🎨

Oil Painting project

Github:https://github.com/Wenqi-528/pic-gif-oli_painting-transfer

😜Inspiration:

1. **Lack cv details in the CV group course (More relative to pictures instead of NLP)**
2. **CV2 is interesting and fun to play with (Intel)**

😀Goal:

- [ ] made a module for the oil painting (packages)
- [ ] choosing the artistic type of painting
- [ ] the width of the brush
- [ ] Make use of Opencv (a power library of computer vision) https://opencv.org/
- [ ] the practice of Python coding especially in Numpy and functions

Introduction:

In the field of computer vision, stylizing pictures is a very common application. What we will do today is to redesign an oil painting algorithm in consideration of various methods, and carry it out in multiple directions.

> Original pictures

> style=sobel, width=2

> style=sobel, width=5

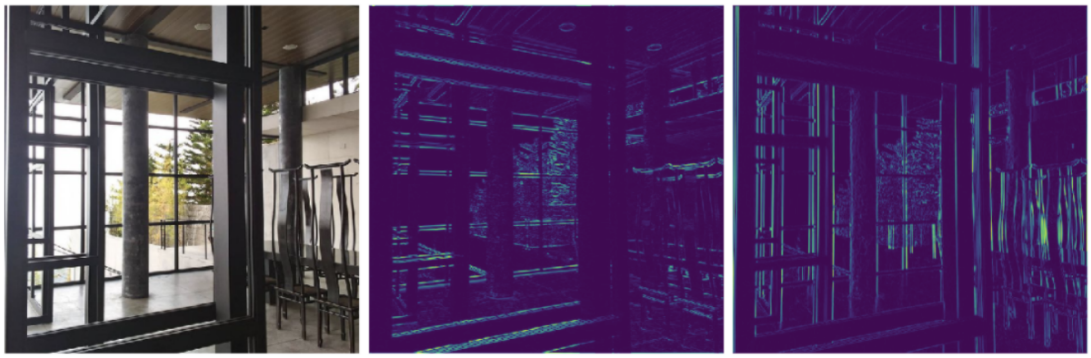
> style=scharr, width=5

Gradient (Edge dector):

For the direction of the brush, we use an edge detector to find the components in the X and Y directions.

We have four different edge detectors: **Prewitt, Roberts, Scharr, Sobel**

OpenCV tutorial:https://docs.opencv.org/3.4/d2/d2c/tutorial_sobel_derivatives.html

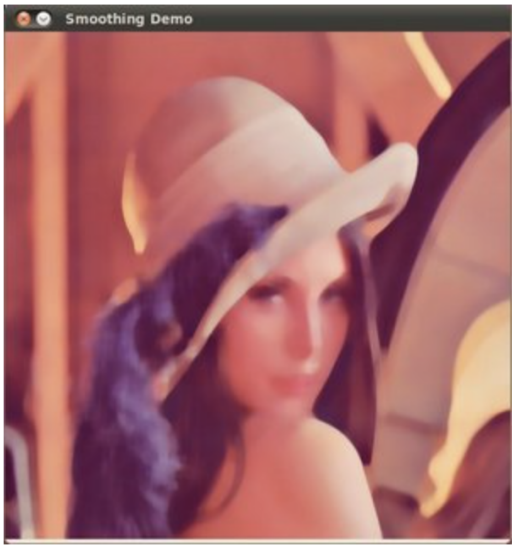


Smoothing:

Next, in order to make the picture look like a painting, we first applied a blur to the picture.

We have options of **Gaussian Blur, Bilateral Filtering, MedianBlur.** I try MedianBlur for better performance.

The algorithm behind smoothing:
https://docs.opencv.org/3.4/dc/dd3/tutorial_gausian_median_blur_bilateral_filter.html



Draw Order (Make functions):

Originally, we painted from top to bottom, from left to right, but the effect was not satisfactory.
Therefore, we disrupt the order of coloring and randomly decide which plan to draw; and in this step, we decide the color of the stroke (skip some strokes), avoid repeated coloring, and speed up.

Define the function to make the random draw (**use of NumPy)**

Ellipse:

According to the determined order, the ellipse is used to represent the stroke; the length and angle of the ellipse
Refer to the Gradient of the first point (the hypotenuse of the X and Y components is used as the length, and the arctan is used as the angle degree

cv.ellipse https://docs.opencv.org/3.4/d6/d6e/group__imgproc__draw.html

🥰Optional and Bonus:

Make the notebook into a module :

Initiate it by python command line:

```
python main.py --brush_width 5  --path tulip.jpeg --gradient scharr
```

▼ parser = argparse.ArgumentParser()

parser.add_argument('--brush_width', default=5, help="Scale of the brush strokes")
parser.add_argument('--path', required=True, type=str, help="Target image path, gif of still image")
parser.add_argument('--palette', default=0, help="Palette colours. 0 = Actual color")
parser.add_argument('--gradient', default='sobel', help="Edge detection type. (sobel, scharr, prewitt, roberts)")
args = parser.parse_args()
main(args)

GIF to JPG to GIF:

The Unix command **call convert** cuts GIF into JPG.