In [1]:
```
!pip install pandas
!pip install matplotlib
!pip install seaborn
!pip install numpy
```

```
Requirement already satisfied: pandas in /home/jupyterlab/conda/envs/python/lib/pyth
on3.7/site-packages (1.3.5)
Requirement already satisfied: python-dateutil>=2.7.3 in /home/jupyterlab/conda/env
s/python/lib/python3.7/site-packages (from pandas) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in /home/jupyterlab/conda/envs/python/li
b/python3.7/site-packages (from pandas) (2023.3)
Requirement already satisfied: numpy>=1.17.3 in /home/jupyterlab/conda/envs/python/l
ib/python3.7/site-packages (from pandas) (1.21.6)
Requirement already satisfied: six>=1.5 in /home/jupyterlab/conda/envs/python/lib/py
thon3.7/site-packages (from python-dateutil>=2.7.3->pandas) (1.16.0)
Requirement already satisfied: matplotlib in /home/jupyterlab/conda/envs/python/lib/
python3.7/site-packages (3.5.3)
Requirement already satisfied: cycler>=0.10 in /home/jupyterlab/conda/envs/python/li
b/python3.7/site-packages (from matplotlib) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in /home/jupyterlab/conda/envs/pyth
on/lib/python3.7/site-packages (from matplotlib) (4.38.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /home/jupyterlab/conda/envs/pyth
on/lib/python3.7/site-packages (from matplotlib) (1.4.4)
Requirement already satisfied: numpy>=1.17 in /home/jupyterlab/conda/envs/python/li
b/python3.7/site-packages (from matplotlib) (1.21.6)
Requirement already satisfied: packaging>=20.0 in /home/jupyterlab/conda/envs/pytho
n/lib/python3.7/site-packages (from matplotlib) (23.1)
Requirement already satisfied: pillow>=6.2.0 in /home/jupyterlab/conda/envs/python/l
ib/python3.7/site-packages (from matplotlib) (8.1.0)
Requirement already satisfied: pyparsing>=2.2.1 in /home/jupyterlab/conda/envs/pytho
n/lib/python3.7/site-packages (from matplotlib) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in /home/jupyterlab/conda/envs/p
ython/lib/python3.7/site-packages (from matplotlib) (2.8.2)
Requirement already satisfied: typing-extensions in /home/jupyterlab/conda/envs/pyth
on/lib/python3.7/site-packages (from kiwisolver>=1.0.1->matplotlib) (4.5.0)
Requirement already satisfied: six>=1.5 in /home/jupyterlab/conda/envs/python/lib/py
thon3.7/site-packages (from python-dateutil>=2.7->matplotlib) (1.16.0)
Requirement already satisfied: seaborn in /home/jupyterlab/conda/envs/python/lib/pyt
hon3.7/site-packages (0.9.0)
Requirement already satisfied: matplotlib>=1.4.3 in /home/jupyterlab/conda/envs/pyth
on/lib/python3.7/site-packages (from seaborn) (3.5.3)
Requirement already satisfied: numpy>=1.9.3 in /home/jupyterlab/conda/envs/python/li
b/python3.7/site-packages (from seaborn) (1.21.6)
Requirement already satisfied: pandas>=0.15.2 in /home/jupyterlab/conda/envs/python/
lib/python3.7/site-packages (from seaborn) (1.3.5)
Requirement already satisfied: scipy>=0.14.0 in /home/jupyterlab/conda/envs/python/l
ib/python3.7/site-packages (from seaborn) (1.7.3)
Requirement already satisfied: cycler>=0.10 in /home/jupyterlab/conda/envs/python/li
b/python3.7/site-packages (from matplotlib>=1.4.3->seaborn) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in /home/jupyterlab/conda/envs/pyth
on/lib/python3.7/site-packages (from matplotlib>=1.4.3->seaborn) (4.38.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /home/jupyterlab/conda/envs/pyth
on/lib/python3.7/site-packages (from matplotlib>=1.4.3->seaborn) (1.4.4)
Requirement already satisfied: packaging>=20.0 in /home/jupyterlab/conda/envs/pytho
n/lib/python3.7/site-packages (from matplotlib>=1.4.3->seaborn) (23.1)
Requirement already satisfied: pillow>=6.2.0 in /home/jupyterlab/conda/envs/python/l
ib/python3.7/site-packages (from matplotlib>=1.4.3->seaborn) (8.1.0)
Requirement already satisfied: pyparsing>=2.2.1 in /home/jupyterlab/conda/envs/pytho
n/lib/python3.7/site-packages (from matplotlib>=1.4.3->seaborn) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in /home/jupyterlab/conda/envs/p
ython/lib/python3.7/site-packages (from matplotlib>=1.4.3->seaborn) (2.8.2)
```

```
Requirement already satisfied: pytz>=2017.3 in /home/jupyterlab/conda/envs/python/li
b/python3.7/site-packages (from pandas>=0.15.2->seaborn) (2023.3)
Requirement already satisfied: typing-extensions in /home/jupyterlab/conda/envs/pyth
on/lib/python3.7/site-packages (from kiwisolver>=1.0.1->matplotlib>=1.4.3->seaborn)
(4.5.0)
Requirement already satisfied: six>=1.5 in /home/jupyterlab/conda/envs/python/lib/py
thon3.7/site-packages (from python-dateutil>=2.7->matplotlib>=1.4.3->seaborn) (1.16.
0)
Requirement already satisfied: numpy in /home/jupyterlab/conda/envs/python/lib/pytho
n3.7/site-packages (1.21.6)
```

In [2]:
```python
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
import pandas as pd
```

In [6]:
```python
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import GridSearchCV

# Definición de los hiperparámetros
parameters = {
    'C': [0.01, 0.1, 1],
    'penalty': ['l2'],
    'solver': ['lbfgs']
}

# 1. Crear el objeto de Regresión Logística
LR = LogisticRegression()

# 2. Crear el objeto GridSearchCV
logreg_cv = GridSearchCV(
    estimator=LR,
    param_grid=parameters,
    scoring='accuracy',
    cv=10
)

# 3. Ajustar (Entrenar) el objeto a los datos de entrenamiento
print("Entrenando el modelo de Regresión Logística...")
logreg_cv.fit(X_train, Y_train)
print("¡Entrenamiento completado!")

# Ahora puedes re-ejecutar el código para la Matriz de Confusión:
# Y_hat = logreg_cv.predict(X_test)
```

```
Entrenando el modelo de Regresión Logística...
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
least_angle.py:35: DeprecationWarning: `np.float` is a deprecated alias for the buil
tin `float`. To silence this warning, use `float` by itself. Doing this will not mod
ify any behavior and is safe. If you specifically wanted the numpy scalar type, use
`np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  eps=np.finfo(np.float).eps,
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
least_angle.py:597: DeprecationWarning: `np.float` is a deprecated alias for the bui
ltin `float`. To silence this warning, use `float` by itself. Doing this will not mo
dify any behavior and is safe. If you specifically wanted the numpy scalar type, use
`np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  eps=np.finfo(np.float).eps, copy_X=True, fit_path=True,
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
least_angle.py:836: DeprecationWarning: `np.float` is a deprecated alias for the bui
ltin `float`. To silence this warning, use `float` by itself. Doing this will not mo
dify any behavior and is safe. If you specifically wanted the numpy scalar type, use
`np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  eps=np.finfo(np.float).eps, copy_X=True, fit_path=True,
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
least_angle.py:862: DeprecationWarning: `np.float` is a deprecated alias for the bui
ltin `float`. To silence this warning, use `float` by itself. Doing this will not mo
dify any behavior and is safe. If you specifically wanted the numpy scalar type, use
`np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  eps=np.finfo(np.float).eps, positive=False):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
least_angle.py:1097: DeprecationWarning: `np.float` is a deprecated alias for the bu
iltin `float`. To silence this warning, use `float` by itself. Doing this will not m
odify any behavior and is safe. If you specifically wanted the numpy scalar type, us
e `np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  max_n_alphas=1000, n_jobs=None, eps=np.finfo(np.float).eps,
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
least_angle.py:1344: DeprecationWarning: `np.float` is a deprecated alias for the bu
iltin `float`. To silence this warning, use `float` by itself. Doing this will not m
odify any behavior and is safe. If you specifically wanted the numpy scalar type, us
e `np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  max_n_alphas=1000, n_jobs=None, eps=np.finfo(np.float).eps,
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
least_angle.py:1480: DeprecationWarning: `np.float` is a deprecated alias for the bu
iltin `float`. To silence this warning, use `float` by itself. Doing this will not m
odify any behavior and is safe. If you specifically wanted the numpy scalar type, us
e `np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  eps=np.finfo(np.float).eps, copy_X=True, positive=False):
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
randomized_l1.py:152: DeprecationWarning: `np.float` is a deprecated alias for the b
uiltin `float`. To silence this warning, use `float` by itself. Doing this will not
modify any behavior and is safe. If you specifically wanted the numpy scalar type, u
se `np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  precompute=False, eps=np.finfo(np.float).eps,
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
randomized_l1.py:320: DeprecationWarning: `np.float` is a deprecated alias for the b
uiltin `float`. To silence this warning, use `float` by itself. Doing this will not
modify any behavior and is safe. If you specifically wanted the numpy scalar type, u
se `np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  eps=np.finfo(np.float).eps, random_state=None,
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
randomized_l1.py:580: DeprecationWarning: `np.float` is a deprecated alias for the b
uiltin `float`. To silence this warning, use `float` by itself. Doing this will not
modify any behavior and is safe. If you specifically wanted the numpy scalar type, u
se `np.float64` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  eps=4 * np.finfo(np.float).eps, n_jobs=None,
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/tmp/ipykernel_342/1586750396.py in <module>
     22 # 3. Ajustar (Entrenar) el objeto a los datos de entrenamiento
     23 print("Entrenando el modelo de Regresión Logística...")
---> 24 logreg_cv.fit(X_train, Y_train)
     25 print("¡Entrenamiento completado!")
     26

NameError: name 'X_train' is not defined
```

In [8]:
```python
import pandas as pd
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import GridSearchCV

# --- PASO 1: Cargar los datos X y Y ---
# Nota: La URL es un ejemplo común para este lab.
URL_X = 'https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DS0
URL_Y = 'https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DS0

# Cargar las features (X) y el target (Y)
X = pd.read_csv(URL_X)
Y = pd.read_csv(URL_Y)['Class'].values # Obtener la columna Class como NumPy array
```

In [9]:
```python
# --- PASO 2: Estandarización de Datos (TAREA 2) ---
transform = StandardScaler()
X = pd.DataFrame(transform.fit_transform(X), columns=X.columns)
print("Datos estandarizados.")
```

```
Datos estandarizados.
```

In [10]:
```
# --- PASO 3: División de Datos (TAREA 3) ---
X_train, X_test, Y_train, Y_test = train_test_split(
    X,
    Y,
    test_size=0.2,
    random_state=2
)
print(f"Datos divididos. X_train shape: {X_train.shape}")
```

```
Datos divididos. X_train shape: (72, 83)
```

In [11]:
```
# --- PASO 4: Entrenamiento del Modelo (TAREA 4) ---
parameters = {
    'C': [0.01, 0.1, 1],
    'penalty': ['l2'],
    'solver': ['lbfgs']
}

LR = LogisticRegression()

logreg_cv = GridSearchCV(
    estimator=LR,
    param_grid=parameters,
    scoring='accuracy',
    cv=10
)

print("Entrenando el modelo de Regresión Logística...")
logreg_cv.fit(X_train, Y_train)
print("¡Entrenamiento completado y logreg_cv definido!")
```

```
Entrenando el modelo de Regresión Logística...
¡Entrenamiento completado y logreg_cv definido!
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:665: DeprecationWarning: `np.int` is a deprecated alias for the builtin
`int`. To silence this warning, use `int` by itself. Doing this will not modify any
behavior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` o
r `np.int32` to specify the precision. If you wish to review your current use, check
the release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_folds = np.zeros(n_samples, dtype=np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:437: DeprecationWarning: `np.int` is a deprecated alias for the builtin
`int`. To silence this warning, use `int` by itself. Doing this will not modify any
behavior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` o
r `np.int32` to specify the precision. If you wish to review your current use, check
the release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  fold_sizes = np.full(n_splits, n_samples // n_splits, dtype=np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:437: DeprecationWarning: `np.int` is a deprecated alias for the builtin
`int`. To silence this warning, use `int` by itself. Doing this will not modify any
behavior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` o
r `np.int32` to specify the precision. If you wish to review your current use, check
the release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  fold_sizes = np.full(n_splits, n_samples // n_splits, dtype=np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
```

```
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
```

```
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
```

```
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_split.py:113: DeprecationWarning: `np.bool` is a deprecated alias for the builti
n `bool`. To silence this warning, use `bool` by itself. Doing this will not modify
any behavior and is safe. If you specifically wanted the numpy scalar type, use `np.
bool_` here.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  test_mask = np.zeros(_num_samples(X), dtype=np.bool)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
```

```
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
```

```
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
```

```
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
```

```
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
```

```
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
```

```
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
```

```
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
```

```
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
```

```
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
```

```
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/
base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int
```

```
`. To silence this warning, use `int` by itself. Doing this will not modify any beha
vior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `n
p.int32` to specify the precision. If you wish to review your current use, check the
release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_search.py:821: DeprecationWarning: `np.int` is a deprecated alias for the builti
n `int`. To silence this warning, use `int` by itself. Doing this will not modify an
y behavior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64`
or `np.int32` to specify the precision. If you wish to review your current use, chec
k the release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/r
elease/1.20.0-notes.html#deprecations
  dtype=np.int)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/model_selecti
on/_search.py:841: DeprecationWarning: The default of the `iid` parameter will chang
e from True to False in version 0.22 and will be removed in 0.24. This will change n
umeric results when test-set sizes are unequal.
  DeprecationWarning)
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/utils/fixes.p
y:357: DeprecationWarning: distutils Version classes are deprecated. Use packaging.v
ersion instead.
  if _joblib.__version__ >= LooseVersion('0.12'):
```

In [12]:

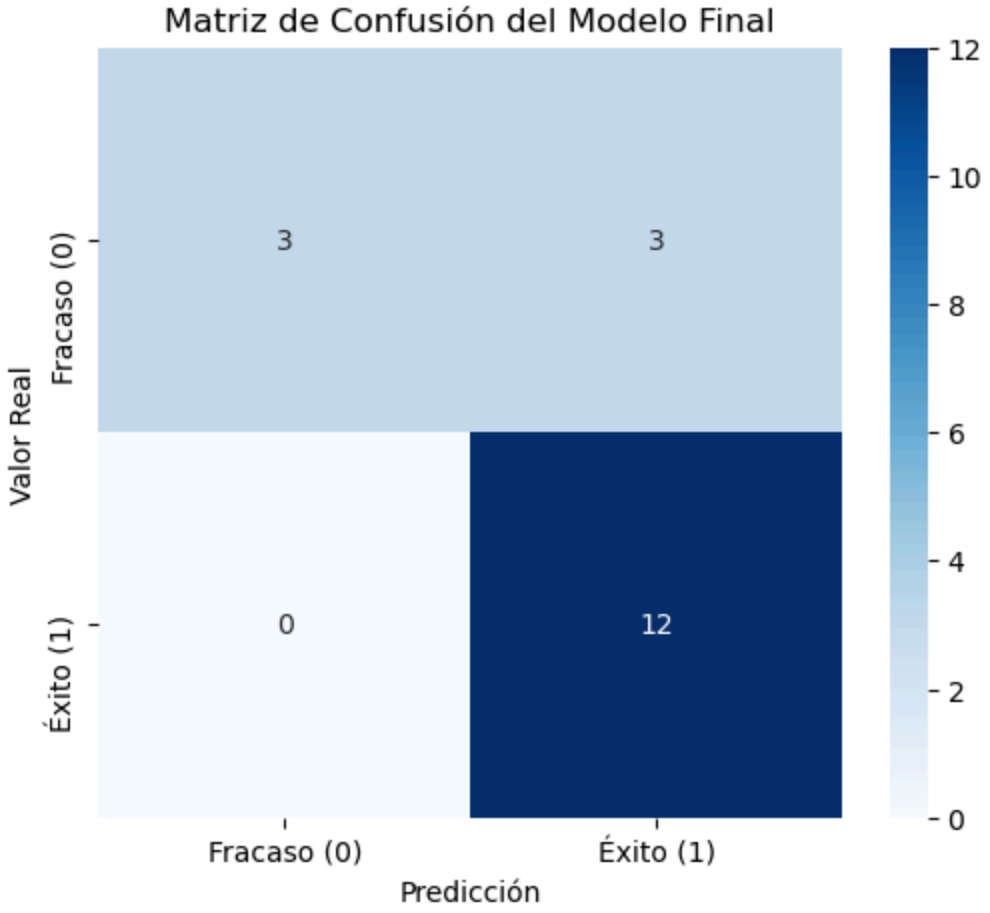
```python
import seaborn as sns
from sklearn.metrics import confusion_matrix
import matplotlib.pyplot as plt

# 1. Obtener las predicciones del mejor modelo (usaremos logreg_cv como ejemplo)
Y_hat = logreg_cv.predict(X_test)

# 2. Calcular la matriz de confusión
cm = confusion_matrix(Y_test, Y_hat)

# 3. Crear el gráfico de mapa de calor (Heatmap)
plt.figure(figsize=(6, 5))
sns.heatmap(
    cm,
    annot=True, # Mostrar los valores numéricos en cada celda
    fmt='d',     # Formato entero
    cmap='Blues', # Paleta de color
    xticklabels=['Fracaso (0)', 'Éxito (1)'],
    yticklabels=['Fracaso (0)', 'Éxito (1)']
)
plt.xlabel('Predicción')
plt.ylabel('Valor Real')
plt.title('Matriz de Confusión del Modelo Final')
plt.show()
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/sklearn/linear_model/base.py:283: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int`. To silence this warning, use `int` by itself. Doing this will not modify any behavior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `np.int32` to specify the precision. If you wish to review your current use, check the release note link for additional information.
Deprecated in NumPy 1.20; for more details and guidance: https://numpy.org/devdocs/release/1.20.0-notes.html#deprecations
  indices = (scores > 0).astype(np.int)
```



In [ ]: