

## **Computer Vision Homework #2**

- Due date: 2021/10/20 12PM
- Report should be submitted to I-class in MS Word or PPT format
- You can use any language (C/C++/Python/Java/...) and even Matlab. But any built-in function except image I/O is not allowed to use. Your code should work on pixel level.

### **1. Camera calibration**

Use the [CalTech Matlab Camera Calibration Toolbox](#) to calibrate your smartphone camera. Compare the estimated intrinsic parameters with known parameters (use EXIF information). Present your procedure, result, analysis, and discussion.

- The focal length should be fixed during multiple image acquisition
- You should need the pixel size of the sensor. Information of most smartphone camera is available in <https://www.gsmarena.com/>

### **2. Planar image stitching**

Design and implement an image stitching program which can stitch at least 3 images horizontally.



You might need to take the following procedure.

Step 1: Feature extraction (SIFT) and matching between images to find correspondence candidates.

Step 2: Robust estimation of homography using RANSAC.

Step 3: (Inverse) Image warping using homography matrix.

Step 4: Blending overlapping pixels. Use alpha-blending.

- Show your intermediate result as detail as possible with full discussion.
- You may use built-in functions only for SIFT detection, linear equation solver.
- Do not take test indoor images to stitch. It will work better for the scene far away because pure-rotation assumption is relatively relaxed due to the small parallax.
- Overlapping area between image should be less than 50%. Much overlap makes the problem too easy.