```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
```

```
#data collection and loading
```

```
titanic_data=pd.read_csv('/content/train.csv')
```

```
titanic_data.head()
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Far
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.250
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.283
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.925
				Futrelle,						

Next steps: Generate code with titanic_data View recommended plots

```
titanic_data.isnull().sum()
```

```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
```

```
titanic_data=titanic_data.drop(columns='Cabin',axis=1)
```

```
titanic_data['Age'].fillna(titanic_data['Age'].mean(),inplace=True)
```

```
titanic_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 11 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
```

```
 0   PassengerId  891 non-null    int64
 1   Survived     891 non-null    int64
 2   Pclass       891 non-null    int64
 3   Name         891 non-null    object
 4   Sex          891 non-null    object
 5   Age          891 non-null    float64
 6   SibSp        891 non-null    int64
 7   Parch        891 non-null    int64
 8   Ticket       891 non-null    object
 9   Fare         891 non-null    float64
 10  Embarked     889 non-null    object
dtypes: float64(2), int64(5), object(4)
memory usage: 76.7+ KB
```

```
titanic_data.isnull().sum()
```

```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Embarked       2
dtype: int64
```

```
print(titanic_data['Embarked'].mode())
```

```
0    S
Name: Embarked, dtype: object
```

```
print(titanic_data['Embarked'].mode()[0])
```

```
S
```

```
titanic_data['Embarked'].fillna(titanic_data['Embarked'].mode()[0],inplace=True)
```

```
titanic_data.isnull()
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Emba
0	False	False	False	False	False	False	False	False	False	False	F
1	False	False	False	False	False	False	False	False	False	False	F
2	False	False	False	False	False	False	False	False	False	False	F
3	False	False	False	False	False	False	False	False	False	False	F
4	False	False	False	False	False	False	False	False	False	False	F
...	...	...	...	...	...	...	...	...	...	...	
886	False	False	False	False	False	False	False	False	False	False	F
887	False	False	False	False	False	False	False	False	False	False	F
888	False	False	False	False	False	False	False	False	False	False	F
889	False	False	False	False	False	False	False	False	False	False	F
890	False	False	False	False	False	False	False	False	False	False	F

891 rows × 11 columns

```
titanic_data.isnull().sum()
```

```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Embarked       0
dtype: int64
```

```
#Anylising the data
```

```
titanic_data.describe()
```

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	891.000000	891.000000	891.000000	891.00000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.20420
std	257.353842	0.486592	0.836071	13.002015	1.102743	0.806057	49.69342
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.00000
25%	223.500000	0.000000	2.000000	22.000000	0.000000	0.000000	7.91040
50%	446.000000	0.000000	3.000000	29.699118	0.000000	0.000000	14.45420
75%	668.500000	1.000000	3.000000	35.000000	1.000000	0.000000	31.00000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.32920

```
titanic_data['Survived'].value_counts()
```

```
Survived
0    549
1    342
Name: count, dtype: int64
```

```
#visualize the data
```

```
sns.set()
```

```
sns.countplot(titanic_data['Survived'])
```

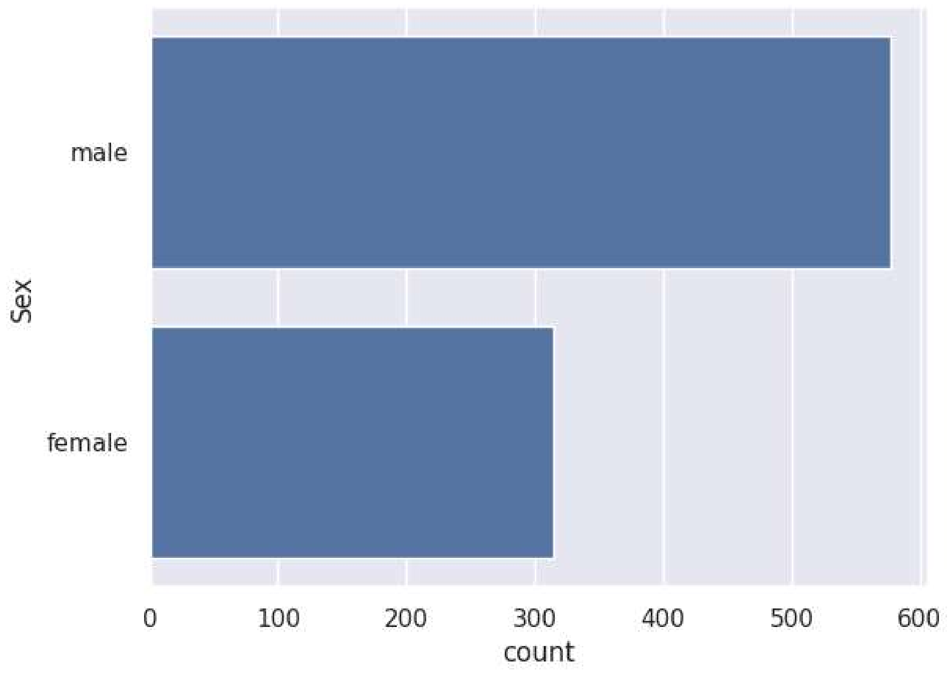
```
<Axes: ylabel='count'>
```

```
titanic_data['Sex'].value_counts()
```

```
Sex
male      577
female    314
Name: count, dtype: int64
```

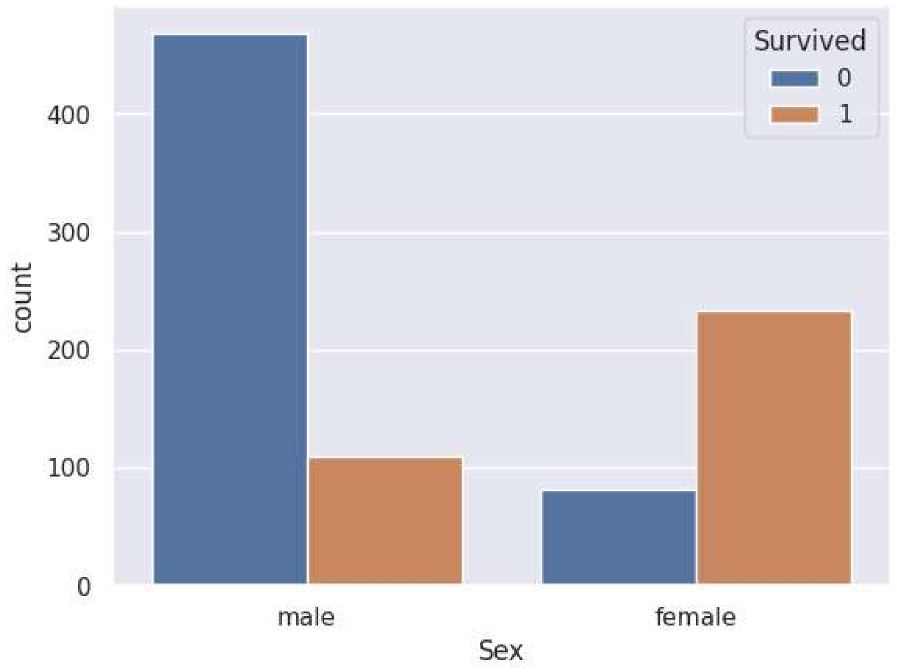
```
sns.countplot(titanic_data['Sex'])
```

```
<Axes: xlabel='count', ylabel='Sex'>
```



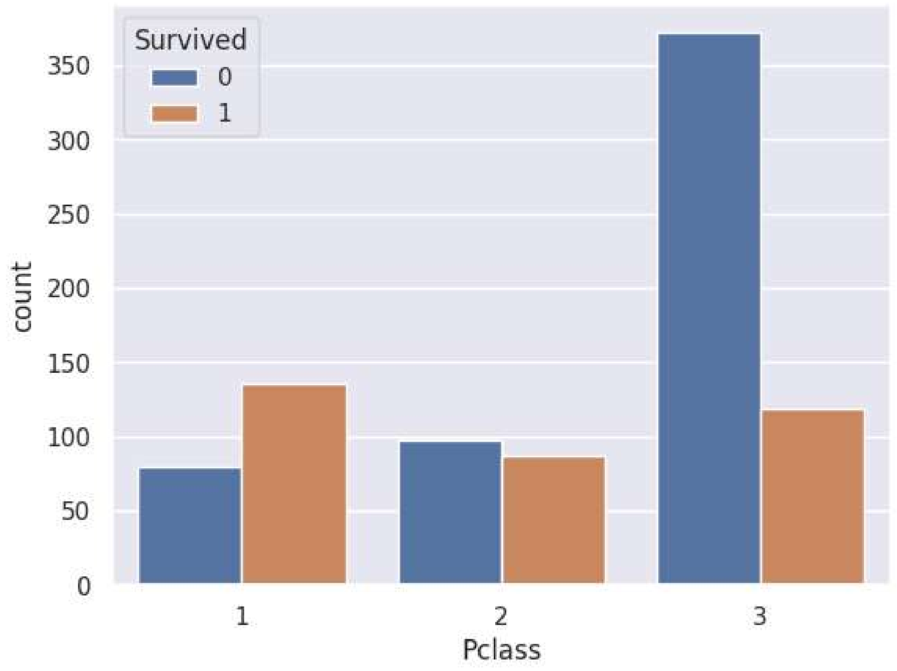
```
sns.countplot(x='Sex',hue='Survived',data=titanic_data)
```

```
<Axes: xlabel='Sex', ylabel='count'>
```



```
sns.countplot(x='Pclass',hue='Survived',data=titanic_data)
```

```
<Axes: xlabel='Pclass', ylabel='count'>
```



```
titanic_data['Embarked'].value_counts()
```

```
Embarked
S    646
C    168
Q     77
Name: count, dtype: int64
```

```
titanic_data['Sex'].value_counts()
```

```
Sex
male      577
```

```
female    314
Name: count, dtype: int64
```

```
titanic_data.replace({'Sex':{'male':0,'female':1}, 'Embarked':{'S':0,'C':1,'Q':2}}, inplace=True)
```

```
X=titanic_data.drop(columns=['PassengerId','Name','Ticket','Survived'],axis=1)
Y=titanic_data['Survived']
```

```
print(X)
```

```
     Pclass  Sex        Age  SibSp  Parch     Fare  Embarked
0         3    0  22.000000      1      0   7.2500         0
1         1    1  38.000000      1      0  71.2833         1
2         3    1  26.000000      0      0   7.9250         0
3         1    1  35.000000      1      0  53.1000         0
4         3    0  35.000000      0      0   8.0500         0
..      ...  ...        ...    ...    ...      ...       ...
886       2    0  27.000000      0      0  13.0000         0
887       1    1  19.000000      0      0  30.0000         0
888       3    1  29.699118      1      2  23.4500         0
889       1    0  26.000000      0      0  30.0000         1
890       3    0  32.000000      0      0   7.7500         2

[891 rows x 7 columns]
```

```
print(Y)
```

```
0      0
1      1
2      1
3      1
4      0
      ..
886    0
887    1
888    0
889    1
890    0
Name: Survived, Length: 891, dtype: int64
```

```
#split the data into test data and train data.
#Now We will be applying machine_learning Algorithms to train this model.
```

```
X_train, X_test, Y_train, Y_test = train_test_split(X,Y, test_size=0.2, random_state=2)
```

```
print(X.shape,X_train.shape,X_test.shape)
```

```
(891, 7) (712, 7) (179, 7)
```

```
model = LogisticRegression()
```

```
#use the train data on logisticregression model
model.fit(X_train, Y_train)
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/linear_model/_logistic.py:458: Converge
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression
  n_iter_i = _check_optimize_result(
 ▾ LogisticRegression
 LogisticRegression()
```

```
X_train_prediction=model.predict(X_train)
```

```
print(X_train_prediction)
```

```
[0 1 0 0 0 0 0 1 0 0 0 1 0 0 1 0 1 0 0 0 0 0 1 0 0 1 0 0 1 0 1 1 0 0 1 0 1
 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1 0 0 0 0 0 0 1 0 1 0 0 1 1 0 0 1 1 0 1 0 0 1
 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 0 1 0 0 0 1 1 1 0 1 0 0 0 0 0 1 0 0 0
 1 1 0 0 1 0 0 1 0 0 1 0 0 1 0 1 0 1 0 1 0 1 1 1 1 1 1 0 0 1 1 1 0 0 1 0 0
 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1 1 1
 0 0 0 1 0 0 0 1 0 0 1 0 0 0 1 1 0 1 0 0 0 0 0 1 1 0 1 1 1 1 0 0 0 0 0 0 0
 0 1 0 0 1 1 1 0 0 1 0 1 1 1 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 1 0 0 0
 0 0 0 0 0 0 1 0 1 0 0 1 0 0 1 0 1 0 1 1 0 0 0 0 1 0 1 0 0 1 0 0 0 1 0 0 0
 0 1 1 0 0 0 0 0 0 1 0 1 0 0 0 0 0 1 1 1 0 0 0 1 0 1 0 0 0 0 0 0 1 1 0 1 1
 0 1 1 1 0 0 0 0 0 0 0 0 0 1 0 0 1 1 1 0 1 0 0 0 0 1 1 0 0 0 1 0 1 1 1 0 0
 0 0 1 0 0 0 1 1 0 0 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 1 0 1 1 1 0 1 1 0 0 0
 0 1 0 1 0 0 1 1 0 0 0 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 1 0 0 0 0 1 1 0 0
 1 0 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 1 0 0 1 0 0 0 1 1 0 1 0
 0 0 0 0 1 0 0 1 0 1 1 0 0 1 0 0 1 0 0 0 1 0 1 1 0 0 1 1 0 1 0 1 1 1 0 1 0
 0 1 0 0 1 0 0 1 0 0 0 0 1 1 0 0 1 0 1 0 0 0 0 0 0 1 1 1 0 0 1 1 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0
 0 0 1 0 0 0 0 0 1 0 1 0 1 0 0 0 1 0 1 1 1 0 0 0 1 0 1 0 0 0 1 1 1 0 0 1 1
 0 0 0 1 0 1 0 0 0 0 0 1 1 0 1 1 1 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 1 0 0 0 0
 1 0 0 1 0 1 0 0 0 1 1 1 1 1 0 0 1 1 0 1 1 1 1 0 0 0 1 1 0 0 1 0 0 0 0 0 0
 0 0 0 1 1 0 0 1 0]
```

```
training_data_accuracy=accuracy_score(Y_train,X_train_prediction)
print("Accuracy Score of the data is:", training_data_accuracy)
```

```
Accuracy Score of the data is: 0.8075842696629213
```

```
X_test_prediction=model.predict(X_test)
```

```
print(X_test_prediction)
```

```
[0 0 1 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 0 1 1 0 1 0 1 1 0 0 0 0 0 0 0 0 1 1
 0 0 0 0 0 1 0 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 0 0 1 0 1 0
 1 0 0 0 1 0 1 0 0 0 1 1 0 0 1 0 0 0 0 0 0 1 0 1 0 0 1 0 1 1 0 1 1 0 0 0 0
 0 0 0 1 1 0 1 0 0 1 0 0 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 0 0 1 1 1 1 0 1 0 0
 0 1 0 0 0 0 1 0 0 1 1 0 1 0 0 0 1 1 0 0 1 0 0 1 1 1 0 0 0 0 0]
```

```
test_data_accuracy=accuracy_score(Y_test,X_test_prediction)
print("Accuracy Score of the data is:", test_data_accuracy)
```

```
Accuracy Score of the data is: 0.7821229050279329
```

```
import joblib
joblib.dump(model, 'Logistic_regression_model.pkl')
```

```
['Logistic_regression_model.pkl']
```

```
!pip install pyngrok

import subprocess
import os
from pyngrok import ngrok
#setup ngrok with authtoken

ngrok.set_auth_token("2gXl1v2iYPxev6lzNuiDzoGbyTW_28dtd7BFR6ZkoDrtT5c8R")

#running flask app
os.system("nohup python -m flask run --no-reload &")

#opening ngrok tunnel to the flask app uding http protocol
proc = subprocess.Popen(["ngrok", "http", "5000"])

#Retrive ngrok's public url here
public_url = ngrok.connect(addr="5000", proto="http")
print("Public URL:", public_url)
```

```
Requirement already satisfied: pyngrok in /usr/local/lib/python3.10/dist-packages (7.1.6)
Requirement already satisfied: PyYAML>=5.1 in /usr/local/lib/python3.10/dist-packages (from pyngrok) (6.0.1)
Public URL: NgrokTunnel: "https://fba2-34-16-178-191.ngrok-free.app" -> "http://localhost:5000"
```

```
from flask import Flask, request, jsonify
import joblib
from pyngrok import ngrok
from IPython.display import display, HTML

# Load the trained model
model = joblib.load('Logistic_regression_model.pkl')

app = Flask(__name__)

@app.route('/')
def home():
    # HTML form to take inputs
    html_form = """
    <!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Titanic Survival Prediction</title>
    <style>
        body {
            background-color: black;
            color: white;
            font-family: Arial, sans-serif;
            text-align: center;
            padding: 20px;
        }
        #predictionForm {
            display: inline-block;
            text-align: left;
        }
        img {
            max-width: 100%;
            height: auto;
        }
    </style>
</head>
<body>
    <h2>Titanic Survival Prediction</h2>
    <form id="predictionForm" method="post" action="/predict">
        <label for="pclass">Pclass:</label>
        <input type="text" id="pclass" name="pclass"><br><br>
        <label for="sex">Sex (0 for male, 1 for female):</label>
        <input type="text" id="sex" name="sex"><br><br>

        <label for="age">Age:</label>
        <input type="text" id="age" name="age"><br><br>

        <label for="sibsp">SibSp:</label>
        <input type="text" id="sibsp" name="sibsp"><br><br>

        <label for="parch">Parch:</label>
        <input type="text" id="parch" name="parch"><br><br>

        <label for="fare">Fare:</label>
        <input type="text" id="fare" name="fare"><br><br>

        <label for="embarked">Embarked (0 for S, 1 for C, 2 for Q):</label>
        <input type="text" id="embarked" name="embarked"><br><br>

        <button type="button" onclick="predictSurvival()">Predict</button>
    </form>

    <p id="predictionResult"></p>

    <img src="https://upload.wikimedia.org/wikipedia/commons/thumb/f/fd/RMS_Titanic_3.jpg/800px-RMS_Titanic_3.jpg" alt='

    <script>
        function predictSurvival() {
            var xhr = new XMLHttpRequest();
            var url = "/predict";
            var data = new FormData(document.getElementById("predictionForm")); // Changed to FormData

            xhr.open("POST", url, true);
            xhr.onreadystatechange = function () {
                if (xhr.readyState === 4 && xhr.status === 200) {
                    var response = JSON.parse(xhr.responseText);
                    document.getElementById("predictionResult").innerHTML = "Survival Prediction: " + response.predictic
                }
            };
            xhr.send(data);
        }
    </script>
</body>
</html>

    """
    return html_form

@app.route('/predict', methods=['POST'])
def predict():
    # Access form data
    pclass = request.form['pclass']
    sex = request.form['sex']
    age = request.form['age']
    sibsp = request.form['sibsp']
    parch = request.form['parch']
    fare = request.form['fare']
    embarked = request.form['embarked']

    # Convert data to appropriate types
    pclass = int(pclass)
    sex = int(sex)
    age = float(age)
    sibsp = int(sibsp)
    parch = int(parch)
    fare = float(fare)
```

```
        embarked = int(embarked)

        # Make prediction
        features = [[pclass, sex, age, sibsp, parch, fare, embarked]]
        prediction = model.predict(features)[0]

        return jsonify({'prediction': int(prediction)})

    def run_flask_app():
        # Run Flask app on port 5000
        app.run(host='127.0.0.1', port=5000, debug=True, use_reloader=False)

    # Start ngrok tunnel
    public_url = ngrok.connect(addr="5000", proto="http")
    print("Public URL:", public_url)

    # Display ngrok tunnel URL
    display(HTML(f"<h2>Open this link in your browser to access the application:</h2><p>{public_url}</p>"))

    try:
        # Keep the Flask app running
        run_flask_app()
    except KeyboardInterrupt:
        # Shutdown ngrok and Flask app
        ngrok.kill()
```

```
Public URL: NgrokTunnel: "https://dcde-34-16-178-191.ngrok-free.app" -> "http://localhost:5000"
```

Open this link in your browser to access the application:

NgrokTunnel: "https://dcde-34-16-178-191.ngrok-free.app" -> "http://localhost:5000"

```
 * Serving Flask app '__main__'
 * Debug mode: on
INFO:werkzeug:WARNING: This is a development server. Do not use it in a production deployment. Use a production WS
 * Running on http://127.0.0.1:5000
INFO:werkzeug:Press CTRL+C to quit
INFO:werkzeug:127.0.0.1 - - [16/May/2024 09:32:21] "GET / HTTP/1.1" 200 -
INFO:werkzeug:127.0.0.1 - - [16/May/2024 09:32:23] "GET /favicon.ico HTTP/1.1" 404 -
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439: UserWarning: X does not have valid feature names, but
  warnings.warn(
INFO:werkzeug:127.0.0.1 - - [16/May/2024 09:33:16] "POST /predict HTTP/1.1" 200 -
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439: UserWarning: X does not have valid feature names, but
  warnings.warn(
INFO:werkzeug:127.0.0.1 - - [16/May/2024 09:33:48] "POST /predict HTTP/1.1" 200 -
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439: UserWarning: X does not have valid feature names, but
```