Computational Photography
Prof. Manuel Menezes de Oliveira Neto
Programming Assignment 3

Simple Compositing

Total of Points of the Assignment: 100

The goal of this assignment is to familiarize the students notions of **basic image compositing**. For this assignment, you will play with the use of **Laplacian sequences** and **alpha compositing**.

Part I (50 points)

For the first part of the assignment you should download the file "PyramidCompositing.zip" and play with a provided MATLAB script for making **image compositing based on Laplacian sequences**. After reviewing the class notes on the subject, run the script to create a composite of an eye on a hand. As you will notice, the resulting image will contain some artifacts. Your tasks include:

1) Understand what is causing these artifacts. Then, you should **try to improve the composite** by fixing the artifacts;
2) Choose a set of photographs or illustrations such that: at least two of them have been captured under day light and at least one has an image of the sun; at least two of them have been captured at night, and at least one of the has an image of the moon. Then, using Laplacian sequences do:

    a) Composite the image of the sun in the sky of a night picture. Also composite in the same night picture some object found in one of the day-light photographs;
    b) Composite an object from a day-light photograph into another day-light picture;
    c) Composite an object from a night photograph into another night picture.

    For each of the cases above, try to find at least a success case and at least a failure case (*i.e.*, an example for which artifacts are clearly visible). Is it possible to find a success example for all situations above? If not, why not? Explain the cause(s) of the artifacts.

Part II (50 points)

For the second part of the assignment you should download the provided file "AlphaCompositing.zip". The file contains a reference image (GT04.png), a corresponding alpha mask file (GT04_alpha.png), and an extra image that can used as a new background for compositing ("background.png"). You should then create an alpha-composite by placing the foreground objects (found in the reference image and delimited by the alpha mask) on the new background. For this, **you should use the Compositing Equation** presented in class. You should pay attention to the fact that **the provided alpha mask file contains integer values** in the range [0,255].

1) Do you observe any artifacts in the alpha-composited images? If so, **what might be causing these artifacts**? **What would you do in order to fix/avoid them**?
2) Create another **composite using different backgrounds**;
3) Capture a picture of yourself (you can take a selfie) containing some framed picture in the scene. Then, try to **composite the foreground characters** from the reference image **on the framed picture**. What will you have to do to achieve this result?

Handing in your Assignment

Write an illustrated report describing your results. It should also present your conclusions about the experience. If you could not finish any of the tasks, explain the reasons.