Introduction to Computer Vision
Region Growing Win32 Application

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ECE 631
Lab 4 Report

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1 Introduction

This lab deals with implementing a segmentation region growing algorithm that is implemented on a Win32 platform.

2 Implementation

The layout of the Win32 application is derived from the stub 'plus' code. The region growing algorithm itself also uses the reg-grow.c code provided on the website as a starter code, and has additional changes.

The major components implemented would be the Color Panel, and the region growing algorithm that used a combination of two predicates.

2.1 The Color Panel

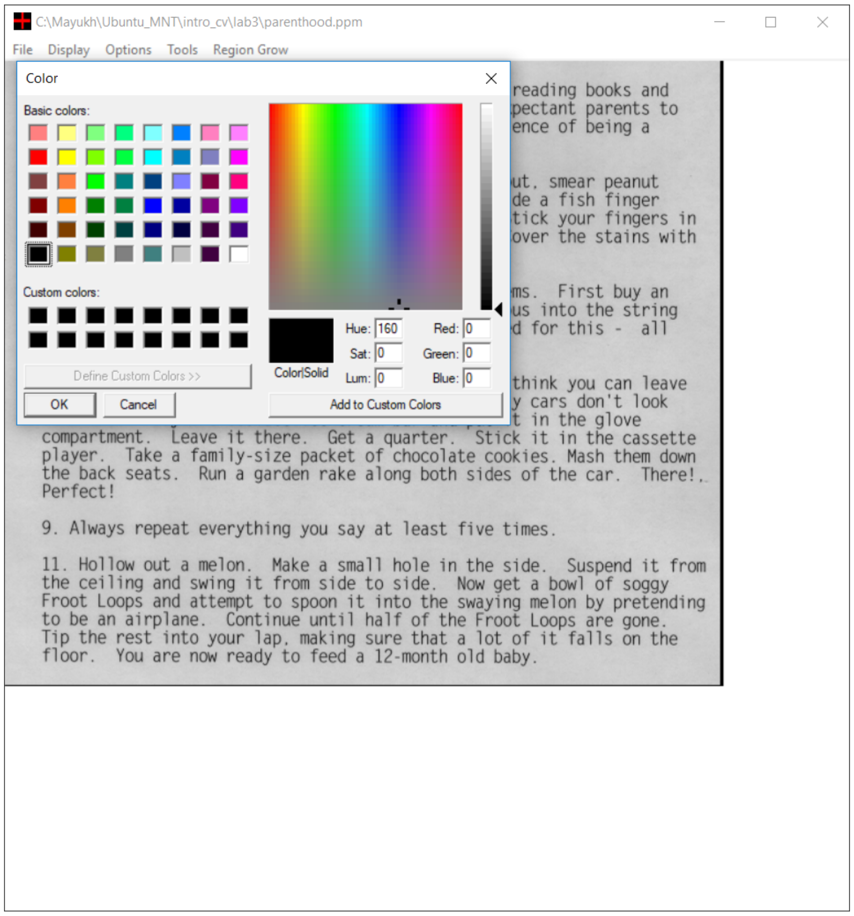
For implementing the colorpannel a structure is created and is called in the corresponding menu item, thense, the user input value is stored in a global variable, which is then used to fill the region grow algorithm.

Listing 1: Color Panel

```
CHOOSECOLOR cc;             // common dialog box structure
static COLORREF acrCustClr[16]; // array of custom colors
HWND hwnd;                  // owner window
HBRUSH hbrush;              // brush handle
static DWORD rgbCurrent;    // initial color selection

// Initialize CHOOSECOLOR
ZeroMemory(&cc, sizeof(cc));
cc.lStructSize = sizeof(cc);
cc.hwndOwner = hwnd;
cc.lpCustColors = (LPDWORD) acrCustClr;
cc.rgbResult = rgbCurrent;
cc.Flags = CC_FULLOPEN | CC_RGBINIT;

if (ChooseColor(&cc)==TRUE)
{
   hbrush = CreateSolidBrush(cc.rgbResult);
   rgbCurrent = cc.rgbResult;
}
```



Hue: 160 Sat: 0 Lum: 0 Red: 0 Green: 0 Blue: 0

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compartment.  Leave it there.  Get a quarter.  Stick it in the cassette
player.  Take a family-size packet of chocolate cookies. Mash them down
the back seats.  Run a garden rake along both sides of the car.  There!.
Perfect!

9. Always repeat everything you say at least five times.

11. Hollow out a melon.  Make a small hole in the side.  Suspend it from
the ceiling and swing it from side to side.  Now get a bowl of soggy
Froot Loops and attempt to spoon it into the swaying melon by pretending
to be an airplane.  Continue until half of the Froot Loops are gone.
Tip the rest into your lap, making sure that a lot of it falls on the
floor.  You are now ready to feed a 12-month old baby.
```

Figure 1: Color Panel

2.2 The region grow algorithm

To calculate the centeroid, two new variables are used, and they are used to compute a eucledian distance to the current pixel, and this distance is used as a measure to control the growing of the region.

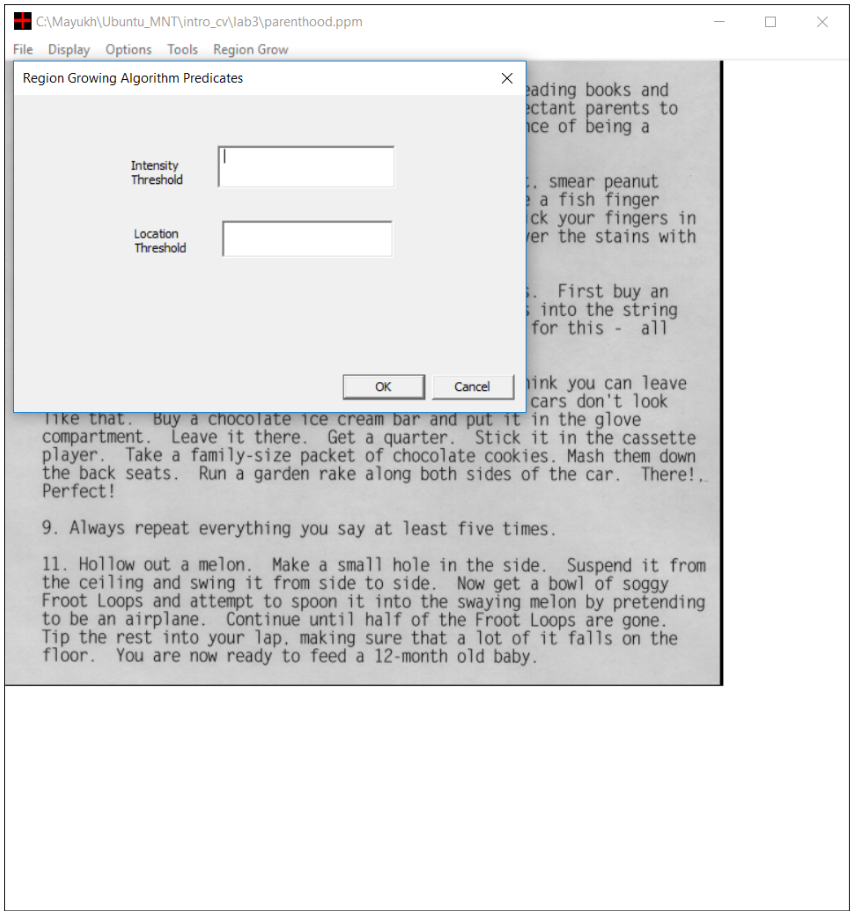
The variables to this predicate are provided through this window:

The algorithm is implemented as below:

Listing 2: Region Growing Predicates

```
if ((*count) % 50 == 0) /* recalculate average after each 50 pixels join */
     {
       average = total / (*count);
       avg_r = total_r / (*count);
       avg_c = total_c / (*count);
       // printf("new avg=%d\n",average);
     }

//An Average is computed
.
```


C:\Mayukh\Ubuntu_MNT\intro_cv\lab3\parenthood.ppm
File
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Options
Tools
Region Grow
Region Growing Algorithm Predicates
Intensity Threshold
Location Threshold
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```

Figure 2: Region Growing Predicate Controls

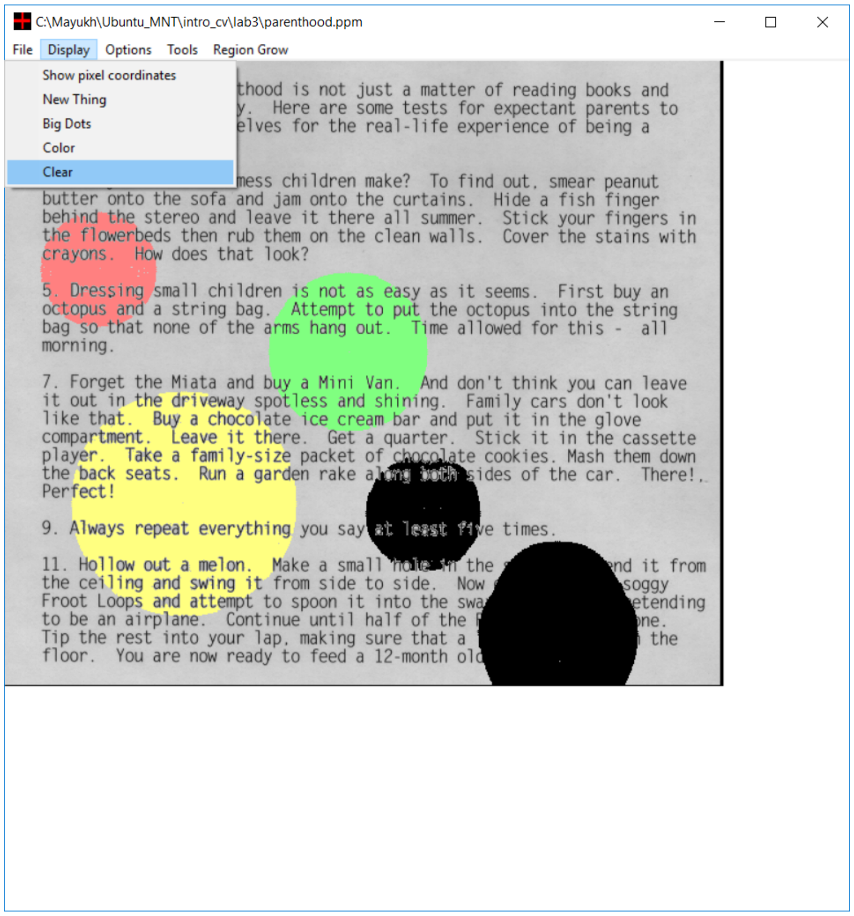
```
.
.

dist = SQR(avg_r - queue[qt] / COLS + r2) + SQR(avg_c - queue[qt] % COLS + c2);
          /* test criteria to join region */
          if ((abs((int)(image[(queue[qt] / COLS + r2)*COLS + queue[qt] % COLS +
              c2])
            - average) > val1) || (dist > val2*val2))
            continue;
```

3 Results

Here are a few screenshots depicting working of the Win32 application.

The various segmentations were obtained by altering the predicate parameters. Here is a description of each

- The red segment was run with a intensity threshold of 10, and a location threshold of



```
thood is not just a matter of reading books and
y.  Here are some tests for expectant parents to
elves for the real-life experience of being a

mess children make?  To find out, smear peanut
butter onto the sofa and jam onto the curtains.  Hide a fish finger
behind the stereo and leave it there all summer.  Stick your fingers in
the flowerbeds then rub them on the clean walls.  Cover the stains with
crayons.  How does that look?

5. Dressing small children is not as easy as it seems.  First buy an
octopus and a string bag.  Attempt to put the octopus into the string
bag so that none of the arms hang out.  Time allowed for this - all
morning.

7. Forget the Miata and buy a Mini Van.  And don't think you can leave
it out in the driveway spotless and shining.  Family cars don't look
like that.  Buy a chocolate ice cream bar and put it in the glove
compartment.  Leave it there.  Get a quarter.  Stick it in the cassette
player.  Take a family-size packet of chocolate cookies. Mash them down
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```

Figure 3: Various Region Growing implementations

50. The size depicts the distance threshold and the grainy white spots show that the intensity threshold was low.

- The second segment, the yellow segment was run with the same intensity threshold, but a greater location threshold of 100. Note the size of the region is double that of the red one.
- The green segment was run with intensity threshold of 70, and distance threshold of 70, the grey spots as in the red segment are not seen here, this region is more solid.
- Finally, the larger black segment was run with an intensity threshold of 250, we see that this region has engulfed the letters too.

4 Code

Listing 3: main.c of Lab4

```c
#include <stdio.h>
```