CAP 6415: Computer Vision Assignment 3

Due Date: Sunday 02/23/2020 **11:59pm**
Submission Type: Upload onto Canvas

Problem Statement:

2D match move/augmented reality: Replace a picture in a magazine or a book with a different image or video.

1. With a webcam, take a picture of a magazine or book page.
2. Outline a figure or picture on the page with a rectangle, i.e., draw over the four sides as they appear in the image.
3. Match features in this area with new image frame. You could select just the four corners if the image being replaced is a very different from the original. If the two images involved have some similarity in appearance, i.e. replacing one face with another, or one car with another, then you could select points inside the region. This step could be manual.
4. Replace the original image with an "advertising" insert, warping the new image with the appropriate homography.

(Extra Credit - 50% of earned grades if you can eliminate the manual step of marking the point correspondences and arrive at a fully automated solution.)

Submission Requirements:

Please upload a ZIP file containing the following files:

1. All your code files, including any helper files/dependencies.
2. A README file detailing how to run your code along with any compilation instructions.
3. A 2-Page technical report containing the following sections:
    a. A short description of the algorithm
    b. A description of any code/algorithms that were used/re-used by you for your implementation.
    c. A few examples of results from your implementations, comparison with the original implementation (if needed).
    d. A general discussion of lessons learned based on your experiments with the algorithm. E.g. What did you struggle with, issues faced while implementing the code, scopes for and/or proposed improvements, etc.
4. Your code will be tested on different test inputs and graded based on the progress of your approach on these test inputs. A demo session will be scheduled for evaluating your implementation.

Grading:

Each assignment will be graded out of 100:

Code (out of 30) quality of coding, readability, understandability (comments, variable names, etc.)

Report (out of 40), point 3a, 3b, 3c, and 3d above

Demo and Results (out of 30) Compilations, execution, correctness of results on test cases,

Solutions to your **programming assignments** have to be self-sufficient and **not dependent on other computer vision code, such OpenCV or Matlab vision package**. You may use packages for display graphics or mathematics packages, such as for linear algebra (numpy, for example, matlab (but not computer vision module)) or graphs or optimization.

All reuse of code has to be clearly acknowledged in the source code, any README files, and also in the report. Failure to do so will be considered plagiarism.