

# Assignment 4

The purpose of this assignment is to acquaint you with a few more fundamental image processing techniques, laying a strong foundation for upcoming comprehensive project on object detection and image stitching.

## Task 1. Feature Detection Basics:

- Select any two distinct images from a given dataset (or source them on your own, but ensure they are not overly complex).
- Implement basic feature detection techniques to identify key points in each image.
- Highlight and annotate these detected features on the original image.

## Task 2. Simple Image Manipulation:

- Given a base scene (like a living room or a study desk), digitally introduce an object into the scene from another image (e.g., a mug or a pen). This object should seamlessly blend into the scene in terms of scale, lighting, and perspective.

Hint: Use image blending techniques and transformations.

[https://www.crcv.ucf.edu/wp-content/uploads/2019/03/CAP5415\\_Fall2012\\_Lecture-7-Pyramids.pdf](https://www.crcv.ucf.edu/wp-content/uploads/2019/03/CAP5415_Fall2012_Lecture-7-Pyramids.pdf)

<https://www.youtube.com/watch?v=NiGcuurpV5o>

<https://cs.brown.edu/courses/csci1950-g/results/proj2/edwallac/>

## Task 3. Introduction to Image Stitching:

- Capture or source two images with a minimum overlap of about 20-30%. These could be simple landscape images or parts of a bigger scene.
- Use basic image stitching methods to combine these images into a larger panorama.

## Deliverables

Your deliverable should include the following material:

- Complete source code. This should be complete, so that it could be easily executed on another system without additional modifications. The code may contain Python file(s) (.py) or Jupyter Notebook(s) (.ipynb).
- A folder containing original images.
- A folder containing processed images showing detected features, manipulated scene, and stitched panorama.
- A report in pdf format detailing:
  - The methods and algorithms used for feature detection and image manipulation.
  - Challenges faced and solutions devised.

- Images before and after processing, with annotations if applicable.

### Instructions

- The report should not be more than 3 pages of text (excluding the images and tables).
- Submit the material to MLS in a single zip file (described below).
- Use Python version > 3.6 and OpenCV version > 3.4
- Store all images as “.png” for consistency.
- All code that you submit should be original. Do not scour the Internet for solutions.

### Marking Scheme

Task	Marks
Task 1	6
Task 2	4
Task 3	4
Report	2
<b>Total</b>	<b>16</b>