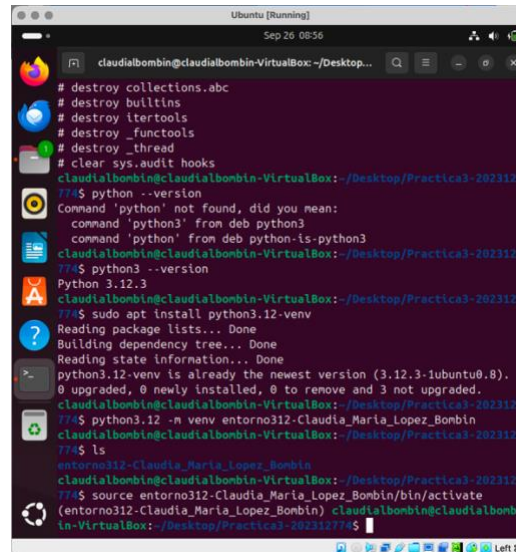


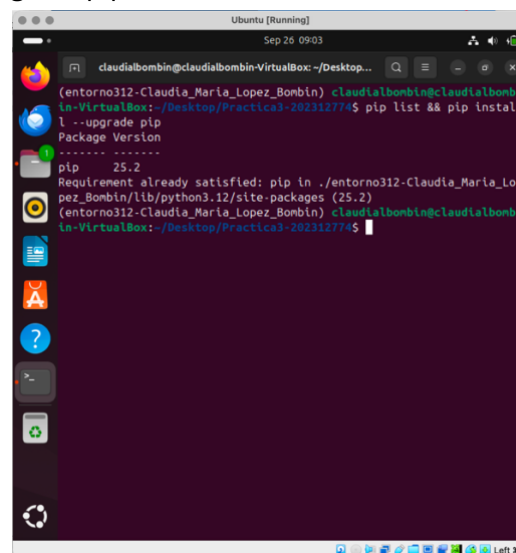
Ejercicio 1

1. `mkdir -p Practica3-202312774 && cd Practica3-202312774`
2. `python3 --version`
3. `python3.12 -m venv entorno312-Claudia`
4. `source entorno312-Claudia /bin/activate`



```
claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774
# destroy collections.abc
# destroy builtins
# destroy itertools
# destroy functools
# destroy _thread
# clear sys.audit hooks
claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774
774$ python --version
Command 'python' not found, did you mean:
  command 'python3' from deb python3
  command 'python' from deb python-is-python3
claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774$ python3 --version
Python 3.12.3
claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774$ sudo apt install python3.12-venv
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
python3.12-venv is already the newest version (3.12.3-1ubuntu0.8).
0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774$ python3.12 -m venv entorno312-Claudia_Maria_Lopez_Bombin
claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774$ ls
entorno312-Claudia_Maria_Lopez_Bombin
claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774$ source entorno312-Claudia_Maria_Lopez_Bombin/bin/activate
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774$
```

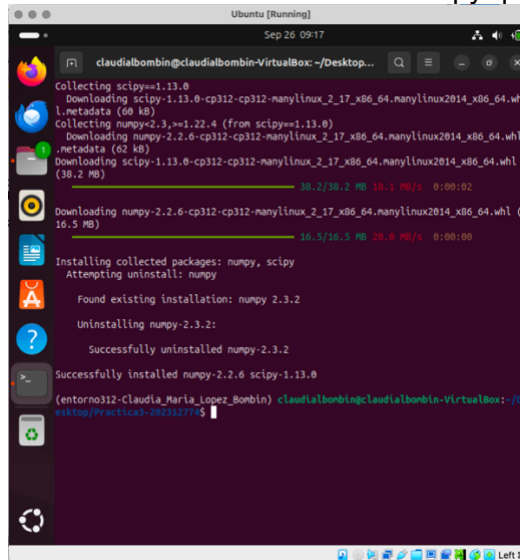
5. `pip list && pip install --upgrade pip`



```
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774$ pip list && pip install --upgrade pip
Package Version
-----
pip      25.2
Requirement already satisfied: pip in ./entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages (25.2)
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-202312774$
```

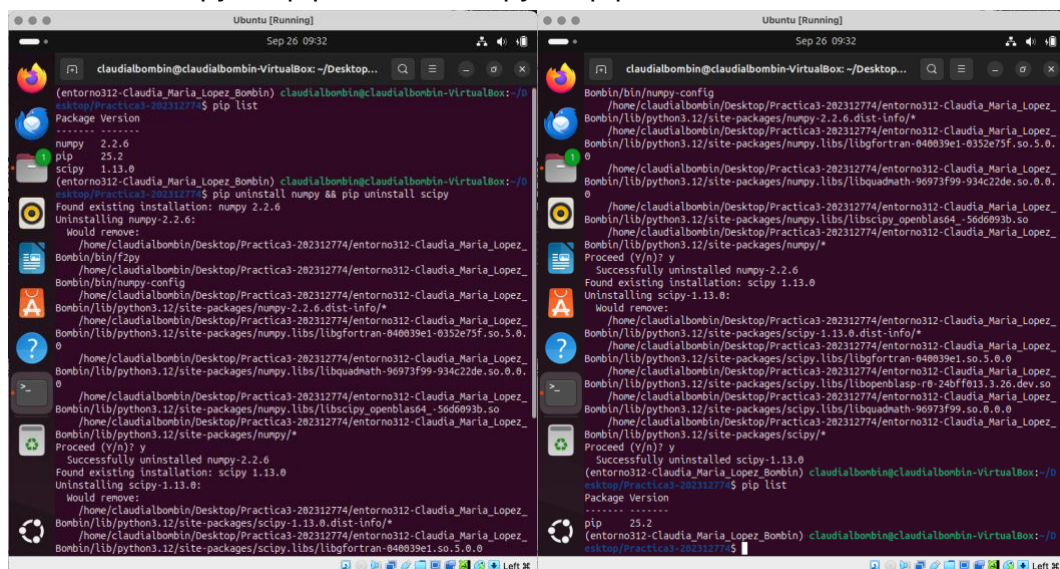
6. `pip list && deactivate && pip list && source entorno312-Claudia /bin/activate`
 - I. Las diferencias que puedo observar son que, en el entorno, solo tenemos instalado el paquete pip (y además en la versión 25.0), mientras que fuera del entorno tenemos muchos más paquetes instalados y pip está en la versión 24.0.
7. `pip install numpy==2.3.2 && pip install scipy==1.13.0`
 - I. Aquí lo que ocurre es una cosa bastante curiosa. Instalamos numpy 2.3.2 (por orden de ejecución del comando), sin problema alguno. Ahora, cuando empieza a instalar scipy, este requiere una versión distinta de numpy. Cuando comprueba

que la versión de numpy que tenemos (2.3.2) no es la que requiere, desinstala la versión 2.3.2 que teníamos e instala la versión de numpy que requiere.



```
claudialbombin@claudialbombin-VirtualBox: ~/Desktop...
Collecting scipy==1.13.0
  Downloading scipy-1.13.0-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (60 kB)
Collecting numpy<2.3, >=1.22.4 (from scipy==1.13.0)
  Downloading numpy-2.2.6-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (62 kB)
  Downloading scipy-1.13.0-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (38.2 MB)
    38.2/38.2 MB 10.1 MB/s 0:00:02
  Downloading numpy-2.2.6-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (16.5 MB)
    16.5/16.5 MB 20.0 MB/s 0:00:00
Installing collected packages: numpy, scipy
Attempting uninstall: numpy
Found existing installation: numpy 2.3.2
Uninstalling numpy-2.3.2:
Successfully uninstalled numpy-2.3.2
Successfully installed numpy-2.2.6 scipy-1.13.0
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-2023127745
```

8. pip uninstall numpy && pip uninstall scipy && pip



```
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-2023127745 pip list
Package Version
-----
numpy 2.2.6
pip 25.2
scipy 1.13.0
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-2023127745 pip uninstall numpy && pip uninstall scipy
Found existing installation: numpy 2.2.6
Uninstalling numpy-2.2.6:
Would remove:
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/bin/numpy-config
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages/numpy-2.2.6.dist-info/*
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages/numpy.libs/libgfortran-840839e1-0352e75f.so.5.0.0
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages/numpy.libs/libquadmath-96973f99-934c22de.so.0.0.0
Proceed (Y/n)? y
Successfully uninstalled numpy-2.2.6
Found existing installation: scipy 1.13.0
Uninstalling scipy-1.13.0:
Would remove:
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/bin/numpy-config
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages/scipy-1.13.0.dist-info/*
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages/scipy.libs/libopenblas64_-56d0693b.so
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages/scipy.libs/libopenblas-r0-24bffa13.3.26.dev.so
/home/claudialbombin/Desktop/Practica3-202312774/entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages/scipy.libs/libquadmath-96973f99.so.0.0.0
Proceed (Y/n)? y
Successfully uninstalled scipy-1.13.0
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-2023127745 pip list
Package Version
-----
pip 25.2
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox: ~/Desktop/Practica3-2023127745
```


10. Usamos el comando pip uninstall numpy && pip uninstall pandas && pip uninstall scipy

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
 fonts-lyx lymy-common lymy3 libbsd libbsd0 libbsd2-2t64
 libhdf5-103-1t64 libjs-jquery-ui liblibfsgs0 liblshull-rs.0 libz2
 python-matplotlib-data python-odf-doc python-odf-tools python-tables-data
 python3-appdirs python3-bst python3-cpuinfo python3-cssselect python3-cycler
 python3-decorator python3-defusedxml python3-et-xmlfile python3-fonttools
 python3-fs python3-html5lib python3-kwarg-solver python3-lxml python3-lz4
 python3-mpmath python3-munkres python3-odf python3-openpyxl
 python3-packaging python3-soupsieve python3-sympy python3-ufolib2
 python3-unicondata2 python3-websencodings unicode-data
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
 python3-munkres
The following packages will be REMOVED:
 python3-bottleneck python3-contourpy python3-matplotlib python3-numexpr
 python3-numpy python3-pandas python3-pandas-lib python3-scipy python3-tables
 python3-tables-lib
The following NEW packages will be installed:
 python3-munkres
0 upgraded, 1 newly installed, 10 to remove and 11 not upgraded.
Need to get 9,236 B of archives.
After this operation, 156 MB disk space will be freed.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu noble/universe amd64 python3-munkres all 1:1.4.3 [9,236 B]
Fetched 9,236 B in 0s (34.2 kB/s)

Reading database ... 232055 files and directories currently installed.)
Removing python3-bottleneck (1:3.5-ds1-3build1) ...
Removing python3-matplotlib (3.6.3-1ubuntu5) ...
Removing python3-contourpy (1:0.7-2build1) ...
Removing python3-tables (3.9.2-1build3) ...
Removing python3-numexpr (2:9.0-1build1) ...
Removing python3-tables-lib (3.9.2-1build3) ...
Selecting previously unselected package python3-munkres.
Reading database ... 231390 files and directories currently installed.)
Preparing to unpack .../python3-munkres_1:1.4.3_all.deb ...
Unpacking python3-munkres (1:1.4.3) ...
Reading database ... 231338 files and directories currently installed.)
Removing python3-pandas (2.1.4dfsg-7) ...
Removing python3-pandas-lib:amd64 (2.1.4dfsg-7) ...
dpkg: python3-numpy: dependency problems, but removing anyway as you requested:
 python3-scipy depends on python3-numpy (= 1:1.25.0).
 python3-scipy depends on python3-numpy-abi9; however:
  Package python3-numpy-abi9 is not installed.
  Package python3-numpy which provides python3-numpy-abi9 is to be removed.
 python3-scipy depends on python3-numpy (= 1:1.25.0).
 python3-scipy depends on python3-numpy-abi9; however:
  Package python3-numpy-abi9 is not installed.
  Package python3-numpy which provides python3-numpy-abi9 is to be removed.
Removing python3-numpy (1:1.26.4ds-6ubuntu1) ...
dpkg: python3-scipy: dependency problems, but removing anyway as you requested:
 python3-fonttools depends on python3-scipy (>= 1:10.0) | python3-munkres (>= 1.
  1.4); however:
  Package python3-scipy is to be removed.
  Package python3-munkres is not configured yet.
Removing python3-scipy (1:11.4-4build1) ...
Setting up python3-munkres (1:1.4.3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
python3-scipy depends on python3-numpy-abi9; however:
  Package python3-numpy-abi9 is not installed.
  Package python3-numpy which provides python3-numpy-abi9 is to be removed.
 python3-scipy depends on python3-numpy (= 1:1.25.0).
 python3-scipy depends on python3-numpy-abi9; however:
  Package python3-numpy-abi9 is not installed.
  Package python3-numpy which provides python3-numpy-abi9 is to be removed.
Removing python3-numpy (1:1.26.4ds-6ubuntu1) ...
dpkg: python3-scipy: dependency problems, but removing anyway as you requested:
 python3-fonttools depends on python3-scipy (>= 1:10.0) | python3-munkres (>= 1.
  1.4); however:
  Package python3-scipy is to be removed.
  Package python3-munkres is not configured yet.
Removing python3-scipy (1:11.4-4build1) ...
Setting up python3-munkres (1:1.4.3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

Ejercicio 2:

1. Apartado 1:

I. Utilizamos vim para crear el archivo requirements.txt

```
claualdialbomin@claualdialbomin-VirtualBox:~/Desktop/Practica3-202312774$ vim requirements.txt
claualdialbomin@claualdialbomin-VirtualBox:~/Desktop/Practica3-202312774$ cat requirements.txt
numpy==2.3.2
pandas==2.3.0
scipy==1.13.0
claualdialbomin@claualdialbomin-VirtualBox:~/Desktop/Practica3-202312774$
```

II. Activamos el entorno con source entorno312-Claudia /bin/activate

III. Utilizamos el comando pip install -r requirements.txt para instalarlos


```
claudialbombin@claudialbombin-VirtualBox:~/Desarrollo/Practicas-202312774$ pip install -r requirements.txt
Collecting numpy==2.3.2 (from -r requirements.txt (line 1))
  Using cached numpy-2.3.2-cp312-cp312-manylinux_2_27_x86_64.manylinux_2_28_x86_64.whl
  .metadata (62 kB)
Collecting pandas==2.3.0 (from -r requirements.txt (line 2))
  Using cached pandas-2.3.0-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl
  .metadata (91 kB)
Collecting scipy==1.13.0 (from -r requirements.txt (line 3))
  Using cached scipy-1.13.0-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl
  .metadata (60 kB)
Requirement already satisfied: python-dateutil>=2.8.2 in ./entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages (from pandas==2.3.0->-r requirements.txt (line 2)) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in ./entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages (from pandas==2.3.0->-r requirements.txt (line 2)) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in ./entorno312-Claudia_Maria_Lopez_Bombin/lib/python3.12/site-packages (from pandas==2.3.0->-r requirements.txt (line 2)) (2025.2)
INFO: pip is looking at multiple versions of scipy to determine which version is compatible with other requirements. This could take a while.
ERROR: Cannot install -r requirements.txt (line 2), -r requirements.txt (line 3) and numpy==2.3.2 because these package versions have conflicting dependencies.

The conflict is caused by:
  The user requested numpy==2.3.2
  pandas 2.3.0 depends on numpy>=1.26.0; python_version >= "3.12"
  scipy 1.13.0 depends on numpy<2.3 and >=1.22.4

To fix this you could try to:
1. loosen the range of package versions you've specified
2. remove package versions to allow pip to attempt to solve the dependency conflict

ERROR: ResolutionImpossible: for help visit https://pip.pypa.io/en/latest/topics/dependency-resolution/#dealing-with-dependency-conflicts
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Desarrollo/Practicas-202312774$
```

Observamos que hay un problema con la dependencia de las versiones de numpy que pretendemos instalar y las que requieren los otros paquetes a instalar. Spicy requiere una versión de numpy estrictamente menor que 2.3.0

2. Si, como he explicado antes, si modificamos la versión de numpy que queremos que se instale.

Modificamos con vim el archivo requirements.txt para que instale numpy 2.2.6 (decido esta versión ya que es la que hemos usado en el ejercicio anterior).

```
claudialbombin@claudialbombin-VirtualBox:~/Desarrollo/Practicas-202312774$ cat requirements.txt
numpy==2.2.6
pandas==2.3.0
scipy==1.13.0

(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Desarrollo/Practicas-202312774$ vim requirements.txt
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Desarrollo/Practicas-202312774$ cat requirements.txt
numpy==2.2.6
pandas==2.3.0
scipy==1.13.0
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Desarrollo/Practicas-202312774$
```

Instalamos ahora los paquetes de requirements.txt con el comando `pip install -r requirements.txt`

```
claudialbombin@claudialbombin-VirtualBox...  
ktop/Practica3-202312774$ vim requirements.txt  
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Des  
ktop/Practica3-202312774$ cat requirements.txt  
numpy==2.2.6  
pandas==2.3.0  
scipy==1.13.0  
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Des  
ktop/Practica3-202312774$ pip install -r requirements.txt  
Collecting numpy==2.2.6 (from -r requirements.txt (line 1))  
  Using cached numpy-2.2.6-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl  
.metadata (62 kB)  
Collecting pandas==2.3.0 (from -r requirements.txt (line 2))  
  Using cached pandas-2.3.0-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl  
.metadata (91 kB)  
Collecting scipy==1.13.0 (from -r requirements.txt (line 3))  
  Using cached scipy-1.13.0-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl  
.metadata (60 kB)  
Requirement already satisfied: python-dateutil>=2.8.2 in ./entorno312-Claudia_Maria_Lo  
pez_Bombin/lib/python3.12/site-packages (from pandas==2.3.0->-r requirements.txt (line  
2)) (2.9.0.post0)  
Requirement already satisfied: pytz>=2020.1 in ./entorno312-Claudia_Maria_Lopez_Bombin  
/lib/python3.12/site-packages (from pandas==2.3.0->-r requirements.txt (line 2)) (2025  
.2)  
Requirement already satisfied: tzdata>=2022.7 in ./entorno312-Claudia_Maria_Lopez_Bomb  
in/lib/python3.12/site-packages (from pandas==2.3.0->-r requirements.txt (line 2)) (20  
25.2)  
Requirement already satisfied: six>=1.5 in ./entorno312-Claudia_Maria_Lopez_Bombin/lib  
/python3.12/site-packages (from python-dateutil>=2.8.2->pandas==2.3.0->-r requirements  
.txt (line 2)) (1.17.0)  
Using cached numpy-2.2.6-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (1  
6.5 MB)  
Using cached pandas-2.3.0-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (1  
2.0 MB)  
Using cached scipy-1.13.0-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (3  
8.2 MB)  
Installing collected packages: numpy, scipy, pandas  
Successfully installed numpy-2.2.6 pandas-2.3.0 scipy-1.13.0  
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Des  
ktop/Practica3-202312774$
```

Vemos con ahora no hay problema a la hora de instalar los paquetes.

3. Creo que no es la solución correcta, ya que puede que para determinados programas o paquetes necesitemos una versión de otro paquete que entre en conflicto con las previas. Además, puede que no sea la ultima versión. Esto puede no ser un problema cuando tenemos pocos paquetes instalados, pero cuando tenemos muchos, tener que encontrar la versión adecuada puede ser más complicado.
4. Esto podemos hacerlo con el siguiente comando:
 - I. `pip freeze > requirements.txt`

Este comando hace una lista de los paquetes que hay y > sobrescribe el archivo requirements.txt. En este caso, no usamos pip show porque incluye dos líneas que luego al intentar instalar da problemas.

```

(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Desktop/Practica3-202312774$ pip freeze > requirements.txt
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Desktop/Practica3-202312774$ cat requirements.txt
numpy==2.2.6
pandas==2.3.0
python-dateutil==2.9.0.post0
pytz==2025.2
scipy==1.13.0
six==1.17.0
tzdata==2025.2
(entorno312-Claudia_Maria_Lopez_Bombin) claudialbombin@claudialbombin-VirtualBox:~/Desktop/Practica3-202312774$
```

5. Usamos el comando `pip uninstall -r requirements.txt && pip list && deactivate && cd .. && rm -r Practica3-202312774`

En mi caso, como estaba dentro del directorio, debo de hacer `cd ..` para salir de el antes de eliminarlo con `rm -r`

Para el tema de desinstalar los paquetes, como hemos instalado previamente todos los que están en el archivo `requirements.txt`, leemos recursivamente las líneas mientras que desinstalamos el paquete que hay en dicha línea.

Ejercicio 3 (relizamos en cluster)

1. `Mkdir venv-Claudia312 && virtualenv -p python3.12 venv-Claudia312`

```
afuso41@6705e8ae1ecf:~$ mkdir venv-Claudia312
afuso41@6705e8ae1ecf:~$ virtualenv -p 3.12/ /venv-Claudia312
RuntimeError: failed to find interpreter for Builtin discover of python_spec=
'3.12/'
afuso41@6705e8ae1ecf:~$ virtualenv -p python3.12 venv-Claudia312
fail
Traceback (most recent call last):
  File "/usr/lib/python3/dist-packages/virtualenv/seed/embed/via_app_data/via
_app_data.py", line 84, in _get
    result = get_wheel(
  File "/usr/lib/python3/dist-packages/virtualenv/seed/wheels/acquire.py", li
ne 26, in get_wheel
    wheel = from_bundle(distribution, version, for_py_version, search_dirs, a
pp_data, do_periodic_update, env)
  File "/usr/lib/python3/dist-packages/virtualenv/seed/wheels/bundle.py", lin
e 13, in from_bundle
    wheel = load_embed_wheel(app_data, distribution, for_py_version, of_versi
on)
  File "/usr/lib/python3/dist-packages/virtualenv/seed/wheels/bundle.py", lin
e 33, in load_embed_wheel
    wheel = get_embed_wheel(distribution, for_py_version)
  File "/usr/lib/python3/dist-packages/virtualenv/seed/wheels/embed/__init__.
py", line 77, in get_embed_wheel
    raise Exception()
Exception: Wheel for pip for Python 3.12 is unavailable. apt install python3-
pip-whl
fail
```

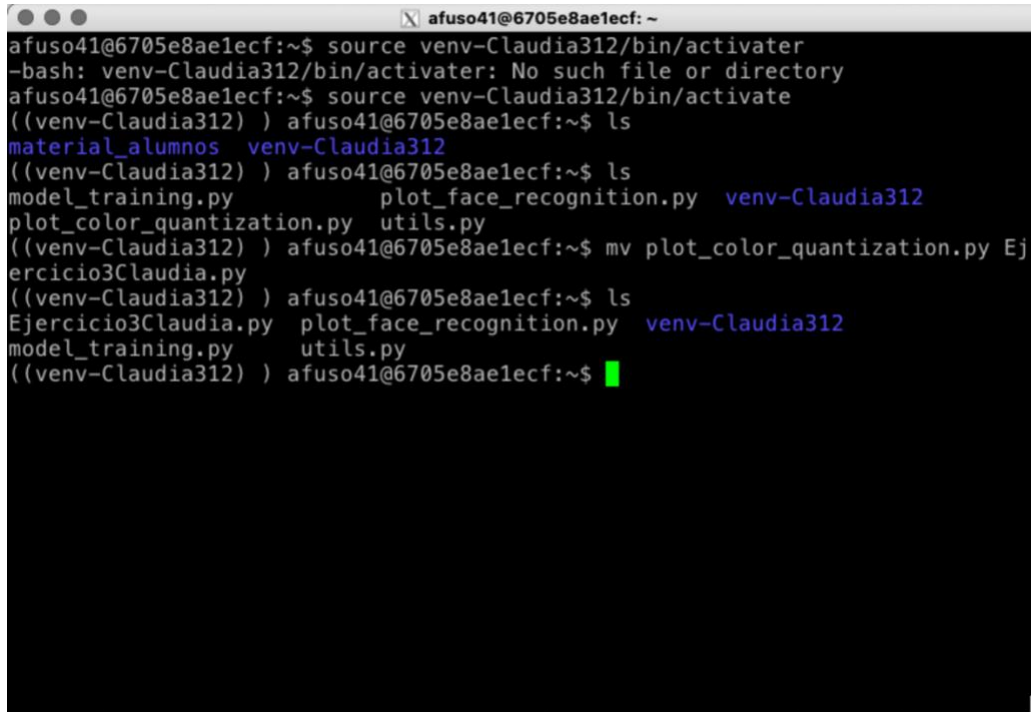
Salta este error, así que intentamos con venv

- python3.12 -m venv venv-Claudia312 && source venv-Claudia312/bin/activate

Aquí creamos el entorno y lo activamos

```
afuso41@6705e8ae1ecf:~$ source venv-Claudia312/bin/activater
-bash: venv-Claudia312/bin/activater: No such file or directory
afuso41@6705e8ae1ecf:~$ source venv-Claudia312/bin/activate
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$
```

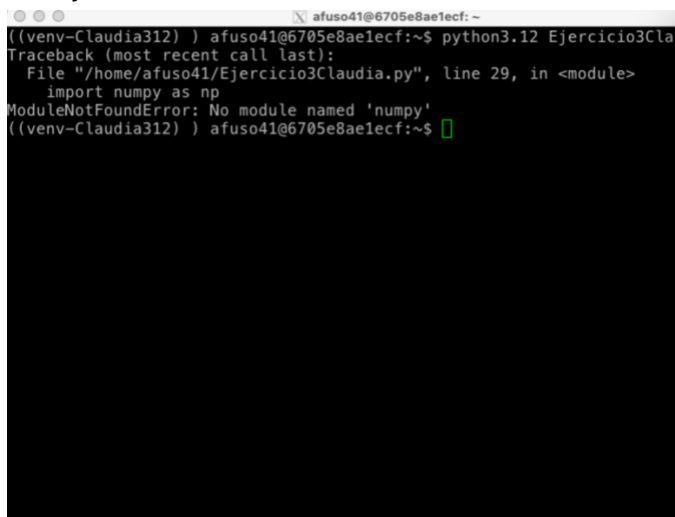

2. Cambiamos el nombre del archivo con el comando: `mv plot_color_quantization.py Ejercicio3Claudia.py`



```
afuso41@6705e8ae1ecf: ~  
afuso41@6705e8ae1ecf:~$ source venv-Claudia312/bin/activater  
-bash: venv-Claudia312/bin/activater: No such file or directory  
afuso41@6705e8ae1ecf:~$ source venv-Claudia312/bin/activate  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ ls  
material_alumnos  venv-Claudia312  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ ls  
model_training.py      plot_face_recognition.py  venv-Claudia312  
plot_color_quantization.py  utils.py  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ mv plot_color_quantization.py Ej  
ercicio3Claudia.py  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ ls  
Ejercicio3Claudia.py  plot_face_recognition.py  venv-Claudia312  
model_training.py      utils.py  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$
```

Nos descargamos del cluster el archivo `Ejercicio3Claudia.py` y modificamos con `vim` lo de incluir el `plt.savefig("FiguraX")`, donde X es el numero de la figura. Ejecutamos en local para comprobar que funciona correctamente y una vez comprobado, subimos al cluster usando Cyberduck.

3. Ejecutamos ahora en el cluster (con putty) para ver que modulos faltan para poder ser ejecutado



```
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ python3.12 Ejercicio3Cla  
Traceback (most recent call last):  
  File "/home/afuso41/Ejercicio3Claudia.py", line 29, in <module>  
    import numpy as np  
ModuleNotFoundError: No module named 'numpy'  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$
```

Falta `numpy`, así que instalamos con el comando `pip install numpy` (no especifico versión porque no se bien cual es la necesaria).

```
afuso41@6705e8ae1ecf: ~  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ python3.12 Ejercicio3Claudia.py  
Traceback (most recent call last):  
  File "/home/afuso41/Ejercicio3Claudia.py", line 29, in <module>  
    import numpy as np  
ModuleNotFoundError: No module named 'numpy'  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ pip install numpy  
Collecting numpy  
  Downloading numpy-2.3.3-cp312-cp312-manylinux_2_27_x86_64.manylinux_2_28_x86_64.whl.metadata (62 kB)  
  Downloading numpy-2.3.3-cp312-cp312-manylinux_2_27_x86_64.manylinux_2_28_x86_64.whl (16.6 MB)  
      16.6/16.6 MB 35.2 MB/s 0:00:00  
Installing collected packages: numpy  
Successfully installed numpy-2.3.3  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$
```

Vuelvo a intentar ejecutar y me salta el error de que falta matplotlib asi que uso pip install matplotlib para instalarlo

```
afuso41@6705e8ae1ecf: ~  
Collecting six>=1.5 (from python-dateutil>=2.7->matplotlib)  
  Downloading six-1.17.0-py2.py3-none-any.whl.metadata (1.7 kB)  
  Downloading matplotlib-3.10.6-cp312-cp312-manylinux2014_x86_64.manylinux_2_17_x86_64.whl (8.7 MB)  
      8.7/8.7 MB 64.5 MB/s 0:00:00  
  Downloading contourpy-1.3.3-cp312-cp312-manylinux_2_27_x86_64.manylinux_2_28_x86_64.whl (362 kB)  
  Downloading cyclor-0.12.1-py3-none-any.whl (8.3 kB)  
  Downloading fonttools-4.60.1-cp312-cp312-manylinux1_x86_64.manylinux2014_x86_64.manylinux_2_17_x86_64.manylinux_2_5_x86_64.whl (4.9 MB)  
      4.9/4.9 MB 75.5 MB/s 0:00:00  
  Downloading kiwisolver-1.4.9-cp312-cp312-manylinux2014_x86_64.manylinux_2_17_x86_64.whl (1.5 MB)  
      1.5/1.5 MB 19.7 MB/s 0:00:00  
  Downloading packaging-25.0-py3-none-any.whl (66 kB)  
  Downloading pillow-11.3.0-cp312-cp312-manylinux_2_27_x86_64.manylinux_2_28_x86_64.whl (6.6 MB)  
      6.6/6.6 MB 66.8 MB/s 0:00:00  
  Downloading pyparsing-3.2.5-py3-none-any.whl (113 kB)  
  Downloading python_dateutil-2.9.0.post0-py2.py3-none-any.whl (229 kB)  
  Downloading six-1.17.0-py2.py3-none-any.whl (11 kB)  
Installing collected packages: six, pyparsing, pillow, packaging, kiwisolver, fonttools, cyclor, contourpy, python-dateutil, matplotlib  
Successfully installed contourpy-1.3.3 cyclor-0.12.1 fonttools-4.60.1 kiwisolver-1.4.9 matplotlib-3.10.6 packaging-25.0 pillow-11.3.0 pyparsing-3.2.5 python-dateutil-2.9.0.post0 six-1.17.0  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$
```

Tambien falta sklearn asi que instalo con pip install sklearn

```

afuso41@6705e8ae1ecf: ~
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ python3.12 Ejercicio3Cla
Traceback (most recent call last):
  File "/home/afuso41/Ejercicio3Claudia.py", line 31, in <module>
    from sklearn.cluster import KMeans
ModuleNotFoundError: No module named 'sklearn'
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ pip install sklearn
Collecting sklearn
  Downloading sklearn-0.0.post12.tar.gz (2.6 kB)
  Preparing metadata (setup.py) ... error
error: subprocess-exited-with-error

× python setup.py egg_info did not run successfully.
  exit code: 1
  [15 lines of output]
  The 'sklearn' PyPI package is deprecated, use 'scikit-learn'
  rather than 'sklearn' for pip commands.

  Here is how to fix this error in the main use cases:
  - use 'pip install scikit-learn' rather than 'pip install sklea
  - replace 'sklearn' by 'scikit-learn' in your pip requirements
    (requirements.txt, setup.py, setup.cfg, Pipfile, etc ...)
  - if the 'sklearn' package is used by one of your dependencies,
    it would be great if you take some time to track which packag
    'sklearn' instead of 'scikit-learn' and report it to their is
ker
  - as a last resort, set the environment variable
    SKLEARN_ALLOW_DEPRECATED_SKLEARN_PACKAGE_INSTALL=True to avoi

```

Salta un error que avisa que sklearn esta depreciado y que instale scikit-learn, asi que instalo usando pip install scikit-learn

```

afuso41@6705e8ae1ecf: ~
note: This is an issue with the package mentioned above, not pip.
hint: See above for details.
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ pip install scikit-learn
Collecting scikit-learn
  Downloading scikit_learn-1.7.2-cp312-cp312-manylinux2014_x86_64.manylinux_2_17_x86_64.whl.metadata (11 kB)
Requirement already satisfied: numpy>=1.22.0 in ./venv-Claudia312/lib/python3.12/site-packages (from scikit-learn) (2.3.3)
Collecting scipy>=1.8.0 (from scikit-learn)
  Downloading scipy-1.16.2-cp312-cp312-manylinux2014_x86_64.manylinux_2_17_x86_64.whl.metadata (62 kB)
Collecting joblib>=1.2.0 (from scikit-learn)
  Downloading joblib-1.5.2-py3-none-any.whl.metadata (5.6 kB)
Collecting threadpoolctl>=3.1.0 (from scikit-learn)
  Downloading threadpoolctl-3.6.0-py3-none-any.whl.metadata (13 kB)
Downloading scikit_learn-1.7.2-cp312-cp312-manylinux2014_x86_64.manylinux_2_17_x86_64.whl (9.5 MB)
9.5/9.5 MB 61.3 MB/s 0:00:00
Downloading joblib-1.5.2-py3-none-any.whl (308 kB)
Downloading scipy-1.16.2-cp312-cp312-manylinux2014_x86_64.manylinux_2_17_x86_64.whl (35.7 MB)
35.7/35.7 MB 80.8 MB/s 0:00:00
Downloading threadpoolctl-3.6.0-py3-none-any.whl (18 kB)
Installing collected packages: threadpoolctl, scipy, joblib, scikit-learn
Successfully installed joblib-1.5.2 scikit-learn-1.7.2 scipy-1.16.2 threadpoolctl-3.6.0
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$

```

Ejecutamos correctamente y se generan las imagenes

```
afuso41@6705e8ae1ecf: ~  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ python3.12 Ejercicio3Claudia.py  
Fitting model on a small sub-sample of the data  
done in 0.067s.  
Predicting color indices on the full image (k-means)  
done in 0.009s.  
Predicting color indices on the full image (random)  
done in 0.016s.  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$
```

Creamos el requirements312.txt con el comando `pip freeze > requirements312.txt` (como hicimos en uno de los apartados anteriores). Hacemos `cat requirements312.txt` para ver que se hayan cargado correctamente los paquetes.

```
afuso41@6705e8ae1ecf: ~  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ pip freeze > requirements312.txt  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ cat requirements312.txt  
contourpy==1.3.3  
cycler==0.12.1  
fonttools==4.60.1  
joblib==1.5.2  
kiwisolver==1.4.9  
matplotlib==3.10.6  
numpy==2.3.3  
packaging==25.0  
pillow==11.3.0  
pyparsing==3.2.5  
python-dateutil==2.9.0.post0  
scikit-learn==1.7.2  
scipy==1.16.2  
setuptools==80.9.0  
six==1.17.0  
threadpoolctl==3.6.0  
wheel==0.45.1  
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$
```

4. Tras haber leído la documentacion, veo que lo primero que debemos hacer es un archivo requirements.in con los paquetes instalados. Esto lo hago con el comando `pip freeze > requirements.in`
Luego usamos el comando `pip-compile requirements.in --output-file requirements312_final.txt`

Hacemos un cat requirements312_final.txt para ver el contenido del archivo (adjunto la captura y no el archivo por que elimine el archivo sin querer)

```
afuso41@6705e8ae1ecf:~$ cat requirements312_final.txt
# This file is autogenerated by pip-compile with Python 3.12
# by the following command:
#
#   pip-compile --cert=None --client-cert=None --index-url=None --output-file=
requirements312_final.txt --pip-args=None requirements.in
#
build==1.3.0
# via
# -r requirements.in
# pip-tools
click==8.3.0
# via
# -r requirements.in
# pip-tools
contourpy==1.3.3
# via
# -r requirements.in
# matplotlib
cycler==0.12.1
# via
# -r requirements.in
# matplotlib
fonttools==4.60.1
# via
# -r requirements.in
# matplotlib
joblib==1.5.2
# via
# -r requirements.in
# scikit-learn
kiwisolver==1.4.9
# via
# -r requirements.in
# matplotlib
matplotlib==3.10.6
# via -r requirements.in
numpy==2.3.3
# via
# -r requirements.in
# matplotlib
pip-tools==7.5.0
# via -r requirements.in
pyparsing==3.2.5
# via
# -r requirements.in
# matplotlib
pyproject-hooks==1.2.0
# via
# -r requirements.in
# build
# pip-tools
python-dateutil==2.9.0.post0
# via
# -r requirements.in
# matplotlib
scikit-learn==1.7.2
# via -r requirements.in
scipy==1.16.2
# via
# -r requirements.in
# scikit-learn
six==1.17.0
# via
# -r requirements.in
# python-dateutil
threadpoolctl==3.6.0
# via
# -r requirements.in
# scikit-learn
wheel==0.45.1
# via
# -r requirements.in
# pip-tools

# The following packages are considered to be unsafe in a requirements file:
# pip
# setuptools
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$
```

Deactivamos el entorno con el comando deactivate y eliminamos el directorio con el comando rm -r venv-Claudia312

```
((venv-Claudia312) ) afuso41@6705e8ae1ecf:~$ deactivate
afuso41@6705e8ae1ecf:~$ rm -r venv-Claudia312/
afuso41@6705e8ae1ecf:~$ ls
Ejercicio3Claudia.py  model_training.py      requirements312_final.txt
Figura1.png          plot_face_recognition.py  utils.py
Figura2.png          requirements.in
Figura3.png          requirements312.txt
afuso41@6705e8ae1ecf:~$
```

Comprobamos que si se ha eliminado el directorio (ojo que los archivos Python ni requirements estaban dentro del directorio, por lo cual no se han eliminado, los eliminamos manualmente para no tener problemas)

Ejercicio 4:

1. Creamos usando el comando vim

Claudia_Maria_Lopez_Bombin_Gestion_Dependencias.sh donde introducimos los comandos uno a uno para que se vayan ejecutando linealmente. En mi caso, para no desesperarme y poder hacer un mejor debug, meto echos anunciando en que paso estoy


```

afuso41@6705e8ae1ecf:~$ ./Claudia_Maria_Lopez_Bombin_Gestion_Dependencias.sh
Creando entorno virtual con Python 3.12...
Activando entorno virtual...
Instalando dependencias desde requirements4_1.txt...
Collecting scikit-learn==1.3.2 (from -r requirements4_1.txt (line 3))
  Downloading scikit_learn-1.3.2-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (11 kB)
Collecting matplotlib==3.7.2 (from -r requirements4_1.txt (line 4))
  Downloading matplotlib-3.7.2.tar.gz (38.1 MB)
----- 38.1/38.1 MB 17.4 MB/s eta 0:00:00
Installing build dependencies ... done
Getting requirements to build wheel ... done
Preparing metadata (pyproject.toml) ... done
Collecting numpy==1.24.3 (from -r requirements4_1.txt (line 5))
  Downloading numpy-1.24.3.tar.gz (10.9 MB)
----- 10.9/10.9 MB 28.5 MB/s eta 0:00:00
Installing build dependencies ... done
Getting requirements to build wheel ... done

[notice] A new release of pip is available: 25.0.1 -> 25.2
[notice] To update, run: pip install --upgrade pip

Ejecutando plot_color_quantization.py...
Resultado guardado en logColor.txt
Desactivando entorno virtual...
Creando entorno virtual con Python 3.11...
Activando entorno virtual...
Instalando dependencias desde requirements4_2.txt...
Collecting scikit-learn==1.3.2 (from -r requirements4_2.txt (line 3))
  Downloading scikit_learn-1.3.2-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (11 kB)
Collecting matplotlib==3.7.2 (from -r requirements4_2.txt (line 4))
  Downloading matplotlib-3.7.2-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (5.6 kB)
Collecting numpy==1.24.3 (from -r requirements4_2.txt (line 5))
  Downloading numpy-1.24.3-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (5.6 kB)
Collecting Pillow==10.0.0 (from -r requirements4_2.txt (line 6))
  Downloading Pillow-10.0.0-cp311-cp311-manylinux_2_28_x86_64.whl.metadata (9.5 kB)
Collecting joblib==1.3.2 (from -r requirements4_2.txt (line 7))
  Downloading joblib-1.3.2-py3-none-any.whl.metadata (5.4 kB)
Collecting scipy==1.5.0 (from scikit-learn==1.3.2->-r requirements4_2.txt (line 3))
  Downloading scipy-1.16.2-cp311-cp311-manylinux2014_x86_64.manylinux_2_17_x86_64.whl.metadata (62 kB)
----- 62.0/62.0 kB 1.9 MB/s eta 0:00:00
Collecting threadpoolctl>=2.0.0 (from scikit-learn==1.3.2->-r requirements4_2.txt (line 3))
  Using cached threadpoolctl-3.6.0-py3-none-any.whl.metadata (13 kB)
Collecting contourpy>=1.0.1 (from matplotlib==3.7.2->-r requirements4_2.txt (line 4))
  Downloading contourpy-1.3.3-cp311-cp311-manylinux_2_27_x86_64.manylinux_2_28_x86_64.whl.metadata (5.5 kB)
Collecting cycler>=0.10 (from matplotlib==3.7.2->-r requirements4_2.txt (line 4))
  Using cached cycler-0.12.1-py3-none-any.whl.metadata (3.8 kB)
Collecting fonttools>=4.22.0 (from matplotlib==3.7.2->-r requirements4_2.txt (line 4))
  Downloading fonttools-4.60.1-cp311-cp311-manylinux2014_x86_64.manylinux_2_17_x86_64.whl.metadata (112 kB)
----- 112.3/112.3 kB 17.8 MB/s eta 0:00:00
Collecting kiwisolver>=1.0.1 (from matplotlib==3.7.2->-r requirements4_2.txt (line 4))

```

```
Using cached threadpoolctl-3.6.0-py3-none-any.whl (18 kB)
Using cached six-1.17.0-py2.py3-none-any.whl (11 kB)
Installing collected packages: threadpoolctl, six, pyparsing, Pillow, packaging, numpy, kiwisolver, joblib, fonttools, cycler, scipy, python-dateutil, contourpy, scikit-learn, matplotlib
Successfully installed Pillow-10.0.0 contourpy-1.3.2 cycler-0.12.1 fonttools-4.60.1 joblib-1.3.2 kiwisolver-1.4.9 matplotlib-3.7.2 numpy-1.24.3 packaging-25.0 pyparsing-3.0.9 python-dateutil-2.9.0.post0 scikit-learn-1.3.2 scipy-1.15.3 six-1.17.0 threadpoolctl-3.6.0

[notice] A new release of pip is available: 24.0 -> 25.2
[notice] To update, run: pip install --upgrade pip
Ejecutando plot_face_recognition.py...
```

The dataset used in this example is a preprocessed excerpt of the "Labeled Faces in the Wild", aka LFW:

```
.. _LFW: http://vis-www.cs.umass.edu/lfw/
```

Expected results for the top 5 most represented people in the dataset:

	precision	recall	f1-score	support
Ariel Sharon	0.67	0.92	0.77	13
Colin Powell	0.75	0.78	0.76	60
Donald Rumsfeld	0.78	0.67	0.72	27
George W Bush	0.86	0.86	0.86	146
Gerhard Schroeder	0.76	0.76	0.76	25
Hugo Chavez	0.67	0.67	0.67	15
Tony Blair	0.81	0.69	0.75	36
avg / total	0.80	0.80	0.80	322

=====

Faces recognition example using eigenfaces and SVMs

=====

The dataset used in this example is a preprocessed excerpt of the "Labeled Faces in the Wild", aka LFW:

<http://vis-www.cs.umass.edu/lfw/lfw-funneled.tgz> (233MB)

.. _LFW: <http://vis-www.cs.umass.edu/lfw/>

Expected results for the top 5 most represented people in the dataset:

	precision	recall	f1-score	support
Ariel Sharon	0.67	0.92	0.77	13
Colin Powell	0.75	0.78	0.76	60
Donald Rumsfeld	0.78	0.67	0.72	27
George W Bush	0.86	0.86	0.86	146
Gerhard Schroeder	0.76	0.76	0.76	25
Hugo Chavez	0.67	0.67	0.67	15
Tony Blair	0.81	0.69	0.75	36
avg / total	0.80	0.80	0.80	322

=====

2025-10-02 08:21:47,630 Downloading LFW metadata: <https://ndownloader.figshare.com/files/5976012>

2025-10-02 08:21:57,999 Downloading LFW metadata: <https://ndownloader.figshare.com/files/5976009>

2025-10-02 08:22:08,350 Downloading LFW metadata: <https://ndownloader.figshare.com/files/5976006>

2025-10-02 08:22:18,750 Downloading LFW data (~200MB): <https://ndownloader.figshare.com/files/5976015>

Total dataset size:

n_samples: 766

n_features: 1850

n_classes: 2

Extracting the top 150 eigenfaces from 574 faces

done in 0.713s

Extracting the top 150 eigenfaces from 574 faces

done in 0.713s

Projecting the input data on the eigenfaces orthonormal basis

done in 0.056s

Fitting the classifier to the training set

done in 5.822s

Best estimator found by grid search:

SVC(C=1000.0, class_weight='balanced', gamma=0.005)

Predicting people's names on the test set

done in 0.030s

	precision	recall	f1-score	support
Colin Powell	0.95	0.92	0.93	59
George W Bush	0.96	0.98	0.97	133
accuracy			0.96	192
macro avg	0.96	0.95	0.95	192
weighted avg	0.96	0.96	0.96	192

[[54 5]

[3 130]]

El dataset ha sido eliminado del disco.

Procesamiento de caras completado. Resultados guardados en faces.png

Desactivando entorno virtual...

Eliminando entorno virtual de Python 3.12...

Eliminando entorno virtual de Python 3.11...

Proceso completado

afuso41@6705e8ae1ecf:~\$ ls

Claudia_Maria_Lopez_Bombin_Gestion_Dependencias.sh logColor.txt plot_color_quantization.py requirements4_1.txt scikit_learn_data

faces.png model_training.py plot_face_recognition.py requirements4_2.txt utils.py

afuso41@6705e8ae1ecf:~\$