Machine Vision

Homework#4

Deadline: 2024/05/15 23:59:59

Robot Vision Lab (Room 1421)

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HW#4

1. Watershed Segmentation
   - 1-1. Mark the area you want to segment.
     - You can use mouse events to mark.
     - Use different colors to represent different labels.
     - Create a 2D array to store labels.

       (Ex: 0 = unmarked, 1 = label 1, 2 = label 2 …)

Marked

HW#4

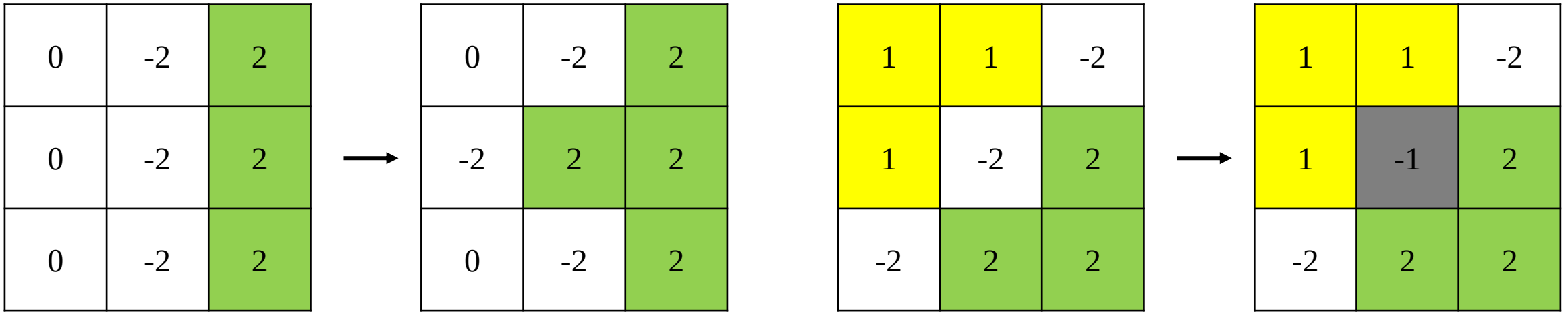
1. Watershed Segmentation
   - 1-2. Region growing.
     a) Create a priority queue. (What is the priority criteria?)
     b) First, add the pixels neighboring the marked pixels and change the label. (Ex: use -2 to represent a pixel is in the queue)
     c) For each pixel in the queue:
        - Mark it with the same label of its neighbor.
        - If there are more two (or more) different labels in its neighbor, mark it as an edge. (Ex: use -1 to represent)
        - Add its unmarked neighbors to the queue. (4-neighbor)
     d) Repeat (c) until all pixels are marked.

Marked

Segmented

HW#4

- Example(0: unmarked, -1: Edge, -2: in queue)



HW#4

Original Image

Mark

Segmented

HW#4

- Images

Try to segment different types of fruits

Try to segment all different coins.

Try to segment the road, sky and grass both sides.

HW#4

- Report
  - Student ID
  - Name
  - Describe the main part of your method(or explain your code)
  - Result images and the marked images (Q1-1)
  - Explain the results you get

HW#4

- Rules in using C/C++ OpenCV Lib
  - ➢Use OpenCV-2.x version
  - ➢Allow use:
    1. Read, save, show image (cvLoadImage, cvShowImage, …)
    2. Define image (Mat)
    3. Get image size (cvSize, cvGetSize)
    4. Libs for mouse events
  - ➢Not Allow use:
    1. Cannot use the function of Lib to do the main part of homework.

       Example: cvWatershed(image, gray, markers); //do the watershed segmentation

       ※ Other libs also not allow use to do the main part of homework

HW#4

- Rules in using Python OpenCV Lib
  - ➢Allow use:
    1. Read, save, show image (cv2.imread, cv2.imshow, …)
    2. Define image
    3. Get image size
    4. Libs for mouse events.
  - ➢Not Allow use:
    1. Cannot use the function of Lib to do the main part of homework.

       Example: cv2. watershed(image, markers) //do the watershed segmentation

       ※ Other libs also not allow use to do the main part of homework

HW#4

- Grade
  - Program(80%)
    - Q1-1(30%)
    - Q1-2(50%)
  - Report(20%)
  - Addition(10%)

HW#4

- Folder Structure
  - ➢There are 3 images in the results folder.
  - ➢Write all questions in one program

Python

```
112598058_hw4/
├── images/
│   ├── img1.jpg
│   ├── img2.jpg
│   └── img3.jpg
├── results/
│   ├── img1_q1.jpg
│   ├── img2_q1.jpg
│   └── img3_q1.jpg
├── 112598058_hw4.py
├── 112598058_hw4.pdf
└── Readme.txt (Optional)
```

C/C++

```
112598058_hw4/
├── project_hw4/
│   ├── images/
│   │   ├── img1.jpg
│   │   ├── img2.jpg
│   │   └── img3.jpg
│   ├── results/
│   │   ├── img1_q1.jpg
│   │   ├── img2_q1.jpg
│   │   └── img3_q1.jpg
│   ├── include/
│   │   └── func.h
│   ├── func.cpp
│   └── main.cpp
├── 112598058_hw4.pdf
└── Readme.txt (Optional)
```

HW#4

- Please compress your files.
  - Example: 112598058_hw4.zip
- Deadline: 2024/05/15 23:59:59
  - For each hour late, 10% of the total score will be deducted.
- Don’t share your code and your report with other students.

  Do it by yourself.