

Tutorial/Lab Session 6

PURPOSE:

1. To practice the use of graphic functions under “xvision”.
2. To practice some Point-Based image processing techniques.

PROCEDURE:

Practice 1: To draw graphic primitives under “xvision”

Step 1: Login to the PC and start the X-window environment.

Step 2: Go to the directory xvision (use “cd xvision”).

Step 3: Edit the file “xvision.c” with “emacs” (use “emacs xvision.c”).

Step 4: Develop the function Test2() with the following content:

```
void Test2()
{
    /* DrawLine(x1, y1, x2, y2, color) */
    DrawLine(100, 50, 200, 50, 80);
    DrawLine(100, 80, 200, 80, 100);
    DrawLine(100, 100, 200, 100, 120);

    /* DrawRectangle(x1, y1, x2, y2, color) */
    DrawRectangle(200, 100, 300, 200, 150);
    DrawRectangle(220, 120, 280, 180, 100);
}
```

Step 5: Compile the program (type “make”).

Step 6: Execute the program (type “xvision”) and click on the button <Test 2>. Observe what happens.

CREATIVE WORK

To draw the outline of a house.

Practice 2: To extract a sub-image from an input image

Step 1: Edit the file “xvision.c” with “emacs” (use “emacs xvision.c”).

Step 2: Add in the following content just above the function Test3():

```
static unsigned char onesubimage[20*20];
```

Step 3: Develop the function Test3() with the following content:

```
void Test3()
{
    char filename[80];
    int row, col, sv, su;
    int x0, y0;

    sv = 20; su = 20;
    printf("\n> Enter image file: ");
    scanf("%s", filename);
    ReadImage(filename);
    DrawPixmap(oneimage, 256, 256, 0, 0);
    /* extract the subimage from the location (x0, y0)*/
    x0 = 100; y0 = 150;
    for (row = 0; row < 20; row++)
        for (col = 0; col < 20; col++)
            onesubimage[row*20+col] =
                oneimage[(y0-sv/2+row)*256+
                    (x0-su/2+col)];
    DrawPixmap(onesubimage, 20,20, 256, 0);
}
```

Step 4: Compile the program (type “make”).

Step 5: Execute the program (type “xvision”) and click on the button <Test 3>. Observe what happens.

CREATIVE WORK

Change the value (x0, y0) to see the difference.

Practice 3: To compute the histogram of an input image

Step 1: Edit the file “xvision.c” with “emacs” (use “emacs xvision.c”).

Step 2: Add in the following content just above the function Test4():

```
static int histogram[256];
```

Step 3: Develop the function Test4() with the following content:

```
void Test4()
{
    char filename[80];
    int row, col, v, x, y;

    printf("\n> Enter image file: ");
    scanf("%s", filename);
    ReadImage(filename);
    DrawPixmap(oneimage, 256, 256, 0, 0);
    /* reset the hisgram values */
    for (v = 0; v < 256; v++) histogram[v] = 0;
    /* compute the histogram */
    for (row = 0; row < 256; row++)
        for (col = 0; col < 256; col++)
        {
            v = (int) oneimage[row*256+col];
            histogram[v] = histogram[v] + 1;
        }
    /* display the histogram */
    for (v = 0; v < 256; v++)
    {
        x = v; y = histogram[v]/2;
        DrawLine(x, 512, x, 512-y, 100);
    }
}
```

Step 4: Compile the program (type “make”).

Step 5: Execute the program (type “xvision”) and click on the button <Test 4>. Observe what happens.

CREATIVE WORK

Display the histogram from the location (256, 256).

Practice 4: To binarize an input image

Step 1: Complete the function Test4() with the following content:

```
void Test4()
{
    (same as in Practice 3)

    /* reset the hisgram values */
    (same as in Practice 3)

    /* compute the histogram */
    (same as in Practice 3)

    /* display the histogram */
    (same as in Practice 3)

    /* image binarization */
    printf("\n> Enter threshold value : ");
    scanf("%d", &v);
    for (row = 0 ; row < 256; row++)
        for (col = 0 ; col < 256 ; col++)
        {
            if ((int) oneimage[row*256+col] > v)
                oneimage[row*256+col] = 200 ;
            else
                oneimage[row*256+col] = 20 ;
        }
    DrawPixmap(oneimage, 256, 256, 512, 0);
}
```

Step 2: Compile the program (type “make”).

Step 3: Execute the program (type “xvision”) and click on the button <Test 4>. Play with different threshold values and observe the results.