Description of program cclabel.c

This program looks for the connected regions and labels the connected regions with a distinctive label L = 1,2,3,...n. The connectivity is defined as: horizontally or vertically connected pixels; but pixels diagonally connected are not defined as connected pixels.

The program will work in the following way:

1. Creat an out put image(im) to store labels and a template image(tm) to store original contents .
2. Add an external boundary of zero values outside the template.
3. Clear the labels (the content of im), and set the label L to 1.
4. Search for the non-zero pixels and label it; also, find pixels connected with it and label it with the same lable L.
5. After the entire region is labeled, then increase the label L.
6. Repeat step 4 and 5.

```
/*****************************************************************/
/* cclabel.c     Labels connected regions on a single byte image   */
/*****************************************************************/

#include "VisXV4.h"          /* VisionX structure include file    */
#include "Vutil.h"           /* VisionX utility header files      */

VXparam_t par[] =            /* command line structure            */
{ /* prefix, value,   description                                 */
{    "if=",    0,   " input file  vtemp: local max filter "},
{    "of=",    0,   " output file "},
{     0,       0,   0}  /* list termination */
};
#define  IVAL   par[0].val
#define  OVAL   par[1].val
void setlabel(int, int,int);
Vfstruct (im);                   /* i/o image structure          */
Vfstruct (tm);                   /* temp image structure         */

main(argc, argv)
int argc;
char *argv[];
{
int     L= 1,  y,x;              /* Lables andindex counters   */
  VXparse(&argc, &argv, par);      /* parse the command line       */

  Vfread(&im, IVAL);             /* read image file              */
  Vfembed(&tm, &im, 1,1,1,1);      /* image structure with border  */
  if ( im.type != VX_PBYTE ) {     /* check image format           */
     fprintf(stderr, "vtemp: no byte image data in input file\n");
     exit(-1);
                                  }
  for (y = im.ylo ; y <= im.yhi ; y++) {
     for (x = im.xlo; x <= im.xhi; x++)  {

                im.u[y][x]= 0 ; /* set labels to zero*/
          }
   }
  for (y = im.ylo ; y <= im.yhi ; y++) {
     for (x = im.xlo; x <= im.xhi; x++)  {
```

```
  if(tm.u[y][x] && !im.u[y][x])

                {setlabel(x,y,L);
                  L++;
                }
                                        }
                                          }

  Vfwrite(&im, OVAL);          /* write image file              */
  exit(0);
}

/* function to compute the local maximum */
void setlabel(int x, int y, int L)
{                  im.u[y][x] = L;
                if(tm.u[y+1][x] && !im.u[y+1][x] )
                                {setlabel(x, y+1,L);
                                }
                if(tm.u[y-1][x] && !im.u[y-1][x] )
                        {setlabel(x, y-1,L);
                        }
                if(tm.u[y][x-1] && !im.u[y][x-1] )
                        {setlabel(x-1, y,L);
                        }
                if(tm.u[y][x+1] && !im.u[y][x+1] )
                        {setlabel(x+1, y, L);
                        }


}
```

Typescript

```
xl553@ph314-10:~/lab2$ vcc cclabel.c -o cclabel
xl553@ph314-10:~/lab2$ vppr mine.vx
    0  1  2  3  4  5  6
 5  0  0  0  0  0  0  0
 4  0  1  1  0  0  0  0
 3  0  0  1  0  0  0  0
 2  0  0  0  0  3  3  0
 1  0  0  0  3  3  3  0
 0  0  0  0  0  0  0  8
```

```
xl553@ph314-10:~/lab2$ ./cclabel mine.vx | vppr
    0  1  2  3  4  5  6
 5  0  0  0  0  0  0  0
 4  0  3  3  0  0  0  0
 3  0  0  3  0  0  0  0
 2  0  0  0  0  2  2  0
 1  0  0  0  2  2  2  0
 0  0  0  0  0  0  0  1
xl553@ph314-10:~/lab2$ vppr mine2.vx
    0  1  2  3  4  5  6  7  8  9
 9  0  0  0  0  0  0  0  0  0  0
 8  0  1  1  1  1  0  0  0  0  0
 7  0  0  0  0  1  0  0  0  0  0
 6  0  1  1  0  1  1  0  0  1  0
 5  0  1  1  0  1  1  0  0  1  0
 4  0  1  1  0  0  0  0  0  1  0
 3  0  1  1  0  0  1  1  1  1  0
 2  0  0  0  0  1  1  0  0  0  0
 1  0  0  0  1  0  0  1  1  1  0
 0  0  0  0  0  0  0  1  1  1  0
xl553@ph314-10:~/lab2$ ./cclabel mine2.vx | vppr
    0  1  2  3  4  5  6  7  8  9
 9  0  0  0  0  0  0  0  0  0  0
 8  0  5  5  5  5  0  0  0  0  0
 7  0  0  0  0  5  0  0  0  0  0
 6  0  4  4  0  5  5  0  0  3  0
 5  0  4  4  0  5  5  0  0  3  0
 4  0  4  4  0  0  0  0  0  3  0
 3  0  4  4  0  0  3  3  3  3  0
 2  0  0  0  0  0  3  3  0  0  0  0
 1  0  0  0  2  0  0  1  1  1  0
 0  0  0  0  0  0  0  1  1  1  0
```

lity. Other standard charts,
used for quality measurements.

lity. Other standard charts,
used for qualit mea urement .

lity. Other standard charts,
used for quality measurements.

tended for use
t for evaluation

lity. Other standard charts,
used for quality measurements.

tended for use
for evaluation