**EXPT NO : 3 A python program to implement Logistic Model**

**DATE: 6/09/2024**

**AIM:**

To write a python program to implement a Logistic Model.

**PROCEDURE:**

Implementing Logistic method using the iris dataset involve the following steps:

**Step 1: Import Necessary Libraries**

First, import the libraries that are essential for data manipulation, visualization, and model building.

```
# Step 1: Import Necessary Libraries import numpy as

np import pandas as pd import matplotlib.pyplot as

plt from sklearn.model_selection import

train_test_split from sklearn.linear_model import

LogisticRegression

from sklearn.metrics import accuracy_score, confusion_matrix,
classification_report
```

**Step 2: Load the Iris Dataset** The

iris dataset can be loaded.

```
# Step 2: Load the Dataset

# For this example, we'll use a built-in dataset from sklearn. You can
replace it with your dataset.

from sklearn.datasets import load_iris
```

```
# Load the iris dataset

data = load_iris()

X = data.data

y = (data.target == 0).astype(int) # For binary classification (classifying
Iris-setosa)
```

### Step 3: Data Preprocessing

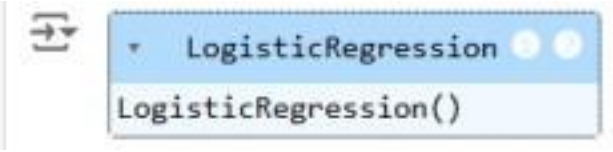
Ensure the data is clean and ready for modeling. Since the Iris dataset is clean, minimal preprocessing is needed.

```
# Step 3: Prepare the Data

# Split the dataset into training and testing sets

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)
```

### Step 4 : Train a Model

```
# Step 4: Create and Train the Model

model = LogisticRegression()

model.fit(X_train, y_train)
```

### OUTPUT :




### Step 5 : Make Predictions

Use the model to make predictions based on the independent variable.

```
# Step 5: Make Predictions
y_pred = model.predict(X_test)
```

## Step 6 : Evaluate the Model

Evaluate the model performance.

```
# Step 6: Evaluate the Model accuracy =

accuracy_score(y_test, y_pred) conf_matrix =

confusion_matrix(y_test, y_pred) class_report =

classification_report(y_test, y_pred)

# Print evaluation metrics

print(f"Accuracy: {accuracy}")

print("Confusion Matrix:")

print(conf_matrix)

print("Classification Report:")

print(class_report)
```

## OUTPUT :

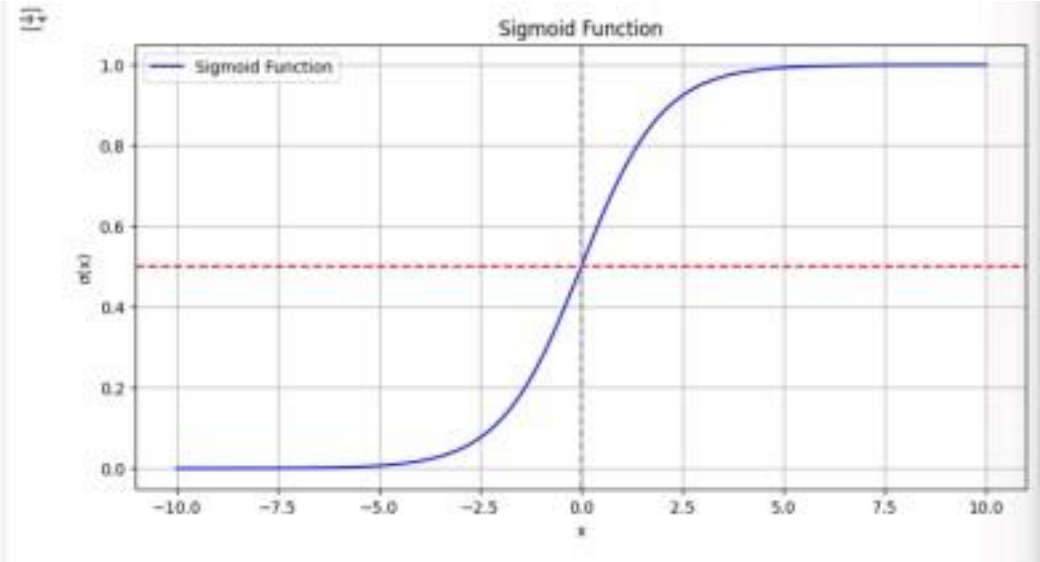
```
Accuracy: 1.0
Confusion Matrix:
[[20  0]
 [ 0 10]]
Classification Report:
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        20
           1       1.00      1.00      1.00        10

    accuracy                           1.00        30
   macro avg       1.00      1.00      1.00        30
weighted avg       1.00      1.00      1.00        30
```

## Step 7 :Visualize the Results

Plot the original data points and the fitted regression line.

```
# Step 7: Visualize Results (Optional)

x_values = np.linspace(-10, 10, 100)
sigmoid_values = 1 / (1 + np.exp(-x_values)) #
Plot the sigmoid function plt.figure(figsize=(10,
5)) plt.plot(x_values, sigmoid_values,
label='Sigmoid Function', color='blue')
plt.title('Sigmoid Function')
plt.xlabel('x') plt.ylabel('σ(x)') plt.grid()

plt.axhline(0.5, color='red', linestyle='--') # Line at

y=0.5 plt.axvline(0, color='gray', linestyle='--') # Line at

x=0 plt.legend()

plt.show()
```

**OUTPUT :**




**RESULT:**

This step-by-step process will help us to implement Logistic models using the Iris dataset and analyze their performance.