**CS5404 Fall 2016 Homework 6 (10pts)**

**Due Nov 30 2016, 11:59PM, submitted via Canvas.**

This project includes corner detection (homework 2), matching (homework3), homography matrix computation (homework4), image warping (homework 5), RANSAC algorithm for inlier detection and image mosaic.

(0) You can use the images provided by the instructor, but you are strongly encouraged to use your camera to take a few images in the campus for this project. Keep in mind that a good image pair should contain a predominantly planar scene structure, or else be taken from a camera that is only rotating (e.g., panning, tilting), with very little translation.

(1) Read in the two images.

(2) Detect corners in source and destination images;

(3) Extract intensity patches around corners in source and destination images;

(4) Match the patches. NCC is used as the metric to compare patches. Two directional matching can be used to find good matches. A gating region can be used to reduce the search range if the displacement between the two images is known to be within the gating region.

(5) Use RANSAC algorithm to find the inlier set of correspondence points by matching patches. Use the inlier set of correspondence point s to compute the Homography matrix.

(6) Based on the homography matrix and your warping method, create a mosaic image to combine two images.

Upload your running codes and a written report to Canvas by the due date/time. Half of your grade will be based on the written report discussing your program, design decisions, and experimental observations, and half on the program itself and output it produces. The report should contain:

a) Brief summary of what you think the project was about (what was the task; what were you trying to achieve),

b) Brief outline of the algorithmic approach.

c) Pictures of intermediate and final results that convince me that your code does what you think it does.

d) Any design decisions you had to make. Be sure to document any additional features you added to increase robustness or generality of your codes.

e) Experimental observations. What do you observe about the behavior of your program when you run it? Does it seem to work the way you think it should? Play around a little with different setting to see what happens.

**Bonus 1 (up to 10%)**: if you are the submission (), you earn (11-n)% bonus points for this homework.