

# Machine Vision

Homework#1

Deadline: 2024/03/20 23:59:59

Robot Vision Lab (Room 1421)

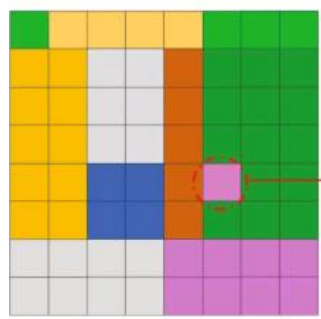
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# HW#1

1. Image Quantization(binary, gray, index-color)
  - 1-1. Convert the color image to the grayscale image
    - Formula:  $(0.3 \times R) + (0.59 \times G) + (0.11 \times B)$ .
  - 1-2. Convert the grayscale image to the binary image
    - Choose a appropriate threshold by yourself.
  - 1-3. Convert the color image to the index-color image
    - Define your own colormap of 16 type colors.

# HW#1



(a) Indexed image

15	12	12	12	12	15	15	15
4	4	7	7	3	10	10	10
4	4	7	7	3	10	10	10
4	4	7	7	3	10	10	10
4	4	11	11	0	10	10	10
4	4	11	11	3	10	10	10
9	9	9	9	1	1	1	1
9	9	9	9	1	1	1	1

(b) Data matrix

	R	G	B
0	255	117	255
1	231	117	240
2	79	136	255
3	210	109	25
4	255	192	0
5	51	102	255
6	0	176	80
7	216	216	216
8	183	94	21
9	218	216	214
10	51	153	51
11	0	102	255
12	255	204	102
13	68	142	255
14	45	148	57
15	0	185	83

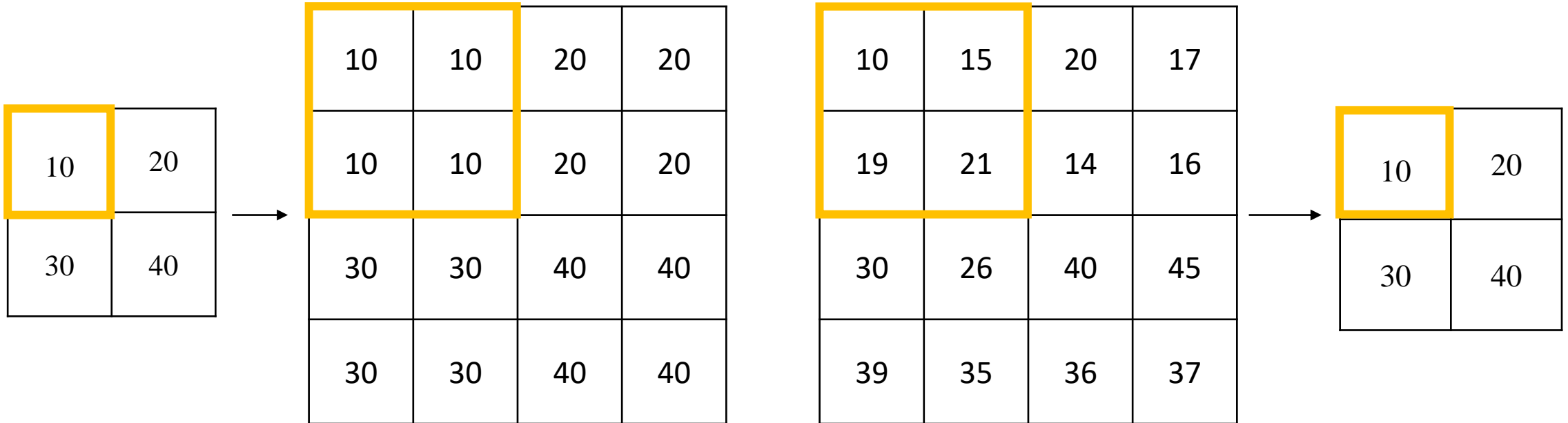
(c) Palette matrix



# HW#1

## 2. Resizing Image

2-1. Resizing image to  $\frac{1}{2}$  and 2 times without interpolation

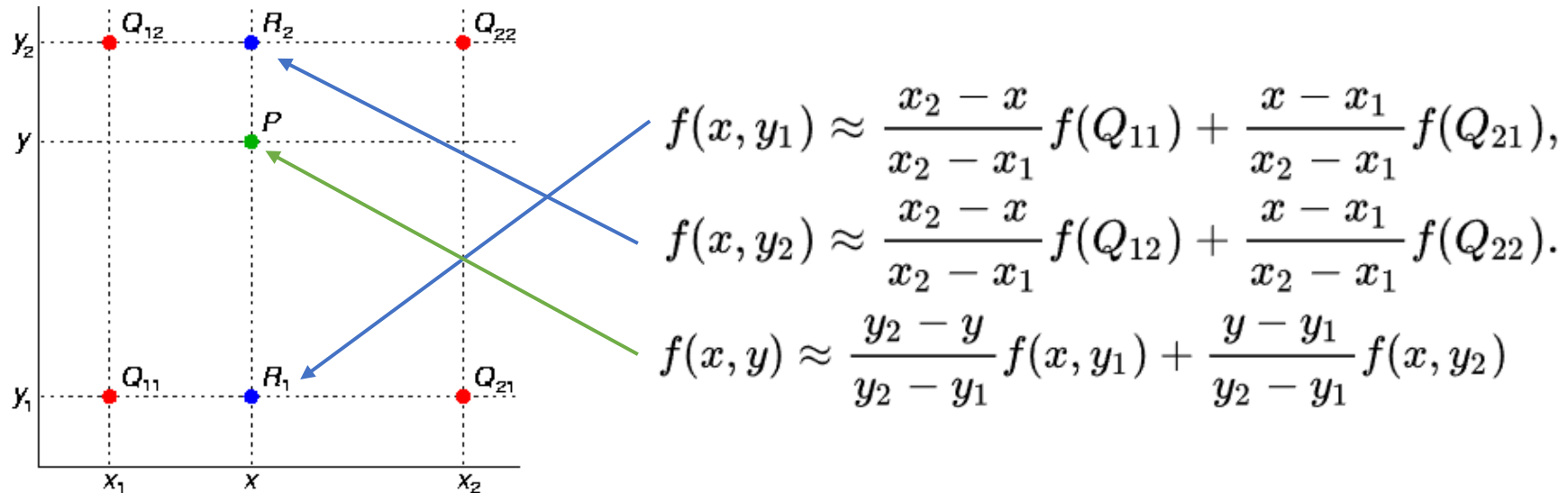


# HW#1

## 2. Resizing Image

2-2. Resizing image to  $\frac{1}{2}$  and 2 times with interpolation

- You can use bilinear or bicubic interpolation.



# HW#1

- Report
  - Student ID
  - Name
  - Describe the main part of your method
  - Result images and colormaps
  - Explain the results you get

# HW#1

- 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)

- **Not Allow use:**

1. Cannot use the function of Lib to do the main part of homework.

Example: `cvtColor(image, gray, CV_RGB2GRAY);` // convert RGB to Gray

# HW#1

- Rules in using Python OpenCV Lib

- Allow use:

1. Read, save, show image (cv2.imread, cv2.imshow, ...)
2. Define image
3. Get image size

- Not Allow use:

1. Cannot use the function of Lib to do the main part of homework.

Example: `cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)` // convert RGB to Gray



# HW#1

- Grade
  - Program(80%)
    - Q1-1(10%)
    - Q1-2(10%)
    - Q1-3(20%)
    - Q2-1(15%)
    - Q2-2(25%)
  - Report(20%)

# HW#1

- Folder Structure

- There are 21 images in the results folder.

- Write all questions in one program

## Python

```
112598058_hw1/  
├── images/  
│   ├── img1.jpg  
│   ├── img2.jpg  
│   └── img3.jpg  
├── results/  
│   ├── img1_q1-1.jpg  
│   ├── img1_q1-2.jpg  
│   ├── img1_q1-3.jpg  
│   ├── img1_q2-1-half.jpg  
│   ├── img1_q2-1-double.jpg  
│   ├── img1_q2-2-half.jpg  
│   ├── img1_q2-2-double.jpg  
│   ├── ...  
│   └── img3_q2-2-double.jpg  
├── 112598058_hw1.py  
├── 112598058_hw1.pdf  
└── Readme.txt (Optional)
```

## C/C++

```
112598058_hw1/  
├── project_hw1/  
│   ├── images/  
│   │   ├── img1.jpg  
│   │   ├── img2.jpg  
│   │   └── img3.jpg  
│   ├── results/  
│   │   ├── img1_q1-1.jpg  
│   │   ├── img1_q1-2.jpg  
│   │   ├── img1_q1-3.jpg  
│   │   ├── img1_q2-1-half.jpg  
│   │   ├── img1_q2-1-double.jpg  
│   │   ├── img1_q2-2-half.jpg  
│   │   ├── img1_q2-2-double.jpg  
│   │   ├── ...  
│   │   └── img3_q2-2-double.jpg  
│   ├── include/  
│   │   └── func.h  
│   ├── func.cpp  
│   └── main.cpp  
├── 112598058_hw1.pdf  
└── Readme.txt (Optional)
```

# HW#1

- Please compress your files.
  - Example: 112598058\_hw1.zip
- Deadline: 2024/3/20 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.