0	0	1	1	1	0
0	0	1	0	1	1	1	1	1	1
1	1	1	1	1	1	1	1	0	0
1	1	1	1	0	1	1	0	1	1
1	1	0	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1	0	0

Termination minutiae at (7, 2)

1	1	1	1	1	1	0	1	1	0
0	0	1	1	0	0	1	1	0	1
1	1	1	0	1	1	1	0	1	1
1	1	1	1	1	1	0	1	1	1
1	1	0	1	0	0	1	1	1	0
0	0	1	0	1	1	1	1	1	1
1	1	1	1	1	1	1	1	0	0
1	1	1	1	0	1	1	0	1	1
1	1	0	0	1	1	0	1	1	0
1	0	1	1	1	1	1	1	0	0