第三次实验报告

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目录

实验内容: 1. **命令行环境**

2.python **入门基础**

3.python **视觉应用**

1 命令行环境

1.1 任务控制

1.1.1 结束进程

sleep 10000 启动休眠任务，Ctrl+Z 挂起前台正在运行的任务，bg 挂起的任务放到后台继续运行，pgrep -af sleep 查找进程,pkill -f sleep 结束进程

```
gy@gy-virtual-machine:~$ sleep 10000
^Z
[1]+  Stopped                 sleep 10000
gy@gy-virtual-machine:~$ bg
[1]+ sleep 10000 &
gy@gy-virtual-machine:~$ jobs
[1]+  Running                 sleep 10000 &
gy@gy-virtual-machine:~$ pgrep -af sleep
11681 sleep 10000
gy@gy-virtual-machine:~$ pkill -f sleep
[1]+  Terminated              sleep 10000
gy@gy-virtual-machine:~$ pgrep -af sleep
```

1.1.2 wait 命令

直接输入 wait, 等待全部进程结束，等到 sleep 结束后再执行 ls。

```
gy@gy-virtual-machine:~$ sleep 60 &
[1] 15682
gy@gy-virtual-machine:~$ wait
[1]+  Done                    sleep 60
gy@gy-virtual-machine:~$ ls
Desktop    Downloads       last-modified.txt  Pictures  snap    Templates   test2.html    Videos  vimrc.1
Documents  html_files.zip  Music              Public    subdir  test1.html  test_project  vimrc
gy@gy-virtual-machine:~$
```

编写 pidwait 函数，可以不用管是否是当前 shell 的子进程，等待任意 PID

```
pidwait(){
        local pid=$1
        if[ -z "$pid" ]; then
                echo "pidwait <PID>"
                return 1
        fi
        while kill -0 "$pid" 2>/dev/null; do
                sleep 1
        done
}
```

```
gy@gy-virtual-machine:~$ nano ~/.bashrc
gy@gy-virtual-machine:~$ source ~/.bashrc
gy@gy-virtual-machine:~$ sleep 30 &
[1] 36960
gy@gy-virtual-machine:~$ pidwait <36960>
bash: syntax error near unexpected token `36960'
gy@gy-virtual-machine:~$ pidwait 36960
[1]+  Done                    sleep 30
gy@gy-virtual-machine:~$ ls
Desktop    Downloads       last-modified.txt  Pictures  snap    Templates   test2.html    Videos  vimrc.1
Documents  html_files.zip  Music              Public    subdir  test1.html  test_project  vimrc
```

1.2 别名

1.2.1 创建别名

在~/.bashrc的文件中添加 “alias dc=‘cd’”，然后使修改生效，使用 dc 定位到 tmp 文件夹中

```
gy@gy-virtual-machine:~$ nano ~/.bashrc
gy@gy-virtual-machine:~$ source ~/.bashrc
gy@gy-virtual-machine:~$ dc /tmp
gy@gy-virtual-machine:/tmp$
```

1.2.2 为多条命令创建别名

执行 |history | awk '1 = "";$printsubstr(0,2)$' | sort | uniq -c | sort -n | tail -n 10

获取最常用的 10 条命令，在 bashrc 文件中为其更换别名，并使修改生效

```
gy@gy-virtual-machine:~$ history | awk '{$1="";print substr($0,2)}' | sort | uniq -c | sort -n | tail -n 10
      3 git clone https://github.com/ctrlpvim/ctrlp.vim
      3 nano marco.sh
      3 nano target.sh
      3 pgrep -af sleep
      3 ./runner.sh
      3 sudo apt install git
      4 source marco.sh
      5 ./semester
      7 python3 fizzbuzz.py 20
      8 vim fizzbuzz.py
```

1.3 配置文件

1.3.1 为配置文件新建文件夹

新建目录，初始化 git 仓库，把配置文件复制放到新的.dotfiles 文件夹中，建立符号链接，将文件夹.dotfiles 提交到 git

```
gy@gy-virtual-machine:~$ mkdir ~/.dotfiles
gy@gy-virtual-machine:~$ cd ~/.dotfiles
gy@gy-virtual-machine:~/.dotfiles$ git init
hint: Using 'master' as the name for the initial branch. This default branch name
hint: is subject to change. To configure the initial branch name to use in all
hint: of your new repositories, which will suppress this warning, call:
hint:
hint:   git config --global init.defaultBranch <name>
hint:
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this command:
hint:
hint:   git branch -m <name>
Initialized empty Git repository in /home/gy/.dotfiles/.git/
gy@gy-virtual-machine:~/.dotfiles$ cp ~/.bashrc ~/.dotfiles/bashrc
gy@gy-virtual-machine:~/.dotfiles$ cp ~/.vimrc ~/.dotfiles/vimrc
gy@gy-virtual-machine:~/.dotfiles$ ln -s ~/.dotfiles/bashrc ~/.bashrc
ln: failed to create symbolic link '/home/gy/.bashrc': File exists
gy@gy-virtual-machine:~/.dotfiles$ mv ~/.bashrc ~/.bashrc.backup
gy@gy-virtual-machine:~/.dotfiles$ ln -s ~/.dotfiles/bashrc ~/.bashrc
gy@gy-virtual-machine:~/.dotfiles$ ln -s ~/.dotfiles/vimrc ~/.vimrc
ln: failed to create symbolic link '/home/gy/.vimrc': File exists
gy@gy-virtual-machine:~/.dotfiles$ mv ~/.vimrc ~/.vimrc.backup
gy@gy-virtual-machine:~/.dotfiles$ ln -s ~/.dotfiles/vimrc ~/.vimrc
gy@gy-virtual-machine:~/.dotfiles$ cd ~/.dotfiles
gy@gy-virtual-machine:~/.dotfiles$ git add .
```

```
gy@gy-virtual-machine:~/.dotfiles$ git commit -m "add bashrc &vimrc"
[master (root-commit) 46c965f] add bashrc &vimrc
 2 files changed, 208 insertions(+)
 create mode 100644 bashrc
 create mode 100644 vimrc
```

1.3.2 添加配置文件

在 dotfiles 的目录里新建配置文件，添加自定义配置，`PS1='\u@\h:\w\$'`链接到/.bashrc，让配置生效，发现提示符改变。

```
gy@gy-virtual-machine:~$ ls -l ~/.bashrc
lrwxrwxrwx 1 gy gy 25  9月 16 14:22 /home/gy/.bashrc -> /home/gy/.dotfiles/bashrc
gy@gy-virtual-machine:~$ source ~/.bashrc
gy@gy-virtual-machine:~$ source ~/.bashrc
gy@gy-virtual-machine:~$
```

```
gy@gy-virtual-machine:~/.dotfiles$ nano ~/.dotfiles/bashrc
gy@gy-virtual-machine:~/.dotfiles$ ls -l ~/.dotfiles/bashrc
-rw-r--r-- 1 gy gy 3928  9月 16 14:03 /home/gy/.dotfiles/bashrc
gy@gy-virtual-machine:~/.dotfiles$ nano ~/.dotfiles/bashrc
gy@gy-virtual-machine:~/.dotfiles$ mv ~/.bashrc ~/.bashrc.backup
gy@gy-virtual-machine:~/.dotfiles$ ln -s ~/.dotfiles/bashrc ~/.bashrc
gy@gy-virtual-machine:~/.dotfiles$ source ~/.bashrc
gy@gy-virtual-machine:~/.dotfiles$ nano ~/.dotfiles/bashrc
```

1.3.3 建立进行快速安装配置的方法

将所有配置文件移至 /dotfiles 目录，写 install.sh 脚本，在新设备上执行 git clone 拷贝 /dotfiles，执行 install.sh 脚本

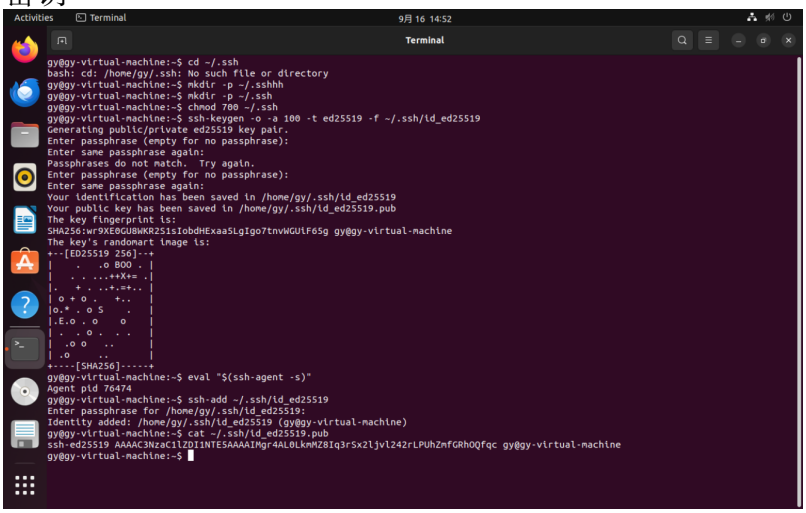
```
gy@gy-virtual-machine:~/dotfiles$mv ~/.bashrc ~/.vimrc ~/.gitconfig ~/dotfiles
gy@gy-virtual-machine:~/dotfiles$cd ~/dotfiles
gy@gy-virtual-machine:~/dotfiles$nano install.sh
gy@gy-virtual-machine:~/dotfiles$chmod +x install.sh
```

```
 GNU nano 6.2                                    install.sh
#!/bin/bash

DOTFILES=~/dotfiles

FILES=(.bashrc .vimrc .gitconfig)

for file in "${FILES[@]}"; do
        if [ -f "$HOME/$file" ] || [ -L "$HOME/$file" ]; then
                mv "$HOME/$file" "$HOME/$fille.backup"
        fi
        ln -s "$DOTFILES/$file" "$HOME/$file"
        echo "Linked $file"
done
echo "finished"
```

1.4 远端设备

1.4.1 SSH 密钥对

.ssh 文件夹不存在，新建目录，生成 SSH 密钥，启动 ssh-agent 并添加密钥，查看密钥



1.4.2 虚拟机配置 ssh 远程连接

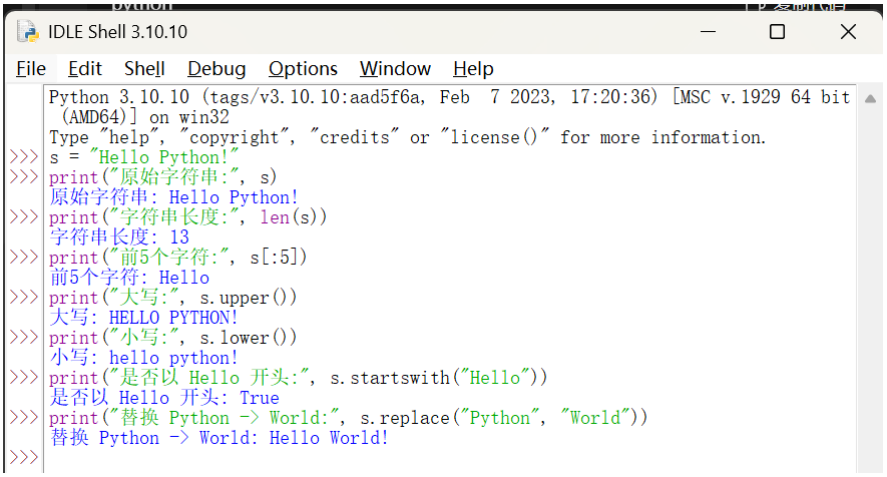
配置虚拟机的网络连接方式是 NAT，安装`openssh_server`，安装 xshell，新建对话连接虚拟机。

```
gy@gy-virtual-machine:~$ /etc/init.d/iptables start
bash: /etc/init.d/iptables: No such file or directory
gy@gy-virtual-machine:~$ sudo apt install openssh-server
[sudo] password for gy:
Reading package lists... Done
```

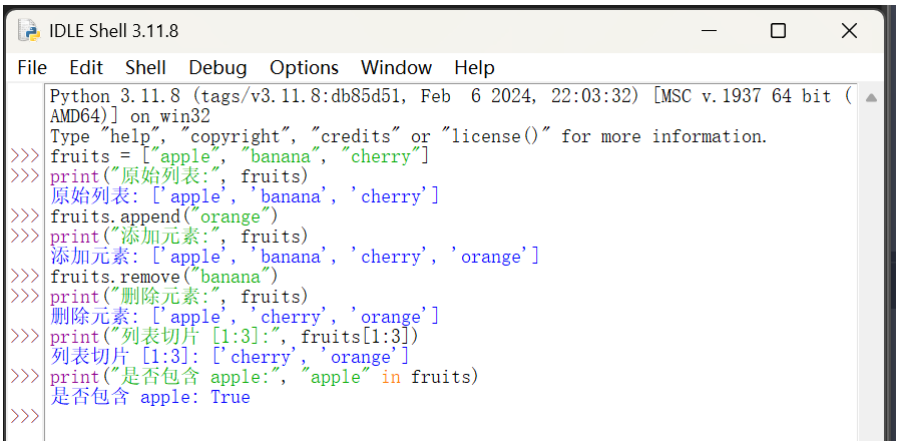
```
gy@gy-virtual-machine:~$ sudo service ssh restart
gy@gy-virtual-machine:~$ sudo vi/etc/ssh/sshd_config
sudo: vi/etc/ssh/sshd_config: command not found
gy@gy-virtual-machine:~$ sudo vi /etc/ssh/sshd_config
```

2 Python 入门基础

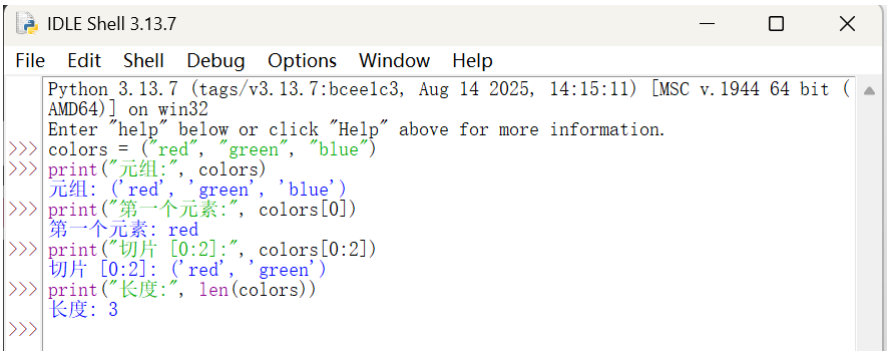
2.1 字符串练习



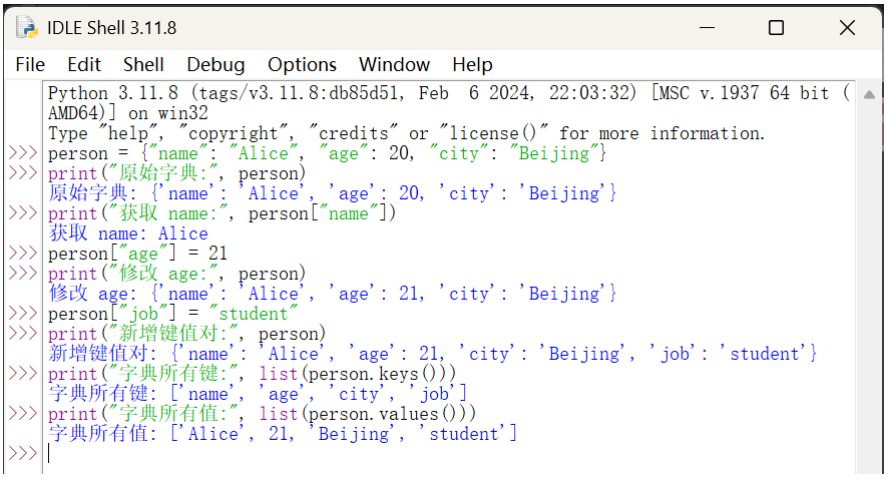
2.2 列表练习



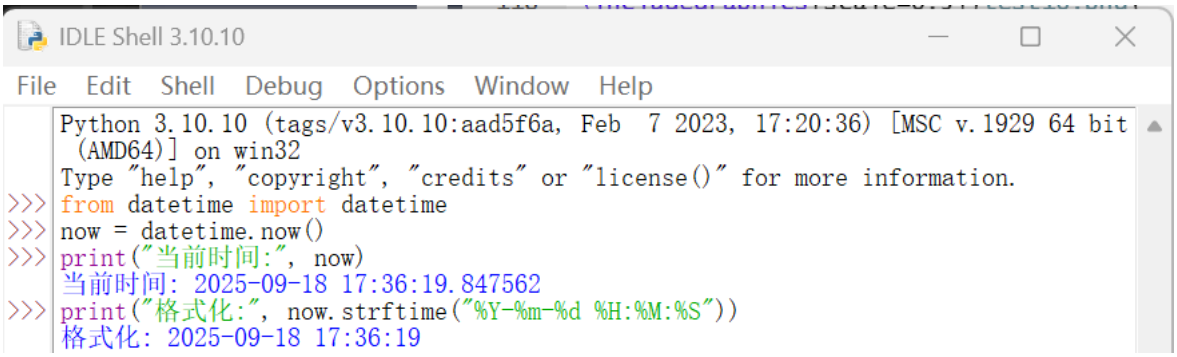
2.3 元组练习



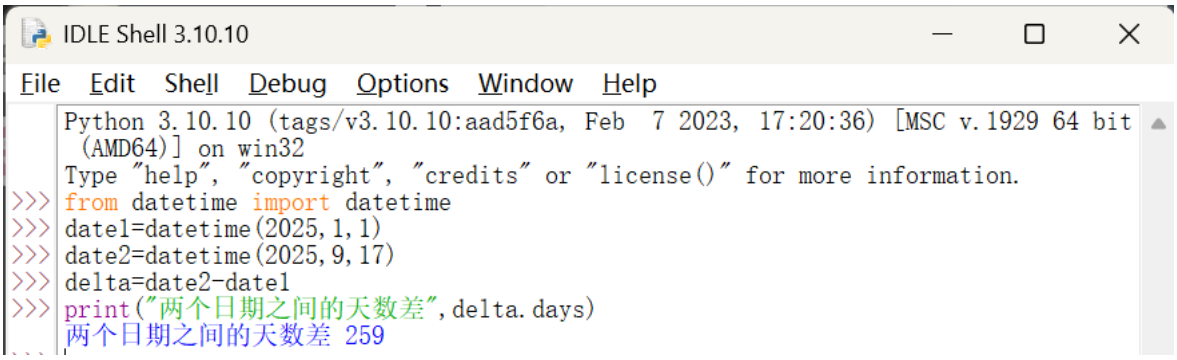
2.4 字典练习



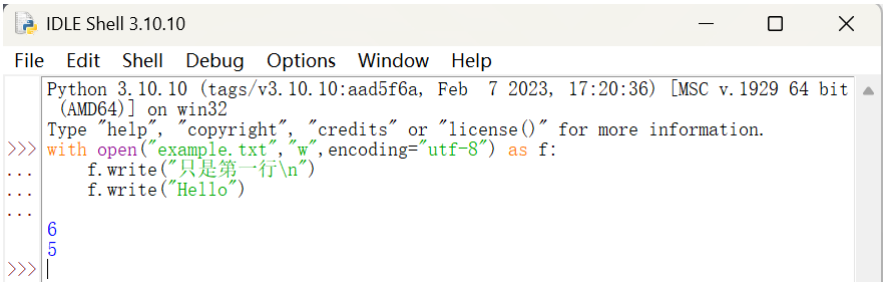
2.5 时间练习



2.6 日期练习



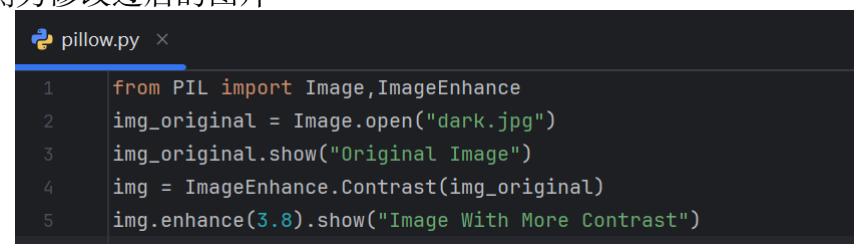
2.7 文件 I/O 练习

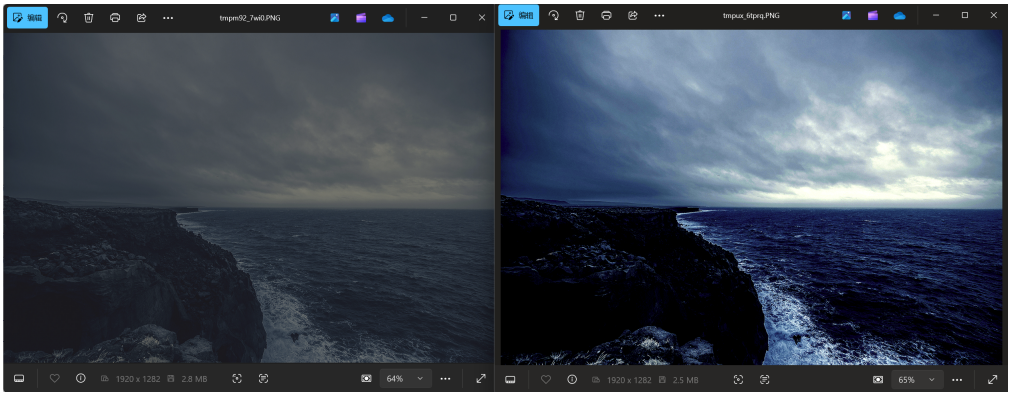


3 Python 视觉应用

3.1 Pillow 库

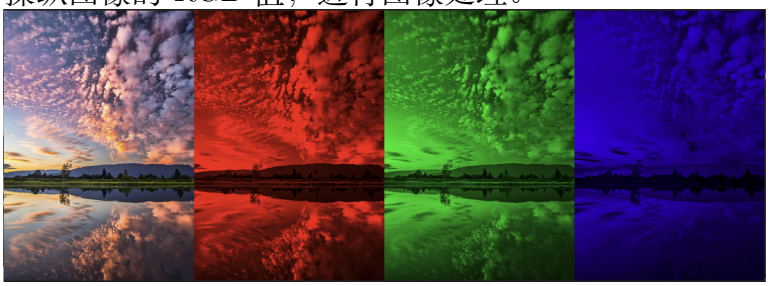
采用 pillow 中的 enhance 增加对比度，使暗的图片变得明亮，左侧为原图，右侧为修改过后的图片





3.2 Numpy 库

操纵图像的 RGB 值，进行图像处理。

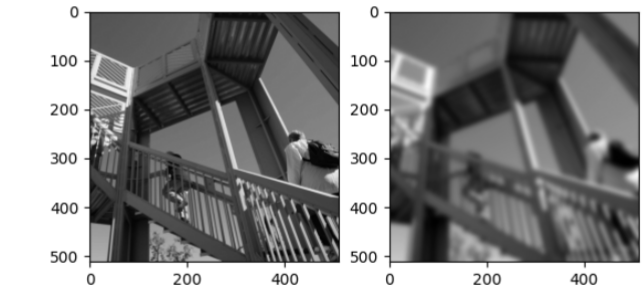


3.3 Scipy 库

使用 scikit-image，使用 scipy 库进行高斯模糊。

Scipy.py

```python
from scipy.datasets import ascent
import matplotlib.pyplot as plt
from scipy.ndimage import gaussian_filter

fig = plt.figure()
plt.gray()
ax1 = fig.add_subplot(121)
ax2 = fig.add_subplot(122)

img = ascent()  # 新接口
result = gaussian_filter(img, sigma=5)

ax1.imshow(img)
ax2.imshow(result)
plt.show()
```

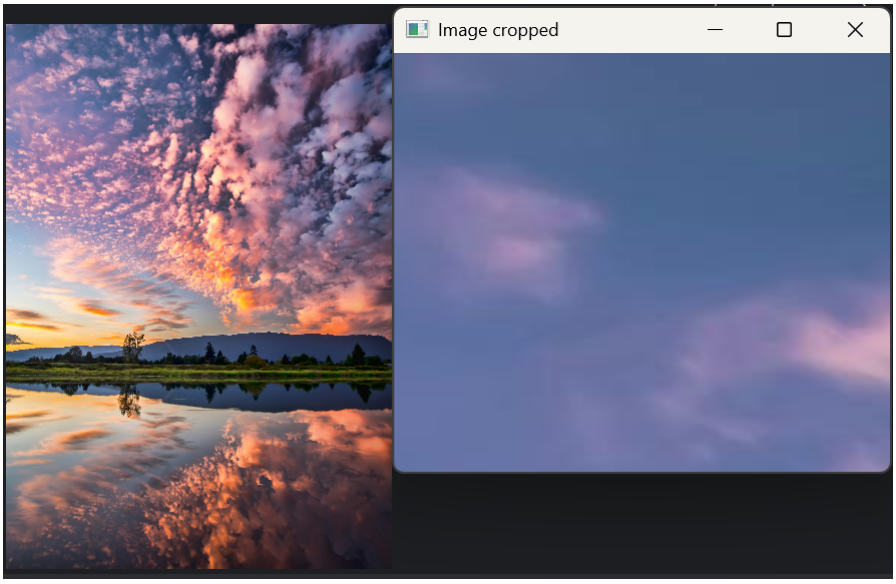


3.4 OpenCV 库

读取照片，从原图里裁剪出一张小图，然后对裁剪图按照目标尺寸进行缩放。左侧为原图，右侧为小图。

opencv.py

```
1  import cv2
2  img = cv2.imread("0.jpg")
3  imgCropped = img[50:283,25:190]
4  shape = imgCropped.shape
5  print(shape[0])
6  imgCropped = cv2.resize(imgCropped, dsize: (shape[1]*2, shape[0]*12//10))
7  cv2.imshow( winname: "Image cropped",imgCropped)
8  cv2.imshow( winname: "Image",img)
9  cv2.waitKey(0)
10
```



4 心得体会

4.1 命令行环境的学习体会

最初接触命令行时，觉得黑底白字的界面比较“古老”，但随着学习的深入，我认识到命令行是一个强大而高效的工具。通过命令行可以快速完成文件管理、程序运行和环境配置等操作，而这些往往比图形化界面更灵活、更专业。

4.2 Python 入门基础的学习体会

在入门阶段，我掌握了 Python 的数据类型（字符串、列表、字典等）、控制语句（循环与条件判断）、函数与模块的基本用法。

通过动手写小程序，例如简单的日期计算器、文本处理脚本，我逐渐体会到编程的逻辑性和创造性。

我发现 Python 的语法简洁、功能强大，这为后续学习数据结构、算法以及各类应用打下了扎实的基础。

4.3 Python 在视觉应用中的初步探索

我尝试使用了 Python 的一些图像处理库（如 OpenCV、Pillow、Numpy 等），初步了解了计算机视觉的应用。我学会了读取、显示和保存图像，并尝试进行图像缩放、裁剪、旋转等基本操作。

GitHub 仓库链接：https://github.com/gy-sun-enfp/System-tool-development