Using_SQLalchemy

October 23, 2023

[ ]:
```
# Just to know last time this was run:
import time
print(time.ctime())
```

```
Mon Oct 23 09:39:28 2023
```

1 J Using sqlalchemy to access MySQL databases

1.1 Have a look at the MySQL.pdf presentation.

This package sqlalchemy contains a pure-Python MySQL client library. In this sense, it does not need to have access to mysql reader or library, which is the case for the mysqldb package.

It is installed with "conda install sqlalchemy" or "pip install sqlalchemy"

We first import the usual libraries

[ ]:
```
%matplotlib inline
import numpy as np
import matplotlib.pyplot as plt
import os
```

This is the import of the library used to connect to MySQl database

[ ]:
```
try:
    import sqlalchemy
except:
    !pip install SQLalchemy
    import sqlalchemy
```

First you need to connect to a database. In our example, we will use the 3MdB database, which needs a password. https://sites.google.com/site/mexicanmillionmodels/

1.1.1 Using pandas library

[ ]:
```
import pandas as pd
import matplotlib.pyplot as plt
from sqlalchemy import create_engine

```

```
host = '132.248.3.52' #'3mdb.astro.unam.mx'
port = 3306
user = 'OVN_user'
db = '3MdB_17'
user_password = os.environ['MdB_PASSWD'] # ask me for the password :-)
```

[ ]:
```
sqlEngine = create_engine(f'mysql+pymysql://{user}:{user_password}@{host}:
↪{port}/{db}')
```

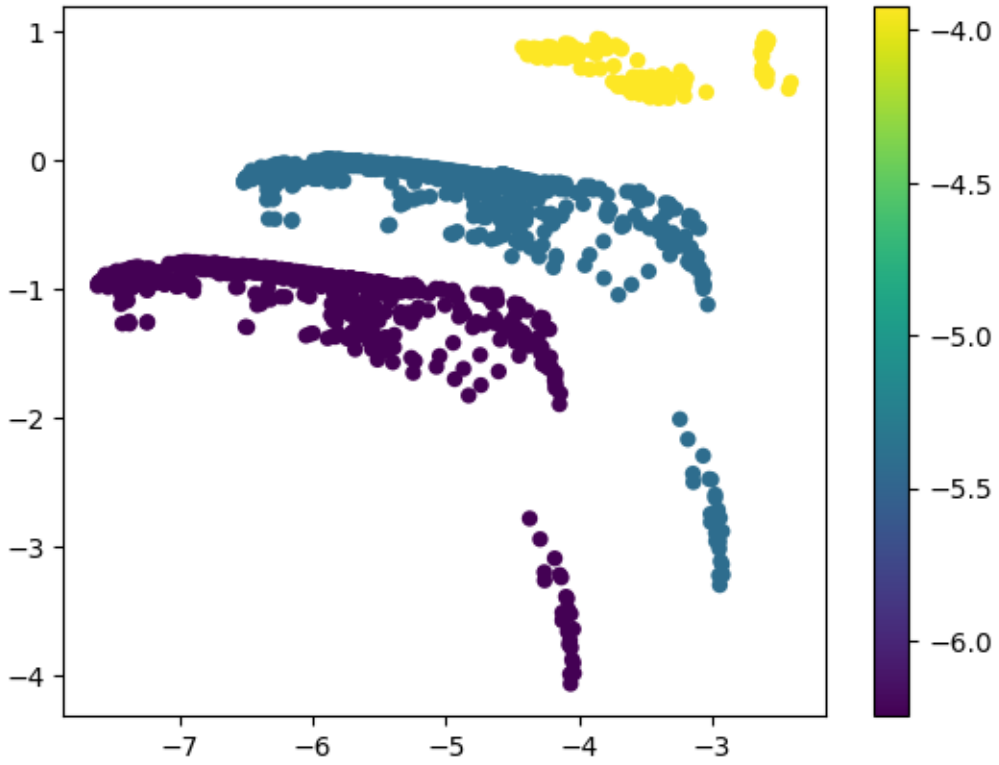
[ ]:
```
sel = """
SELECT log10(N__2_658345A/H__1_656281A) as n2,
    log10(O__3_500684A/H__1_486133A) as o3,
    OXYGEN as O
FROM tab_17
WHERE ref = 'CB_19'
#ORDER BY rand()
LIMIT 2000"""

with sqlEngine.connect() as db_con:
    res = pd.read_sql(sel, con=db_con)
```

[ ]:
```
print(len(res))
```

```
2000
```

[ ]:
```
plt.scatter(res['n2'], res['o3'], c=res['O'], edgecolor='None')
plt.colorbar()
```

[ ]:
```
<matplotlib.colorbar.Colorbar at 0x7fa2474257f0>
```



[ ]:
```
res.describe()
```

[ ]:

	n2	o3	O
count	1000.000000	1000.000000	1000.000000
mean	-2.351177	-1.169856	-3.543808
std	1.529404	2.527733	1.066100
min	-7.247958	-15.954747	-6.246535
25%	-3.672348	-2.285243	-4.123366
50%	-2.174273	-0.231490	-3.323371
75%	-1.063497	0.701821	-2.667255
max	0.673524	1.538546	-1.959355

1.1.2 More on databases, astronomy, SQL and python:

- AstroBetter: a very usefull blog, this post is on CDS and Python: https://www.astrobetter.com/blog/2020/07/06/the-cds-and-python-iv-simbad-the-yellow-pages-of-astronomical-sources/
- ADQL: Astronomy Data Query Language:
- IVOA reference document: https://www.ivoa.net/documents/ADQL/20180112/PR-ADQL-2.1-20180112.html
- Man page on CDS: http://tapvizier.u-strasbg.fr/adql/help.html

- ADQL cookbook on Gaia server: https://www.gaia.ac.uk/data/gaia-data-release-1/adql-cookbook
- Virtual Observatory :
- Cone search: http://voservices.net/spectrum/search_form_cone.aspx
- SQL interface: http://voservices.net/spectrum/search_form_sql.aspx
- SciServer (needs an account):
- Main page: https://www.sciserver.org/
- Dashboard: https://apps.sciserver.org/dashboard/
- Introduction to CasJobs: https://skyserver.sdss.org/CasJobs/Guide.aspx
- Example of Skyquery: http://www.voservices.net/skyquery/Assets/Query/Examples/00_index.aspx
- Using Python : https://github.com/sciserver/SciScript-Python
- Example using ython: https://github.com/sciserver/SciScript-Python/blob/master/Examples/Examples_SciScript-Python.ipynb
- An enhanced command line SQL interpreter client for astronomical surveys: https://github.com/mgckind/easyaccess

[ ]: