README.md

Synthetic_Lighting_Assignment

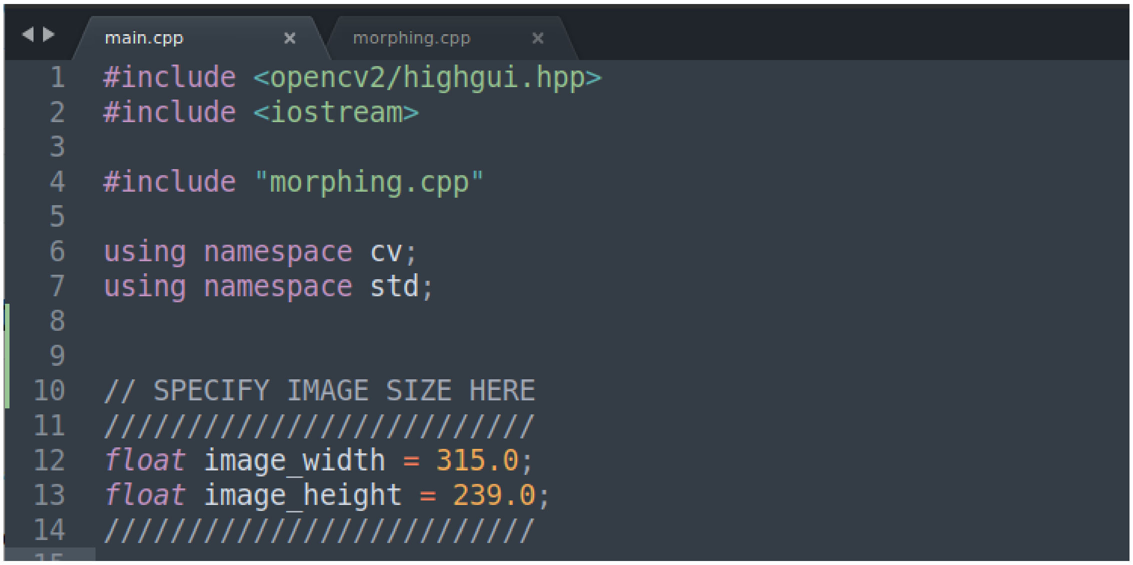
Part 1: Setup [5 marks]

Find a setting with four different light sources. Now click four images using the following scheme:

- The camera location should remain **exactly** the same throughout the process.
- Each image should have exactly 1 light source turned on.
- The four images should be identical in terms of size.
- Images should be in jpg format (if not, you need to manually change the expected format in main.cpp)

Rename the images to `im1.jpg` , `im2.jpg` , `im3.jpg` , `im4.jpg` and place them in the img directory.

IMPORTANT: Once you've taken the four images, go to `main.cpp` and add the length and width of your images in the image_width and image_height variables (on the top). You can check the size of an image by opening it's properties(right click).



```cpp
#include <opencv2/highgui.hpp>
#include <iostream>

#include "morphing.cpp"

using namespace cv;
using namespace std;


// SPECIFY IMAGE SIZE HERE
//////////////////////////
float image_width = 315.0;
float image_height = 239.0;
//////////////////////////
```

In case you were unable to take images of your own, four images have already been placed in the `img` folder that you can use to implement the next part.

Part2: Four-way Morphing [15 Marks]

Go to the `morphing4()` function in *morphing.cpp*.

Given the four input images `inp1` , `inp2` , `inp3` and `inp4` and the horizontal and vertical weights `wh` and `wv` , use the concepts and techniques learnt in the lab to morph between the four light sources.

Try to extend the equation for 2-image interpolation to a 4-image interpolation yourself.

To test your implementation, run the following command:

```
g++ main.cpp -o output `pkg-config --cflags --libs opencv`;./output 0
```

Now move your cursor horizontally and vertically on the image. If implemented correctly, you will observe the transitions between the four lights as you move your cursor.

Part3: Four-way Colored Morphing [10 Marks]

Go to the `filtered_morphing4()` function in *morphing.cpp*.

Now implement a four-light version of colored_morphing yourself.

Given the four input images and two weights, change the color of the light sources to four different colors and perform 4-way morphing on the resulting images. You are encorged to use the funtions that you've already created (i.e. `colored_light()` and `morphing4()`).

To test your implementation, run the following command:

```
g++ main.cpp -o output `pkg-config --cflags --libs opencv4`;./output 1
```

Now move your cursor horizontally and vertically on the image. If implemented correctly, you will observe the transitions between the four differently colored lights as you move your cursor.

Resources used and further reads:

- https://magnetiq.ca/pages/multiple-synthetic-lights/
- http://www.graficaobscura.com/synth/