

BIOMETRICS

Fall 2006

Homework 4: Finding the Candy Man Using Fingerprint Recognition

Due: December 1, 2006

The purpose of this lab is to implement a component of minutiae-based fingerprint recognition. The input to your program will be a set of minutiae points extracted from a fingerprint image.

Your job is to decide which of the seven fingerprints are the same as those of the notorious Candy Man. Given two sets of minutiae points, you should first estimate an affine transformation to bring the minutiae points into correspondence using RANSAC. You then need to decide how many minutiae points match and make a decision about which fingerprints were from the CandyMan. There may be more than one.

As input, there is a zip file accessible from the course web page which includes 8 files (one of which is CandyMan.txt), each containing a set of minutiae points. The features are in the following format.

<TYPE END or BIF> Pos=(<x>,<y>) D=<fmt1, fmt2> C=<fmt1, fmt2> G=<density>

The type is self explanatory, as are the positions. The D represents direction, and it is two (closely related) measurements. I would recommend using only one for comparisons. The C is the curvature (same deal as with D with two closely related measurements). The G is the density in the region (consider it a ridge width measure).

What to turn in:

1. A report which includes
 - a. A description of your implementation
 - b. For each of the seven sets of minutiae, have a figure which shows the overlay of the CandyMan's minutiae after the estimating the affine transformation.
 - c. A table with seven rows and columns showing the number of inliers (matching minutiae), and a decision about which ones are from the CandyMan.
2. Turn in a hardcopy of the report.
3. Email your report and source code to kriegman@cs.ucsd.edu