Untitled42

November 3, 2025

[3]:
```
import pandas as pd
df = pd.DataFrame(
{"a" : [4, 5, 6],
"b" : [7, 8, 9],
"c" : [10, 11, 12]},
index = [1, 2, 3])
print(df)
```

```
   a  b   c
1  4  7  10
2  5  8  11
3  6  9  12
```

[7]:
```
import pandas as pd
data=pd.read_csv("cars.csv")
print(data)
```

```
       Unnamed: 0         car_name     brand     model  vehicle_age  \
0               0      Maruti Alto    Maruti      Alto            9
1               1    Hyundai Grand   Hyundai     Grand            5
2               2      Hyundai i20   Hyundai       i20           11
3               3      Maruti Alto    Maruti      Alto            9
4               4    Ford Ecosport      Ford  Ecosport            6
...           ...              ...       ...       ...          ...
15406       19537      Hyundai i10   Hyundai       i10            9
15407       19540    Maruti Ertiga    Maruti    Ertiga            2
15408       19541      Skoda Rapid     Skoda     Rapid            6
15409       19542  Mahindra XUV500  Mahindra    XUV500            5
15410       19543       Honda City     Honda      City            2

       km_driven seller_type fuel_type transmission_type  mileage  engine  \
0         120000  Individual    Petrol            Manual    19.70     796
1          20000  Individual    Petrol            Manual    18.90    1197
2          60000  Individual    Petrol            Manual    17.00    1197
3          37000  Individual    Petrol            Manual    20.92     998
4          30000      Dealer    Diesel            Manual    22.77    1498
...          ...         ...       ...               ...      ...     ...
15406      10723      Dealer    Petrol            Manual    19.81    1086
15407      18000      Dealer    Petrol            Manual    17.50    1373
```

```
15408      67000      Dealer    Diesel            Manual    21.14    1498
15409    3800000      Dealer    Diesel            Manual    16.00    2179
15410      13000      Dealer    Petrol         Automatic    18.00    1497

       max_power  seats    price
0          46.30      5   120000
1          82.00      5   550000
2          80.00      5   215000
3          67.10      5   226000
4          98.59      5   570000
...          ...    ...      ...
15406      68.05      5   250000
15407      91.10      7   925000
15408     103.52      5   425000
15409     140.00      7  1225000
15410     117.60      5  1200000

[15411 rows x 14 columns]
```

[11]:
```
my_data=pd.DataFrame(data,columns=['price','brand'])
print(my_data)
```

```
         price     brand
0       120000    Maruti
1       550000   Hyundai
2       215000   Hyundai
3       226000    Maruti
4       570000      Ford
...        ...       ...
15406   250000   Hyundai
15407   925000    Maruti
15408   425000     Skoda
15409  1225000  Mahindra
15410  1200000     Honda

[15411 rows x 2 columns]
```

[19]:
```
#Using head() method with an argument which helps us to restrict the number of␣
 ↪initial records that should be displayed
data.head(n=2)
 #Using.tail() method with an argument which helps us to restrict the number of␣
 ↪initial records that should be displayed
data.tail(n=2)
```

[19]:
```
       Unnamed: 0         car_name     brand    model  vehicle_age  km_driven  \
15409       19542  Mahindra XUV500  Mahindra  XUV500            5    3800000
15410       19543       Honda City     Honda    City            2      13000
```

```
      seller_type fuel_type transmission_type  mileage  engine  max_power  \
15409      Dealer    Diesel            Manual     16.0    2179      140.0
15410      Dealer    Petrol         Automatic     18.0    1497      117.6

       seats    price
15409      7  1225000
15410      5  1200000
```

[21]:
```
#information about the data
print(data.describe())
#assigning the 'col_i 'column as target
target=data['price']
data.head(n=2)
```

```
         Unnamed: 0   vehicle_age     km_driven       mileage        engine  \
count  15411.000000  15411.000000  1.541100e+04  15411.000000  15411.000000
mean    9811.857699      6.036338  5.561648e+04     19.701151   1486.057751
std     5643.418542      3.013291  5.161855e+04      4.171265    521.106696
min        0.000000      0.000000  1.000000e+02      4.000000    793.000000
25%     4906.500000      4.000000  3.000000e+04     17.000000   1197.000000
50%     9872.000000      6.000000  5.000000e+04     19.670000   1248.000000
75%    14668.500000      8.000000  7.000000e+04     22.700000   1582.000000
max    19543.000000     29.000000  3.800000e+06     33.540000   6592.000000

          max_power         seats         price
count  15411.000000  15411.000000  1.541100e+04
mean     100.588254      5.325482  7.749711e+05
std       42.972979      0.807628  8.941284e+05
min       38.400000      0.000000  4.000000e+04
25%       74.000000      5.000000  3.850000e+05
50%       88.500000      5.000000  5.560000e+05
75%      117.300000      5.000000  8.250000e+05
max      626.000000      9.000000  3.950000e+07
```

[21]:
```
   Unnamed: 0       car_name    brand  model  vehicle_age  km_driven  \
0           0    Maruti Alto   Maruti   Alto            9     120000
1           1  Hyundai Grand  Hyundai  Grand            5      20000

  seller_type fuel_type transmission_type  mileage  engine  max_power  seats  \
0  Individual    Petrol            Manual     19.7     796       46.3      5
1  Individual    Petrol            Manual     18.9    1197       82.0      5

    price
0  120000
1  550000
```

[25]:
```
df=pd.read_csv('cars.csv')
df.to_csv('my_data.csv')
```

[32]:
```
data_copy=data.copy()
train_set=data_copy.sample(frac=0.80,random_state=0)
test_set =data_copy.drop(train_set.index)
```

[40]:
```
 #Use‘pop’ to extract the labels
train_set_labels=train_set.pop('price')
test_set_labels=test_set.pop('price')
print("train_set:\n",train_set)
print("train_set_labels:\n",train_set_labels)
```

```
train_set:
        Unnamed: 0            car_name     brand        model  vehicle_age  \
5122          6501        Renault KWID   Renault         KWID            1
9792         12542         Hyundai i10   Hyundai          i10           11
8379         10768         Tata Safari      Tata       Safari            8
10718        13645          Honda City     Honda         City            6
641            815        Maruti Swift    Maruti        Swift            2
...            ...                 ...       ...          ...          ...
5974          7635     Mahindra Bolero  Mahindra       Bolero            5
8333         10709      Maruti Wagon R    Maruti      Wagon R            4
11698        14849  Maruti Swift Dzire    Maruti  Swift Dzire           13
2910          3697        Renault KWID   Renault         KWID            5
6096          7787       Hyundai Verna   Hyundai        Verna            9

       km_driven       seller_type fuel_type transmission_type  mileage  \
5122        1200        Individual    Petrol         Automatic    22.00
9792       60000        Individual    Petrol            Manual    20.36
8379       60000        Individual    Diesel            Manual    11.57
10718      57000            Dealer    Diesel            Manual    26.00
641        14499  Trustmark Dealer    Petrol            Manual    22.00
...          ...               ...       ...               ...      ...
5974       76000            Dealer    Diesel            Manual    13.60
8333       35000            Dealer    Petrol            Manual    21.79
11698     110000        Individual    Diesel            Manual    19.30
2910       35000        Individual    Petrol            Manual    25.17
6096       96888            Dealer    Diesel         Automatic    22.32

       engine  max_power  seats
5122      999      67.00      5
9792     1197      78.90      5
8379     2179     138.10      7
10718    1498      98.60      5
641      1197      81.80      5
...       ...        ...    ...
5974     2523      63.00      9
8333      998      67.05      5
11698    1248      73.90      5
2910      799      53.30      5
```

```
6096     1582     126.30      5

[12329 rows x 13 columns]
train_set_labels:
 5122     450000
9792     165000
8379     350000
10718    525000
641      535000
          ...
5974     590000
8333     350000
11698    325000
2910     250000
6096     550000
Name: price, Length: 12329, dtype: int64
```

[68]:
```
from glob import glob

# Returns a list of pathnames in list files
pathnames = glob(r"C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/
 ↪Codes_LOG-POLAR_HMAX/HMAX_model/data/*")
#r"..." ensures that backslashes are not treated as escape characters.
for path in pathnames:
        print(path)
```

```
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\1.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\10.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\100.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\101.jpg
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C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-POLAR_HMAX/HMAX_model/data\59.jpg
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C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-POLAR_HMAX/HMAX_model/data\60.jpg
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C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-POLAR_HMAX/HMAX_model/data\82.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-POLAR_HMAX/HMAX_model/data\83.jpg
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C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-POLAR_HMAX/HMAX_model/data\87.jpg

```
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POLAR_HMAX/HMAX_model/data\88.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\89.jpg
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POLAR_HMAX/HMAX_model/data\9.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\90.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\91.jpg
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POLAR_HMAX/HMAX_model/data\92.jpg
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POLAR_HMAX/HMAX_model/data\93.jpg
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POLAR_HMAX/HMAX_model/data\94.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\95.jpg
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POLAR_HMAX/HMAX_model/data\96.jpg
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POLAR_HMAX/HMAX_model/data\97.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\98.jpg
C:/Users/Thinkpad/OneDrive/Documents/projectdanemarkitaly/Codes_LOG-
POLAR_HMAX/HMAX_model/data\99.jpg
```

[74]:
```
from sklearn import datasets
dat=datasets.load_breast_cancer()
print("Examples=",dat.data.shape,"Labels=",dat.target.shape)
```

```
Examples= (569, 30) Labels= (569,)
```

[76]:
```
from sklearn import datasets
dat=datasets.fetch_20newsgroups(subset='train')
from pprint import pprint
pprint(list(dat.target_names))
```

```
['alt.atheism',
 'comp.graphics',
 'comp.os.ms-windows.misc',
 'comp.sys.ibm.pc.hardware',
 'comp.sys.mac.hardware',
 'comp.windows.x',
 'misc.forsale',
 'rec.autos',
 'rec.motorcycles',
 'rec.sport.baseball',
 'rec.sport.hockey',
```

```
'sci.crypt',
'sci.electronics',
'sci.med',
'sci.space',
'soc.religion.christian',
'talk.politics.guns',
'talk.politics.mideast',
'talk.politics.misc',
'talk.religion.misc']
```

[78]:
```
from sklearn.datasets import fetch_openml
mice=fetch_openml(name='miceprotein',version=4)
mice.data.shape
```

[78]:
```
(1080, 77)
```

[80]:
```
mice.target.shape
```

[80]:
```
(1080,)
```

[84]:
```
import numpy as np
np.unique(mice.target)
```

[84]:
```
array(['c-CS-m', 'c-CS-s', 'c-SC-m', 'c-SC-s', 't-CS-m', 't-CS-s',
       't-SC-m', 't-SC-s'], dtype=object)
```

[86]:
```
mice.url
```

[86]:
```
'https://www.openml.org/d/40966'
```

[88]:
```
mice.details['version']
```

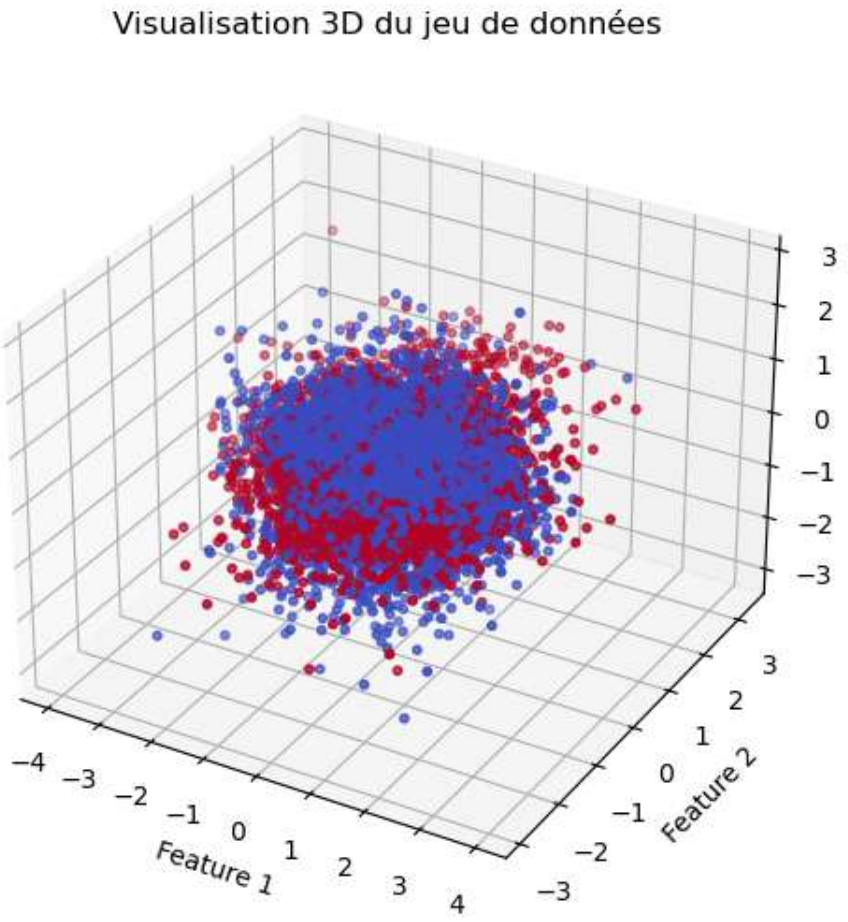
[88]:
```
'4'
```

[98]:
```
from sklearn.datasets import make_classification
X, y = make_classification(
    n_samples=10000,    # nombre total d'exemples
    n_features=5,       # 5 variables (dimensions)
    flip_y=0.1,         # 10% des labels aléatoirement inversés (introduit du␣
 ↪bruit)
    class_sep=0.1       # séparation très faible entre les classes (données peu␣
 ↪séparables)
)
```

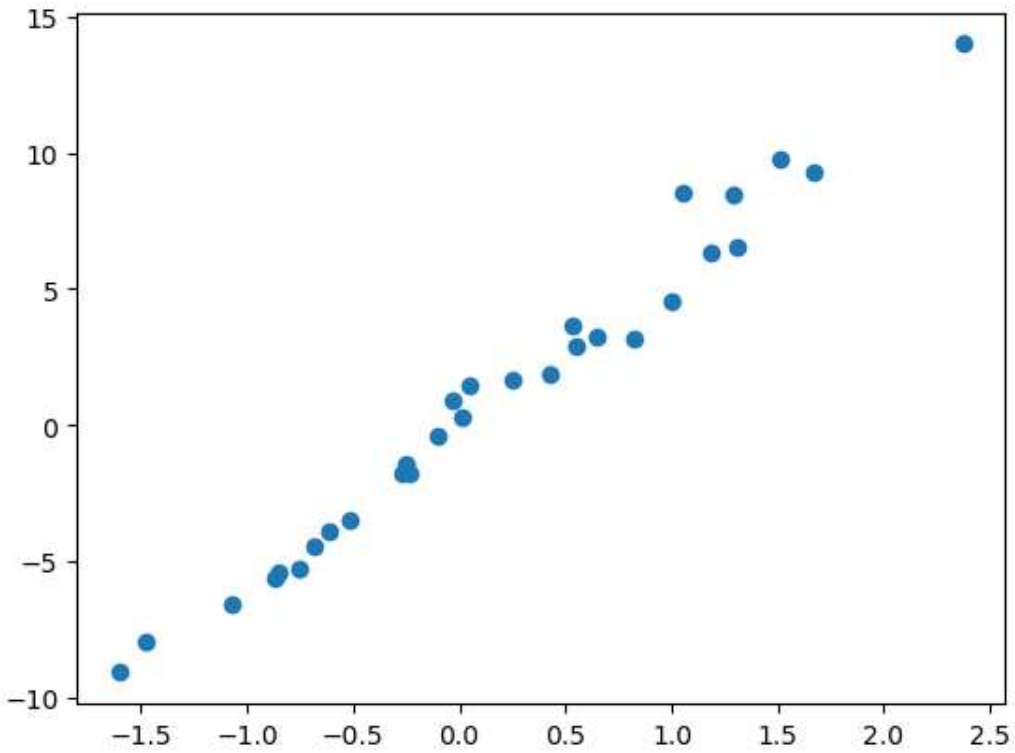
[100]:
```
print("X shape =", X.shape)
print("len y =", len(y))
print(y)
```

```
X shape = (10000, 5)
len y = 10000
[1 1 0 ... 0 1 1]
```

[114]:
```python
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D

# Visualisation 3D
fig = plt.figure(figsize=(8,6))
ax = fig.add_subplot(111, projection='3d')
ax.scatter(X[:,0], X[:,1], X[:,2], c=y, cmap='coolwarm', s=10)
ax.set_xlabel('Feature 1')
ax.set_ylabel('Feature 2')
ax.set_zlabel('Feature 3')
plt.title('Visualisation 3D du jeu de données')
plt.show()
```

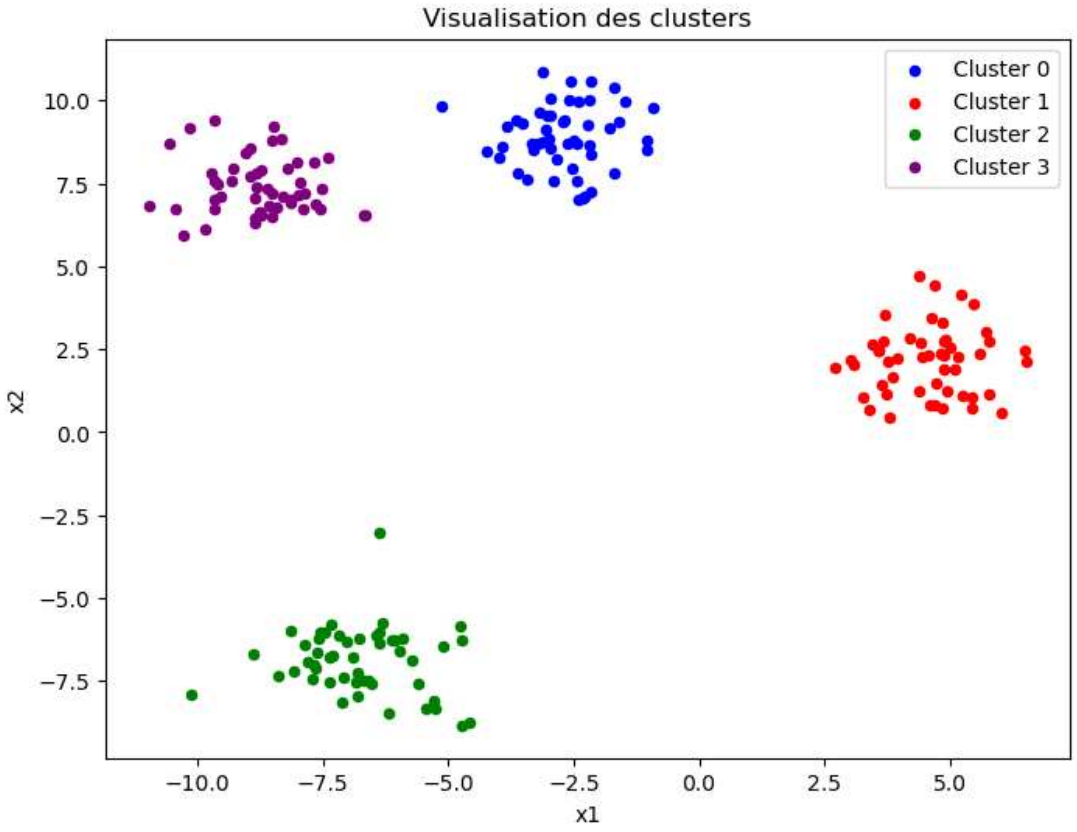


[118]:
```
from sklearn import datasets
from matplotlib import pyplot as plt
x,y=datasets.make_regression(
 n_samples=30,
 n_features=1,
 noise=0.8)
plt.scatter(x,y)
plt.show()
```



[122]:
```
from sklearn.datasets import make_blobs
from matplotlib import pyplot as plt
import pandas as pd

# Génération des données
X, y = make_blobs(n_samples=200, centers=4, n_features=2, random_state=42)

# Transformation en DataFrame pour faciliter la manipulation
df = pd.DataFrame({
    'x1': X[:, 0],
    'x2': X[:, 1],
    'label': y
})
```

```
# Grouper les données par cluster
groups = df.groupby('label')

# Création du graphique
fig, ax = plt.subplots(figsize=(8,6))
colors = ["blue", "red", "green", "purple"]

# Boucle pour tracer chaque groupe
for idx, group in groups:
    group.plot(ax=ax, kind='scatter', x='x1', y='x2', label=f'Cluster {idx}',␣
 ↪color=colors[idx])

# Affichage
plt.title('Visualisation des clusters')
plt.xlabel('x1')
plt.ylabel('x2')
plt.show()
```



[128]:
```
import pandas as pd
import numpy as np
# dictionary of lists
dictionary = {"Name":["Alex", "Mike", "John", "Dave", "Joey"],
     "Height(m)": [1.75, 1.65, 1.73, np.nan, 1.82],
     "Test Score":[70, np.nan, 8, 62, 73]}
# creating a dataframe from dict
df = pd.DataFrame(dictionary)
# using isnull() function this function return dataframe of Boolean values
# which are True for NaN values.
print(df.isnull())
print("SUM : \n",df.isnull().sum())
```

```
    Name  Height(m)  Test Score
0  False      False       False
1  False      False        True
2  False      False       False
3  False       True       False
4  False      False       False
SUM :
 Name           0
Height(m)      1
Test Score     1
dtype: int64
```

[136]:
```
# Convertir en numérique
df['Test Score'] = pd.to_numeric(df['Test Score'], errors='coerce')
df['Height(m)'] = pd.to_numeric(df['Height(m)'], errors='coerce')

# Remplir les NaN par la moyenne
df['Test Score'] = df['Test Score'].fillna(df['Test Score'].mean())
df['Height(m)'] = df['Height(m)'].fillna(df['Height(m)'].mean())

# Supprimer lignes restantes avec NaN (optionnel)
df = df.dropna()
```

[138]:
```
df
```

[138]:

	Name	Height(m)	Test Score
0	Alex	1.7500	70.00
1	Mike	1.6500	53.25
2	John	1.7300	8.00
3	Dave	1.7375	62.00
4	Joey	1.8200	73.00

[140]:
```
import pandas as pd
import numpy as np
```

```python
# Création du dictionnaire avec des valeurs manquantes non standard
dictionary_1 = {
    "Name": ["Alex", "Mike", "John", "Dave", "Joey"],
    "Height(m)": [1.75, 1.65, "-", "na", 1.82],
    "Test Score": [70, np.nan, 8, 62, 73]
}

# Création du DataFrame
df_1 = pd.DataFrame(dictionary_1)
print("Original DataFrame:\n", df_1)

# Détecter les valeurs manquantes standard (NaN)
print("\nIsnull:\n", df_1.isnull())

# Remplacer les valeurs non standard par NaN
df_1 = df_1.replace(["-", "na"], np.nan)
print("\nAfter replacing non-standard missing values:\n", df_1)

# Remplir les NaN par 0
df_1 = df_1.fillna(0)
print("\nAfter fillna(0):\n", df_1)
```

```
Original DataFrame:
    Name Height(m)  Test Score
0  Alex      1.75        70.0
1  Mike      1.65         NaN
2  John         -         8.0
3  Dave        na        62.0
4  Joey      1.82        73.0

Isnull:
     Name  Height(m)  Test Score
0  False      False       False
1  False      False        True
2  False      False       False
3  False      False       False
4  False      False       False

After replacing non-standard missing values:
    Name  Height(m)  Test Score
0  Alex       1.75        70.0
1  Mike       1.65         NaN
2  John        NaN         8.0
3  Dave        NaN        62.0
4  Joey       1.82        73.0

After fillna(0):
    Name  Height(m)  Test Score
```

```
0  Alex       1.75        70.0
1  Mike       1.65         0.0
2  John       0.00         8.0
3  Dave       0.00        62.0
4  Joey       1.82        73.0
```

```
C:\Users\Thinkpad\AppData\Local\Temp\ipykernel_28472\2380661644.py:19:
FutureWarning: Downcasting behavior in `replace` is deprecated and will be
removed in a future version. To retain the old behavior, explicitly call
`result.infer_objects(copy=False)`. To opt-in to the future behavior, set
`pd.set_option('future.no_silent_downcasting', True)`
  df_1 = df_1.replace(["-", "na"], np.nan)
```

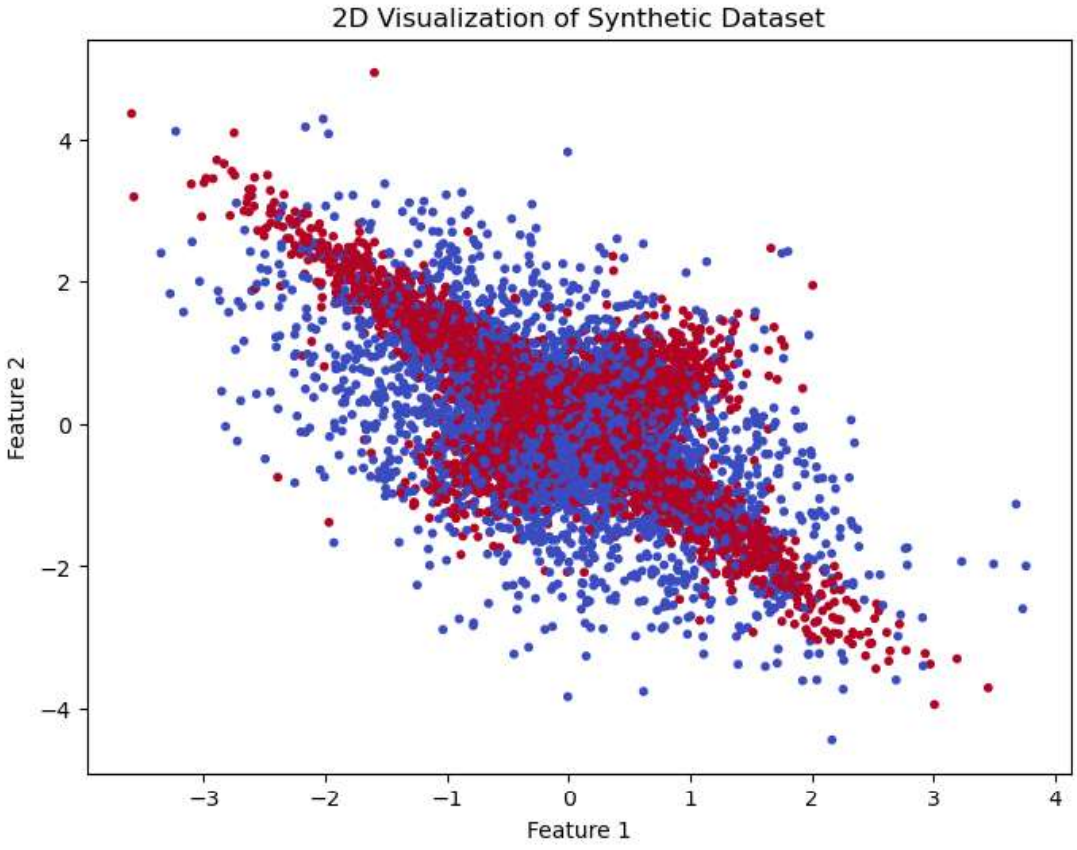
[142]:
```
import numpy as np
from sklearn.impute import SimpleImputer
X=[[np.nan,2],[6,np.nan],[7,6]]
# mean,median,most_frequent,constant(fill_value=)
imp=SimpleImputer(missing_values=np.nan,strategy='mean')
data=imp.fit_transform(X)
print(data)
```

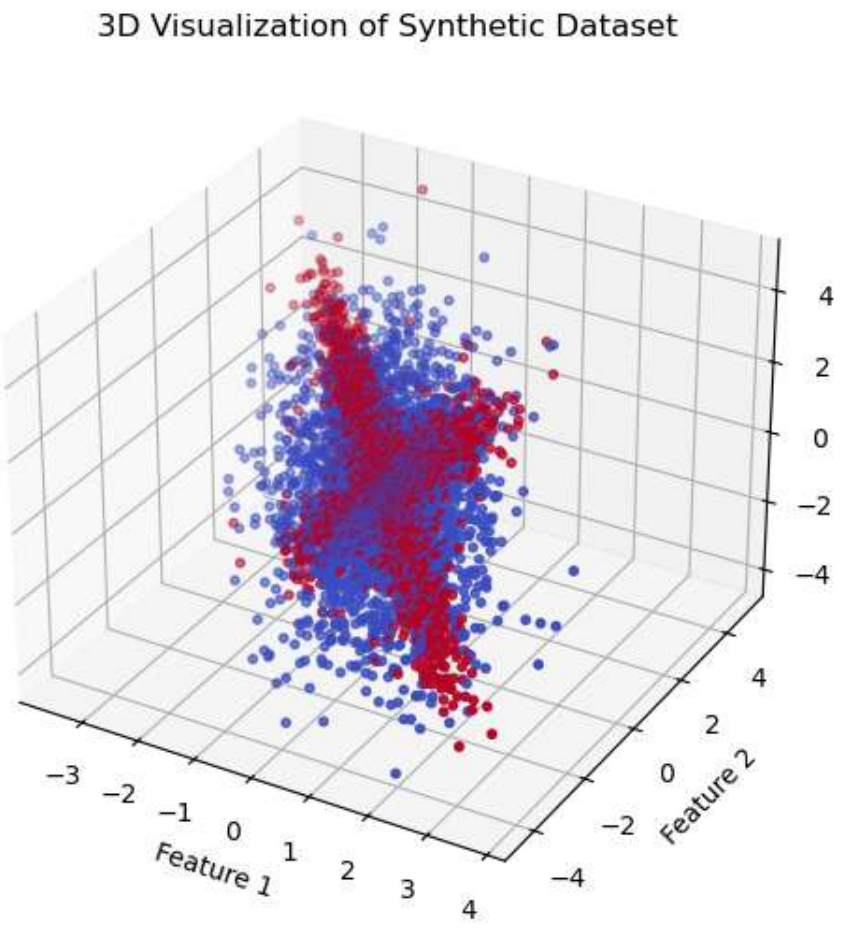
```
[[6.5 2. ]
 [6.  4. ]
 [7.  6. ]]
```

[144]:
```
from sklearn.datasets import make_classification
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D  # pour visualisation 3D

# Génération des données
X, y = make_classification(
    n_samples=10000,
    n_features=4,
    flip_y=0.1,
    class_sep=0.1,
    random_state=42
)

print("X shape =", X.shape)
print("len y =", len(y))
print("y unique classes:", set(y))

# Visualisation 2D (en utilisant les deux premières features)
plt.figure(figsize=(8,6))
plt.scatter(X[:,0], X[:,1], c=y, cmap='coolwarm', s=10)
plt.xlabel('Feature 1')
plt.ylabel('Feature 2')
plt.title('2D Visualization of Synthetic Dataset')
```

```
plt.show()

# Visualisation 3D (en utilisant les trois premières features)
fig = plt.figure(figsize=(8,6))
ax = fig.add_subplot(111, projection='3d')
ax.scatter(X[:,0], X[:,1], X[:,2], c=y, cmap='coolwarm', s=10)
ax.set_xlabel('Feature 1')
ax.set_ylabel('Feature 2')
ax.set_zlabel('Feature 3')
plt.title('3D Visualization of Synthetic Dataset')
plt.show()
```

```
X shape = (10000, 4)
len y = 10000
y unique classes: {0, 1}
```




3D Visualization of Synthetic Dataset
Feature 1
Feature 2
−3
−2
−1
0
1
2
3
4
−4
−2
0
2
4