Document of MSU Palmprint Encoding and Matching Software (Version 1.1)

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This document is a short introduction of the algorithms used in

Anil K. Jain, Jianjiang Feng: Latent Palmprint Matching. IEEE Trans. Pattern Anal. Mach. Intell. 31(6): 1032-1047 (2009)

VC projects

- PalmEncodeApp: Demo for palmprint encoding (/demo/PalmEncodeApp/).
- PalmMatchApp: Demo for palmprint matching (/demo/PalmMatchApp/).
- PalmEncodeR.lib: Static library of palmprint encoding algorithm (/lib/PalmEncodeR.lib).
- PalmMatchR.lib: Static library of palmprint matching algorithm (/lib/PalmMatchR.lib).

These projects are built in Microsoft Visual Studio 2008 SP1. OpenCV 1.0 is used.

The only two important parameters for matching library are:

```
bool g_bPartial2Full;// true for latent-to-full match, false for full-to-full match
int g_nMaxRotation;// maximum rotation angle between two palmprints, 180 means that any rotation is possible
```

The values of these two parameters are set in the caller, PalmMatchApp.

Two example palmprints (/Data/Image/a.bmp, /Data/Image/b.bmp) can be used to run the demo.

The output of encoding algorithm

The five properties of minutiae

Feature	Type	Description
x	Int	-
y	Int	-
direction	Int	**in the range (-180,180]**
type	Int	**1:termination; 3:**

		bifurcation
quality	**Int**	**1: reliable; 0: unreliable**

The five bitmap files

Feature	File name	Resolution	Description
ridge direction map	bd*.bmp	**Block-wise**(16x16)	**Char type. In the range [-90,90], 91 is invalid value**
ridge period map	bp*.bmp	**B**(16x16)	**BYTE type. In the range [50,250]; value = 10*ridge period**
quality map	q*.bmp	**B**(16x16)	**0: background; 1: bad quality; 2: good quality;**
segmentation map	s*.bmp	**B**(16x16)	**Index of continuous segmentation (start from 1)**
thinning (skeleton) image	**t*.bmp**	**Pixel-wise**	**0: ridge pixel; 255: background**

The output of matching algorithm

feature	type	description
score	double	**the matching scores between images (all the following features are considered)**
pair_num	int	**the number of matched minutiae**
desc_score	double	**the similarity of descriptor of matched minutiae**
minu_ratio1	double	**the ratio of the number of matched minutiae to the total number of minutiae in the common area of first image**
minu_ratio2	double	**the ratio of the number of matched minutiae to the total number of minutiae in the common area of second image**
relation_score	double	**a score measuring the similarity of**

		the relationship between matched minutiae
align_error	int	**the average Euclidean distance between matched minutiae after alignment**
dirField_diff	int	**the average difference of orientation fields of two images**
dirField_area	int	**the number of blocks where two images have consistent ridge orientation**
mpairs	vector<Support>	**ID of matched minutiae; Support.ii: the minutia in first image; Support.jj: the matched minutia in the second image**
m_tran	**Tran**	**spatial transform between two images**