ECEn 631 Homography

Objectives:
- Learn to use feature descriptors and matcher in OpenCV.
- Learn to detect an object from live video input.

Instructions:
- Use OpenCV to complete this exam.
- Include your video link and discussion (how you do it and what you observe in one PDF file.
- Submit your PDF file and source code file(s) in one zip file without the folder or directory.
- Use your first name and last name (e.g., justinsmith.zip) as the file name.
- Login to myBYU and submit your work through BYU Learning Suite online submission.

Task 1: Corner detection and feature description 30 points
- Select a picture or painting on the wall with rich features and use it as your reference picture.
- Capture an image of this reference picture. Crop out the background wall and use the image as the reference image.
- You can use the four corners of the reference image as the feature points for matching OR you can use the good feature points in the reference picture for matching.
- Highlighted the four corners or all the feature points in your reference image.
- Include your image and the code in the PDF file.

Task 2: Live demo of homography 70 points
- Select another picture or painting and use it as your target picture.
- Capture an image of this target picture. Crop out the background wall and use it as the target image.
- Resize your target image to be the same size as the reference image.
- Point your camera to the reference picture.
- Move your camera around and change camera distance to the reference picture.
- Detect the four corners of the reference picture or the good feature points in the real-time input from the camera and match them to those in the reference image from Task 1.
- Use the matched corners or good feature points to calculate a homography matrix.
- Warp and superimpose the target image onto the reference image from the camera in real time.
- Record a video of your result.
- Submit your video link and a brief discussion in the PDF file.
- Include your code.