Captures d’écran du code source

- Importer des bibliothèques qui on va travailler avec

Tunisian Vaccine

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

- Importer de la base de données et afficher les 5 premières lignes

```
data = pd.read_csv('https://raw.githubusercontent.com/owid/covid-19-data/master/public/data/vaccinations/country_data/Tunisia.csv
data.head(5)
```

	location	date	vaccine	source_url	total_vaccinations	people_vaccinated	people_fully_vaccinated	total_boosters
0	Tunisia	2021-03-12	Sputnik V	https://www.africanews.com/2021/03/13/tunisia-...	0	0	0.0	NaN
1	Tunisia	2021-03-13	Sputnik V	https://www.facebook.com/santetunisie.rns.tn/v...	743	743	0.0	NaN
2	Tunisia	2021-03-14	Sputnik V	https://www.facebook.com/santetunisie.rns.tn/p...	2076	2076	0.0	NaN
3	Tunisia	2021-03-15	Sputnik V	https://www.facebook.com/186480324724413/posts...	2555	2555	0.0	NaN
4	Tunisia	2021-03-19	Sputnik V	https://www.facebook.com/186480324724413/posts...	6861	6861	0.0	NaN

- Supprimer les colonnes que nous n'en avons pas besoin et afficher la résultat

```
data= data.drop(['vaccine','source_url','location','total_boosters'], axis=1)
data.head(5)
```

	date	total_vaccinations	people_vaccinated	people_fully_vaccinated
0	2021-03-12	0	0	0.0
1	2021-03-13	743	743	0.0
2	2021-03-14	2076	2076	0.0
3	2021-03-15	2555	2555	0.0
4	2021-03-19	6861	6861	0.0

- Afficher les données disparus (NULL)

```
data.isnull().sum()
```

```
date                        0
total_vaccinations          0
people_vaccinated           0
people_fully_vaccinated     3
dtype: int64
```

- Replacer tous les cas nuls avec 0 pour éviter les problèmes dans la partie prédiction

```
data['people_fully_vaccinated'] = data['people_fully_vaccinated'].fillna(0)
data[data.isnull().any(axis=1)]
```

date	total_vaccinations	people_vaccinated	people_fully_vaccinated

- Afficher la description de notre dataset

```
data.describe()
```

	total_vaccinations	people_vaccinated	people_fully_vaccinated
count	2.270000e+02	2.270000e+02	2.270000e+02
mean	4.518149e+06	2.844926e+06	1.997091e+06
std	3.938548e+06	2.340088e+06	1.986165e+06
min	0.000000e+00	0.000000e+00	0.000000e+00
25%	8.204935e+05	5.512720e+05	2.487035e+05
50%	2.619884e+06	1.681477e+06	7.814830e+05
75%	8.599588e+06	5.355410e+06	4.140680e+06
max	1.105785e+07	6.312309e+06	5.377874e+06

- Afficher la corr de notre dataset
- Afficher le nombre du colonne et du ligne de notre dataset

```
data.corr()
```

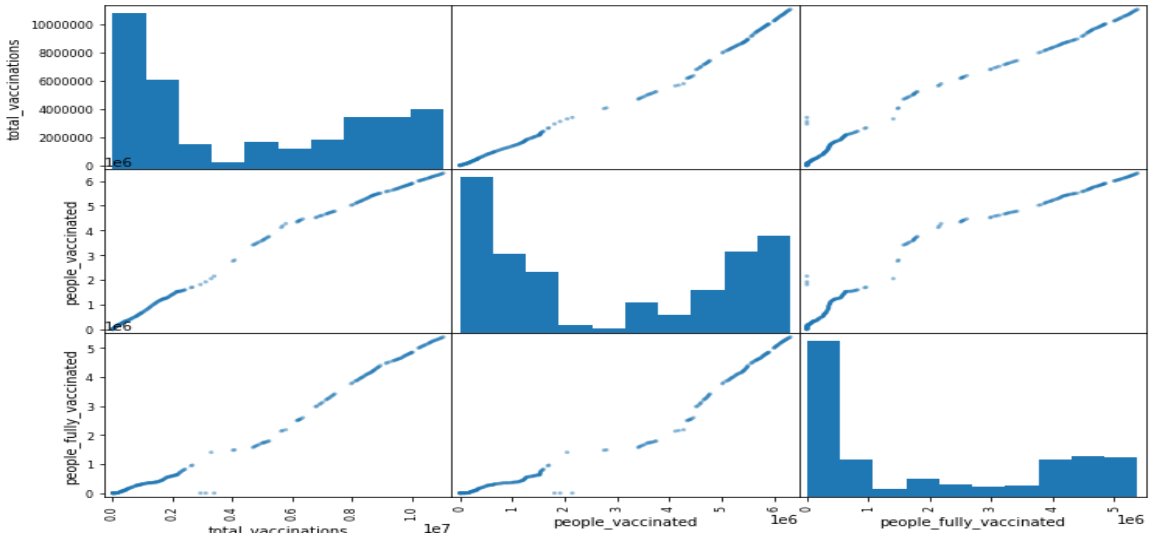
	total_vaccinations	people_vaccinated	people_fully_vaccinated
total_vaccinations	1.000000	0.995685	0.992193
people_vaccinated	0.995685	1.000000	0.980617
people_fully_vaccinated	0.992193	0.980617	1.000000

```
data.shape
```

```
(227, 4)
```

- Importer bibliothèque scatter_matrix et représenter la distribution des données

```
from pandas.plotting import scatter_matrix
ls = ["date","total_vaccinations", "people_vaccinated","people_fully_vaccinated"]
scatter_matrix(data[ls], figsize=(12, 8));
```



- Afficher les informations et les types des colonnes

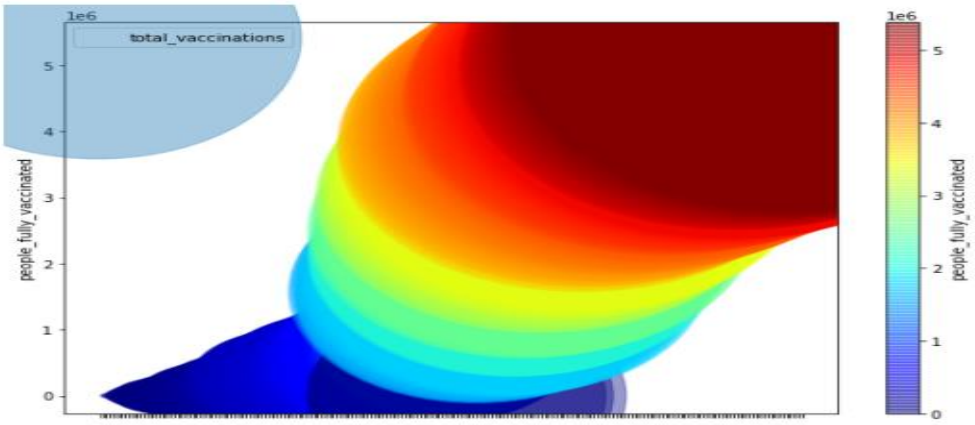
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 227 entries, 0 to 226
Data columns (total 4 columns):
 #   Column                  Non-Null Count  Dtype  
---  ------                  --------------  -----  
 0   date                    227 non-null    object 
 1   total_vaccinations      227 non-null    int64  
 2   people_vaccinated       227 non-null    int64  
 3   people_fully_vaccinated 227 non-null    float64
dtypes: float64(1), int64(2), object(1)
memory usage: 7.2+ KB
```

- Afficher une courbe du nombre des personnes vaccinés faible jusqu'au devient plus nombreux

```
data.plot(kind="scatter", x="date", y="people_fully_vaccinated", alpha=0.4,
  s=data["total_vaccinations"]/100, label="total_vaccinations", figsize=(10,7),
  c="people_fully_vaccinated", cmap=plt.get_cmap("jet"), colorbar=True,
)
plt.legend()
```

```
<matplotlib.legend.Legend at 0x148e0646b20>
```



- Changer le type de date en numérique pour éviter les problèmes de train de model

Parti Machine Learning

```
data['date'] = pd.to_numeric(data.date.str.replace('-',''))
data.head()
```

	date	total_vaccinations	people_vaccinated	people_fully_vaccinated
0	20210312	0	0	0.0
1	20210313	743	743	0.0
2	20210314	2076	2076	0.0
3	20210315	2555	2555	0.0
4	20210319	6861	6861	0.0

- Diviser notre dataset en deux parties x et y

```
x=data[['date','total_vaccinations']].values
y=data[['people_vaccinated']].values
```

- Importer la bibliothèque sklearn et fit le dataset avec le model LinearRegression

```
from sklearn.linear_model import LinearRegression
model = LinearRegression()
model.fit(x,y)
```

```
LinearRegression()
```

- Importer la bibliothèque train_test_split et fit un deuxième model de test avec le model LinearRegression

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2)
model2 = LinearRegression()
model2.fit(x_train,y_train)
```

```
LinearRegression()
```

- Afficher le score du notre test dataset qui est égale a 98,99%

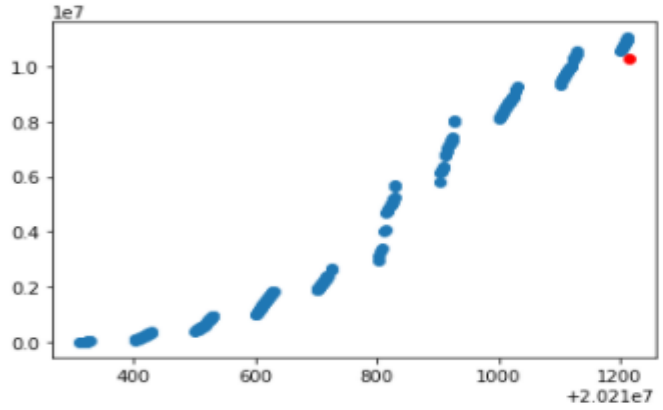
```
score=(model2.score(x_test,y_test))*100
score
```

```
98.99771293375608
```

- Pointer dans le modèle scatter un point que nous voulons savoir leur prédiction

```
plt.scatter(x[:,0],x[:,1])
plt.scatter(20211214,10292254,c='red')
```

```
<matplotlib.collections.PathCollection at 0x148e2ca60a0>
```



- Faire la prédiction d'une random saisir (dans la future)

```
pred=model.predict([['20211214','10292254']])
print('La Résultat est:',int(pred))
```

```
La Résultat est: 6309914
```

- Parti interface qui été créé avec Qt_Designer

Parti Interface

```
# importation des bibliothèques des tools QTWidgets
from PyQt5 import QtWidgets, uic
import sys
import webbrowser
```

```
# ----------------------functions Front-------------------------
def exit():
    Fen.destroy()
    Fen2.destroy()
def transfert():
    Fen2.show()
    Fen.destroy()
# ----------------------functions Back-------------------------
def lien():
     webbrowser.open_new('http://localhost:8888/notebooks/Desktop/WORK2/Projet_ML_MR_MED_Kharrat.ipynb')
def trait():
    d=Fen2.lineEdit.text()
    i=Fen2.lineEdit_2.text()
    rt=model.predict([[d,i]])
    Fen2.lineEdit_3.setText(str(int(rt)))
    rt2=11935764-rt
    Fen2.lineEdit_4.setText(str(int(rt2)))
```

```
App =QtWidgets.QApplication(sys.argv)
#  ---------------Front----------------
Fen=uic.loadUi('Front.ui')
Fen.show()
Fen.pushButton.clicked.connect(transfert)
Fen.pushButton_2.clicked.connect(exit)
# -------------Back--------------
Fen2=uic.loadUi('Back.ui')
Fen2.pushButton.clicked.connect(trait)
Fen2.pushButton_2.clicked.connect(lien)
Fen2.pushButton_3.clicked.connect(exit)
# -----------Exécutér----------
App.exec_()
sys.exit()
```