ECE 6310 – **Lab4** Name: **Atef Emran**

Segmentation and Region interaction

Summary

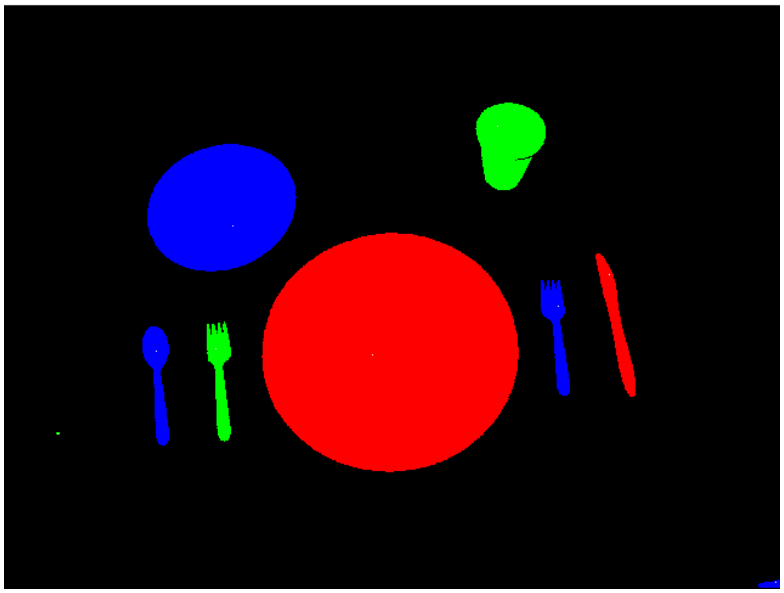
In this project, interactive region growing needs to be implemented using win32 GUI library. The program shall allow the user to click any location in an image and visualize the results of growing a region there. The main features of the program are:

1. The program should visualize the region growing by coloring pixels as they join the growing region.
2. The program should have a GUI option that allows the user to select the color for pixels that join the region.
3. The program should also have an option that clears the result of a previous region grow, displaying the original image.
4. The program should have a menu option to grow the region in "play" mode or in "step" mode. In play mode, a pixel should join the region each 1 ms. In step mode, a pixel should join the region each time the user presses the key "j". The program should allow the user to change between modes while a region is growing.
5. The program should use a dialog box to allow the user to select values for two predicates for joining the region. The first predicate is the absolute difference of the pixel intensity to the average intensity of pixels already in the region. (To join, a pixel must be within this range.) The second predicate is the distance of the pixel to the centroid of pixels already in the region. (To join, a pixel must be within this range.) Both predicates should be applied at the same time while growing a region.

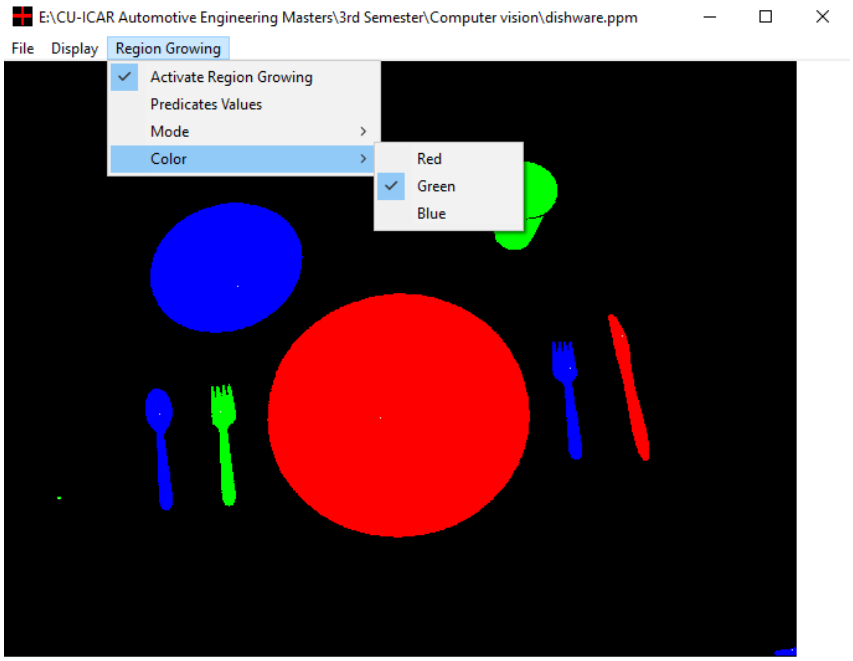
Implementation and Results

The program execution was carried out using win32 GUI library. The execution results are highlighted below for each feature mentioned above.

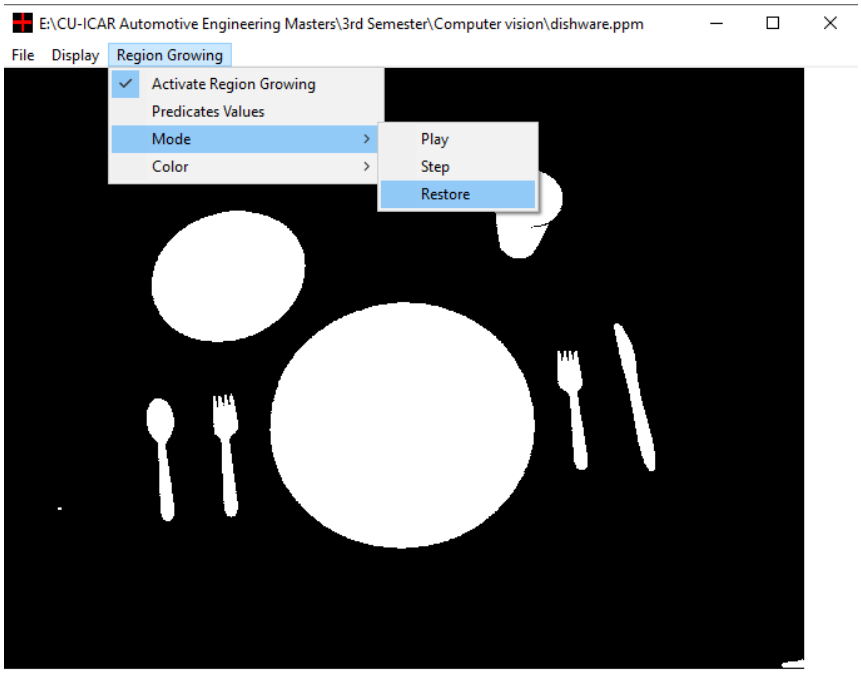
1. *The program should visualize the region growing by coloring pixels as they join the growing region.*
   The screenshot below shows the colored pixels for each region



2. *The program should have a GUI option that allows the user to select the color for pixels that join the region.*
   Below the user can choose the color to fill the clicked region.

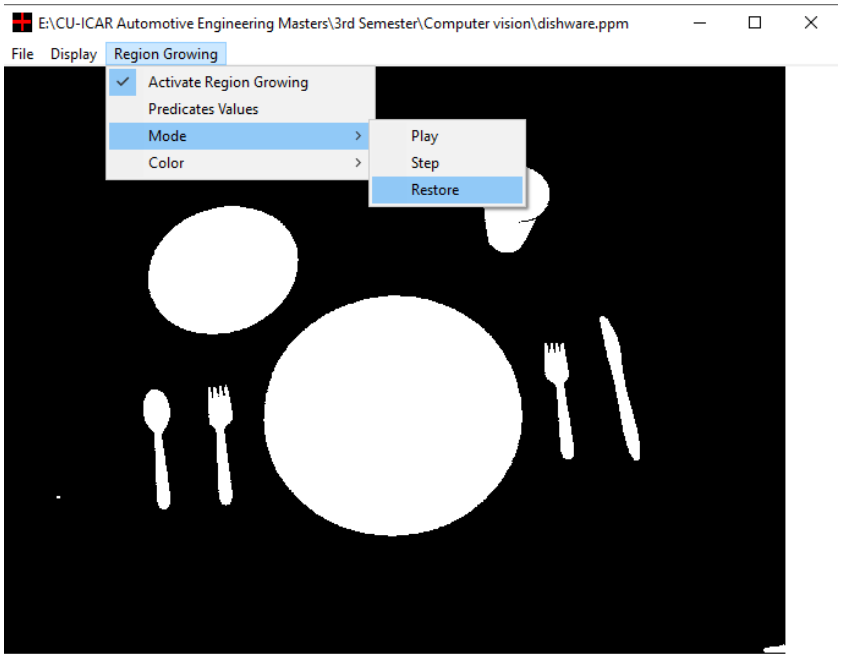


3. *The program should also have an option that clears the result of a previous region grow, displaying the original image.*
   The Restore button is available in the modes menu which restores the image original status



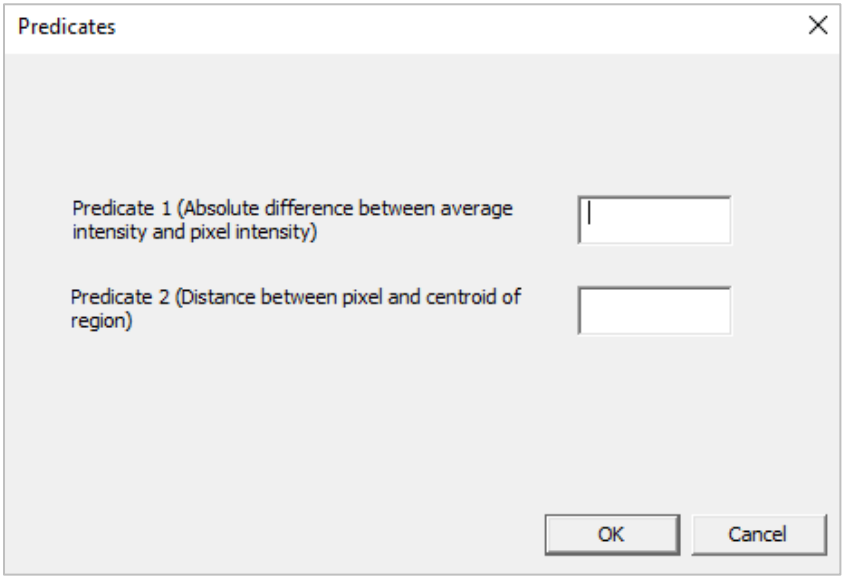
4. *The program should have a menu option to grow the region in "play" mode or in "step" mode. In play mode, a pixel should join the region each 1 ms. In step mode, a pixel should join the region each time the user presses the key "j". The program should allow the user to change between modes while a region is growing.*

   The modes selection is available in at the below menu.

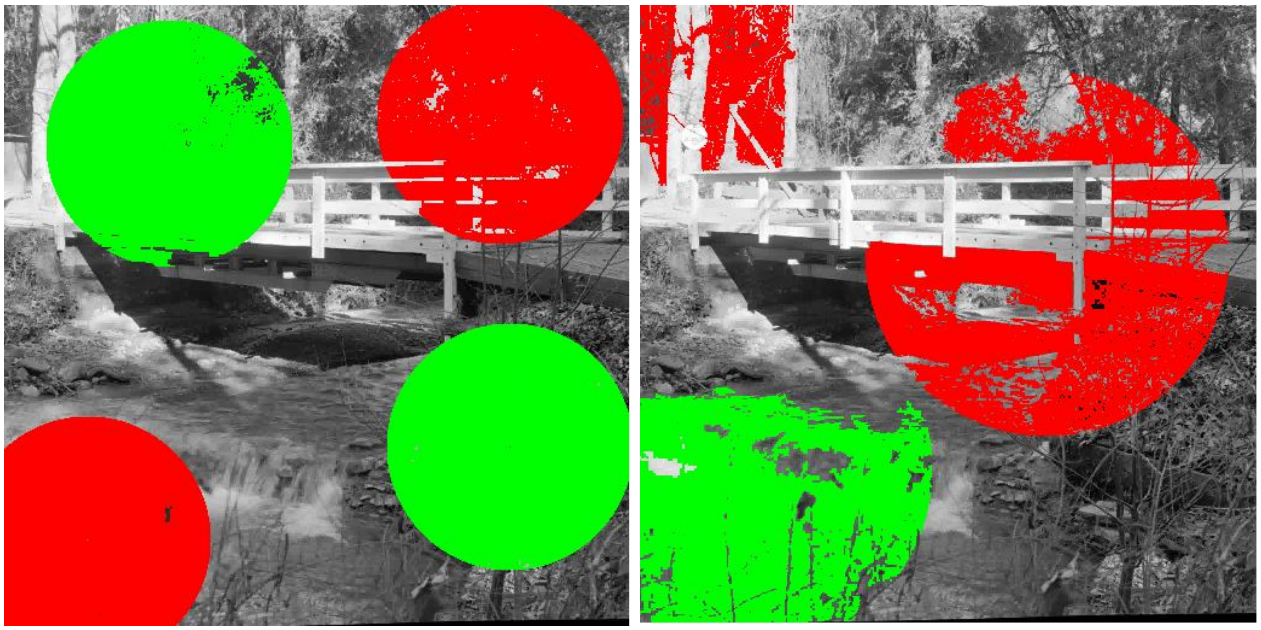


5. *The program should use a dialog box to allow the user to select values for two predicates for joining the region. The first predicate is the absolute difference of the pixel intensity to the average intensity of pixels already in the region. (To join, a pixel must be within this range.) The second predicate is the distance of the pixel to the centroid of pixels already in the region. (To join, a pixel must be within this range.) Both predicates should be applied at the same time while growing a region.*

   The below window will pop-up for the user to enter the predicator 1 and 2.



The impact of the different predicator values could be shown below, the left image has (Predicator 1 = 100, and Predicator 2 = 100), and the right image has (Predicator 1 = 20, and Predicator 2 = 150)



As we can see the influence of decreasing the predator 1 is having less tolerance of adding any points to the region, on the other hand increasing the predicator 2 increasing the allowable region distance from the center of the click.

Instructions

To run the program, download the zip file and run it on Visual Studio 2019, build it and run the program.