電腦視覺

Homework 1

Contents:

Description

This is the report for the first homework for Computer Vision 2019. Both parts are completed.

The environment is Windows, with the code (for both parts) being written in Python 3 with the cv2 module.

Methodology

For part 1:

(a) The rows of the image are reversed, flipping the image along the X axis.
(b) Each row's pixels are reversed, flipping the image along the Y axis.
(c) The pixel in (i,j) position is replaced with its original (j,i) pixel, i.e. the picture is transposed.

For part 2:

(d) The library functions `getRotationMatrix2D` (with a -45° angle) and `warpAffine` are used.
(e) The library function `resize` is used, with `fx = fy = 0.5`.
(f) The library function `threshold` is used, with the threshold being set at 128.

Code Fragments

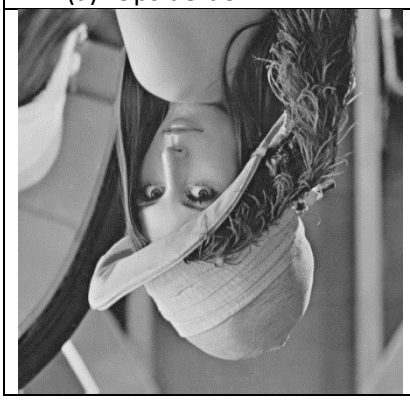
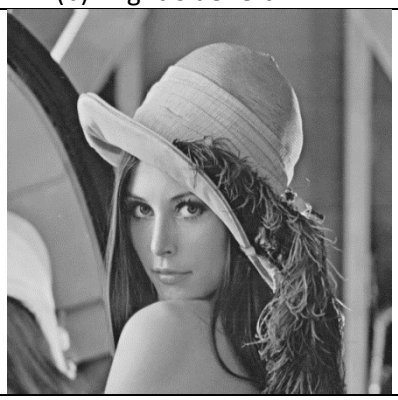
The primary code for image operations in part 1 are shown here. For part 2, please see the file itself.

```
flipped_image    = image[::-1] # to flip it on its head

right_left_image = image.copy()
for i in range(image.shape[0]):
    right_left_image[i] = right_left_image[i][::-1]

diag_image = image.copy()

for i in range(image.shape[0]):
    for j in range(image.shape[1]):
        diag_image[i][j] = image[j][i]
```

Images: Part 1

Original image (scaled)

Using the code attached ("**part1.py**"), the result is as follows:

(a) Upside-down	(b) Right-side-left	(c) diagonally mirrored
		

(Part 2 is on the next page.)

Images: Part 2

Using the code attached ("**part2.py**"), the result is as follows:

(d) 45 degrees clockwise	(e) halved	(f) binarize at 128
		

Additional notes

- Both Python files (part1.py, part2.py), when executed, will open up several windows displaying the image. You can press ESC to close them all. Once closed, they will create the corresponding files (in .bmp format).
- The cv2 module is required to run the programs. (Along with its prerequisites.)