How can I plot a logistic regression curve using Python?

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To create a logistic regression curve using Python, one can follow these steps:

1. Import the necessary libraries such as numpy, pandas, and sklearn.
2. Load the dataset that will be used for the logistic regression analysis.
3. Preprocess the data by handling missing values, converting categorical variables into numerical, and splitting the data into training and testing sets.
4. Train the logistic regression model using the training data.
5. Use the trained model to make predictions on the testing data.
6. Calculate the accuracy of the model by comparing the predicted values with the actual values.
7. Use the predicted values and the corresponding actual values to plot the logistic regression curve using the matplotlib library.
8. Customize the plot by adding labels, titles, and legends to make it more informative and visually appealing.
9. Analyze the curve and make interpretations about the relationship between the independent and dependent variables.
10. Save the plot for future reference or further analysis.

In summary, plotting a logistic regression curve using Python involves loading and preprocessing the data, training and evaluating the model, and using the predicted values to create a visual representation of the relationship between the variables.

Plot a Logistic Regression Curve in Python

You can use the function from the seaborn data visualization library to plot a logistic regression curve in Python:

import seaborn as sns

sns.regplot(x=x, y=y, data=df, logistic=True, ci=None)

The following example shows how to use this syntax in practice.

Example: Plotting a Logistic Regression Curve in Python

For this example, we'll use the Default dataset from the Introduction to Statistical Learning book. We can use the following code to load and view a summary of the dataset:

```
#import dataset from CSV file on Github
url = "https://raw.githubusercontent.com/Statology/Python-Guides/main/default.csv"
data = pd.read_csv(url)
#view first six rows of dataset
data
```

```
default student balance income
0 0 0 729.526495 44361.625074
1 0 1 817.180407 12106.134700
2 0 0 1073.549164 31767.138947
3 0 0 529.250605 35704.493935
4 0 0 785.655883 38463.495879
5 0 1 919.588530 7491.558572
```

This dataset contains the following information about 10,000 individuals:

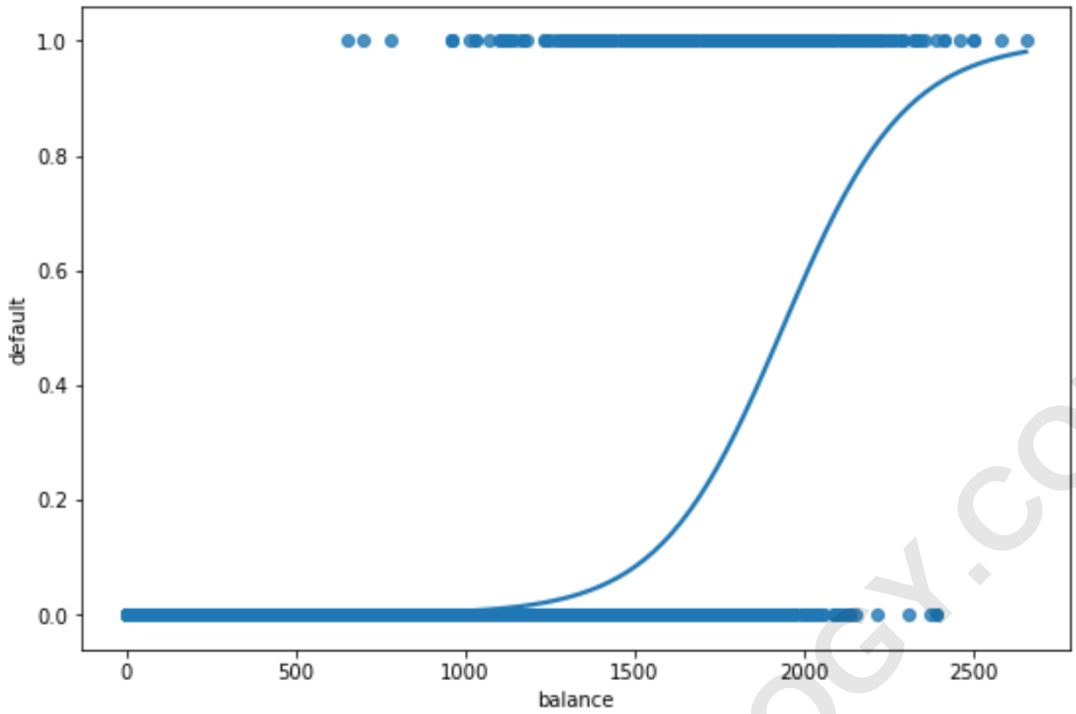
default: Indicates whether or not an individual defaulted.student: Indicates whether or not an individual is a student.balance: Average balance carried by an individual.income: Income of the individual.

Suppose we would like to build a logistic regression model that uses "balance" to predict the probability that a given individual defaults.

We can use the following code to plot a logistic regression curve:

```
#define the predictor variable and the response variable
x = data
y = data

#plot logistic regression curve
sns.regplot(x=x, y=y, data=data, logistic=True, ci=None)
```



The x-axis shows the values of the predictor variable "balance" and the y-axis displays the predicted probability of defaulting.

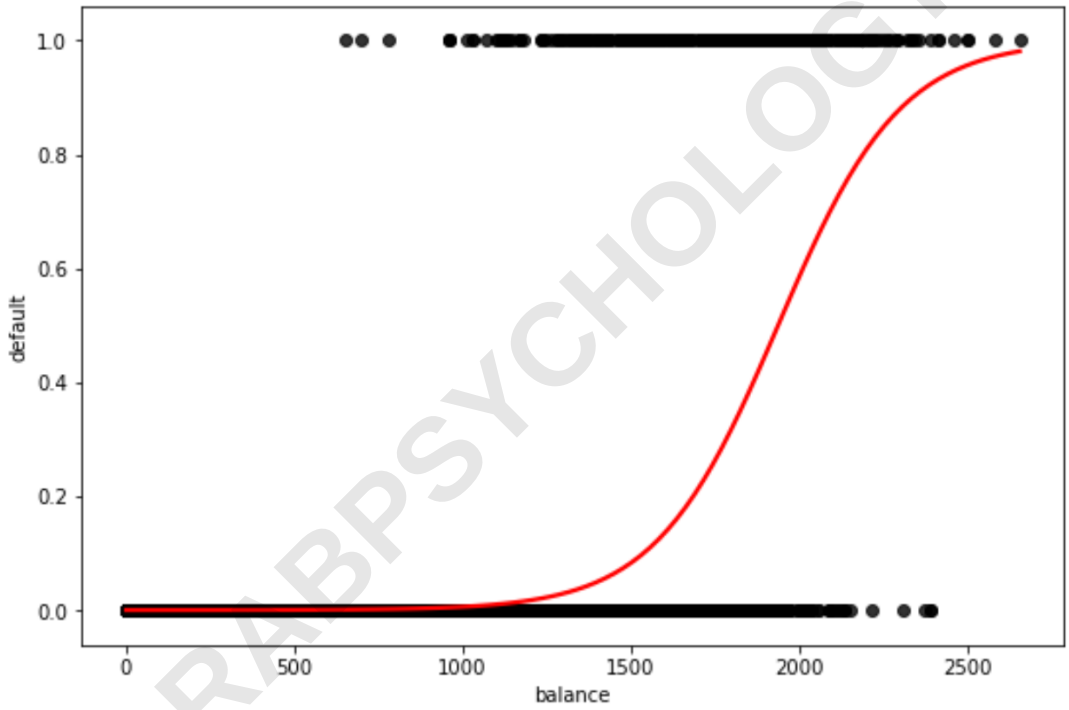
We can clearly see that higher values of balance are associated with higher probabilities that an individual defaults.

Note that you can also use scatter_kws and line_kws to modify the colors of the points and the curve in the plot:

#define the predictor variable and the response variable
x = data

```
y = data

#plot logistic regression curve with black points and red line
sns.regplot(x=x, y=y, data=data, logistic=True, ci=None),
scatter_kws={'color': 'black'}, line_kws={'color': 'red'})
```



Additional Resources

The following tutorials provide additional information about logistic regression: