CS 631 Assignment #2

Due Date: **Apr 5th 1999**

Description

In this assignment, you will take two or more images and create an image mosaic using techniques discussed in the lecture. This assignment must be completed in two parts:

- Write a program to detect edges in an image using the *Canny Edge Detection* technique. The program should take three arguments, namely, an input pgm file, a value that indicates the percentage of the pixels in the image that should be edges and an output file containing the "edge-detected" image. The command-line interface should look something like this:

  canny <input-file> <percentage> <output-file>

  If you would like to provide any explanations on the command-line interface, please do so in the form of a usage.

- Write another program that takes two images (pgm format) as input and returns a mosaiced image. In addition to the two images, the program should take arguments for initial translation, scaling and search radius parameters. It should also print the translation and scaling parameters discovered by your algorithm to the standard output (stdout – i.e. screen). Note that in this assignment, you are only required to perform translation and scaling transformations to form the image mosaic. The command-line interface should look like this:

  mosaic <input-file> <init-trans-x> <init-trans-y> <trans-radius> <scale-radius> <output-file>

  The transformations used for this assignment will be of the form:

  $$X(u, v) = au + b$$
  $$Y(u, v) = cv + d$$

  Your program will need to search:

  values of b of <init-trans-x> +/- <trans-radius>, stepping by 1
  values of d of <init-trans-y> +/- <trans-radius>, stepping by 1
  values of (a,b) of (1,1) +/- <scale-radius>, stepping by .01

  Accordingly, your program must output parameters a, b, c and d that were discovered and used to form the mosaiced image. The translation and scaling parameters must be computed using the *Hausdorff fraction*.

Here is a list of web-sites that contain information on image mosaicing. You are encouraged to use them as references in order to do the assignment.

http://www.cs.cmu.edu/afs/cs/project/classes-ph/862.95/www/notes/mosaic.html
http://www.sgi.com/grafica/merge/index.html
http://www.videobrush.com/
http://www.ipix.com/
http://www.rs6000.ibm.com/resource/features/1997/mars/panoramix.html
http://www.cs.cornell.edu/cs631/assignments/edgedetection.ps
http://www.cs.cornell.edu/cs631/assignments/videomosaic.pdf

Instructions

- This assignment must be done in groups of 2 students.

- You should use C or C++ and please make sure that your code compiles on the Windows platform. You are free to use whatever libraries that are available to manipulate the images (short of actually doing the assignment), however these libraries must be statically linked into your executable.

- We will provide you with a pair of images to be mosaiced on the web. The minimum requirement is for your mosaicing implementation to work on these images.

- You are required to send "hw2.zip" file as an attachment containing the following:
  1. Source code and executables (canny.exe and mosaic.exe)
  2. Readme.txt containing instructions on how to compile and run your program.
  3. Makefile (that can be run using nmake) or MS VisualStudio project files. Do not include object files if not necessary for compilation.

- How to submit?
  - Send *hw2.zip* as an attachment to warkhedi@cs.cornell.edu
  - The subject header of your e-mail must contain the string "CS631: HW2" (ignoring the whitespaces & case).
  - The assignment should be submitted on or before 11:59pm Apr 5th 1999.

- Grading
  - This assignment will be graded on a scale of 10.
  - The grade will primarily be based on correctness of your mosaicing implementation.