CS 33400, Spring 2010
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Due: Tuesday March 30th at 6:00am

Assignment 6—Panoramas

In a nutshell

Extend your interactive 3-D graphics application with a panorama constructor based on user specified correspondences, and with environment mapping.

Details

1. Panorama construction
   - Take a sequence of 5+ overlapping digital photographs of a distant scene.
   - Register the images as follows:
     - Display a pair of consecutive images I_k and I_{k+1} side by side and allow the user to click correspondences.
     - Compute the 3 rotation angles defining the planar pinhole camera (PPC) view of I_{k+1} by aligning the user specified correspondences. (OK to minimize the error with 3 nested for loops.)
   - Build a cube map from the registered images.
2. Environment mapping of distant geometry
   - Load the cube map.
   - Allow interactive pan, tilt, roll, and zoom at the center of the cube map.
   - Make a 10s 30fps movie showing off the best parts of your panorama.
3. Extra credit
   - 360^o horizontal field of view x 40^o vertical field of view panorama (3%)
   - Complete panorama (5%)
   - High resolution panorama (i.e. at least 2k x 2k pixel construction images and 3k x 3k pixel cube map faces) (3%)
   - Downhill simplex minimization of correspondence reprojection error (3%)
   - Image registration by minimizing color differences (5%)
   - 2 or more panoramas connected by video tunnel(s) (5%)

Turn in

- Code.
- Construction images.
- Registration data (i.e. PPCs of images); your program should be able to load registration data and compute cube map from it.
- Cube map (i.e. one image per cube map face).
- Movie file.
- A README.txt description of your GUI.