CMP SCI 6420 **Image Processing and Computer Vision**
Assignment # 3 Due Date: April 22, 2021

Image Segmentation with SLIC Pixels

Purpose

The purpose of this assignment is to segment a given image using the SLIC pixels algorithm. You are given a color image and you will apply the OpenCV function `createSuperpixelSLIC()` to show the picture using superpixels.

Task

SLIC, Simple Linear Iterative Clustering, is a modification of the k-means algorithm. It helps with generating superpixels that are approximately equal in size.

You are given a color picture. Process it using the SLIC pixel algorithm to create superpixels. Experiment with different parameters of the `createSuperpixelSLIC` function to compute the superpixels.

Invoking the solution

Your solution will be invoked using the following command:

```
slic [-h] [--algorithm=a] [--ruler=r] input_image
```

`slic`	Name of your executable
`algorithm`	Name of SLIC algorithm variant
	`SLIC` segments image using a desired region size
	`SLICO` optimizes using an adaptive compactness factor
	`MSLIC` optimizes using manifold methods giving more context-sensitive superpixels
`size`	Chooses an average superpixel size measured in pixels [default: 10]
`ruler`	Chooses the enforcement of superpixel smoothness [default=10.0]

The parameters enclosed in `[]` are optional. You are free to use long parameter names such as `--help` for `-h`.

Suggested implementation steps

1. Parse the command line. You can create your own parser or use the class `CommandLineParser` provided by OpenCV. Each of the optional arguments may have a default value. If the user specifies the option `-h`, print a help message and exit. Otherwise, assign the suggested parameters from user inputs or default values.
2. Read the input image.
3. Apply the SLIC algorithm and display the image.

Criteria for Success

You should be able to successfully perform the steps outlined above.

Grading

I'll use the following rubric to assess your submission.

1. *Overall submission; 30pts* Program compiles and upon reading, seems to be able to solve the assigned problem.
2. *Command line parsing; 10pts* Program is able to parse the command line appropriately, assigning defaults as needed; issues help if needed.
3. *Application of* SLIC*; 60pts* Program is able to apply the algorithm and display the output.

Submission

Submit an electronic copy of all the sources, `README`, Makefile(s), and results. Create your programs in a directory called *username*.5 where *username* is your login name on delmar. This directory should be located in your `$HOME`. Once you are done with everything, *remove the executables and object files*, and issue the following commands:

```
% cd
% chmod 755 ~
% ~bhatias/bin/handin cs6420 5
% chmod 700 ~
```

Do not copy-paste these commands from the PDF; type in those commands.