

Assignment 3

December 15, 2016

INSTRUCTIONS

This is the final coursework for the Image Processing module. This coursework is on Poisson Image Editing. We recommend you use Matlab, but you may also use C/C++/Java.

Submit a report including any pictures and plots showing your results and listing of your code. The report should include a brief list of what you have attempted and to what extent you have successfully completed the tasks. Next, write a short description of the methods you used for each part together with any conclusions you have drawn from your experiments. Please clearly mention the sequence of commands used to generate the results.

This coursework requires an online submission via the moodle page.

LATE POLICY The coursework is due **January 13th 23:55 pm (Friday)**. We will use the following late policy:

Submissions after the deadline but within 24 hours of it will be marked down to 90% of the number of points achieved.

Submissions later than 24 hours, but within 48 hours from the deadline will be marked down to 80% of the number of points achieved.

Submissions later than 48 hours will receive 0%.

Note: This coursework is quite different from the previous ones. The descriptions are intentionally sparse so that you are forced to read and understand from the paper (see later). The coursework will take time – not because the implementation is difficult, but because you have to first understand the paper. We hope that you will eventually find the process very rewarding. Start now!

Do not hesitate to contact me (l.agapito@cs.ucl.ac.uk) if you are stuck even after an honest effort. The paper you are going to read and implement is quite a classic in this topic. That means you can probably get patchy implementations if you search on the web. Please, *DO NOT* go down that path. You have only access to the paper and you are free to discuss the paper (not implementation) with your classmates.

1 COURSEWORK DESCRIPTION

In this coursework, we will be learning about image editing focusing on cloning, gradient based editing, etc. The coursework is based on the following paper “*Poisson image editing*”, P. Pérez, M. Gangnet, and A. Blake, *Siggraph* 2003.

Task 1 (30 points) Read the above paper. It is a relatively short paper, but study the paper in details. You may have to read the paper a few times before you understand how the method works. (a) Provide a short summary of the paper, focusing on the problem statement, the key ideas, and various applications described. (b) Describe what you like and you don’t in the paper. Are the results surprising, do you spot artifacts, can you think of cases when the algorithm will fail?

Task 2 (80 points) Select a grayscale image. Mark out a region R using a polygon (you can use rpoly). Remove the selected region R and fill it in using the Equation (2) in the paper. You are solving for unknown intensity values inside the region R . Test the method in smooth regions and also in regions with edges (high-frequency). Also report the behavior as the size of the selected region increases.

Task 3 (50 + 40 points) Now we are ready to try ‘seamless cloning’. The relevant Equations are (9) to (11). Perform both versions (a) importing gradients and (b) mixing gradients.

Task 4 (20 points) Repeat task 3a for color images. You have to process R, G, B components separately.

Task 5 (30 points) Select images you like to edit and show interesting effects. Try to record the intermediate results; you can allow multiple strokes in this stage. Try to create some ‘cool’ effects.

Task 6 (50 points) Implement **only one** of the selection editing effects described in Section 4 of the paper. You can decide between: texture flattening, local illumination changes, local colour changes or seamless tiling.