Univariate Linear Regression in Python

Univariate Linear Regression:

Linear Regression is an algorithmic method for finding linear relationships between predictable (independent) and target (dependent) variables (i.e. x and y). The LR model attempts to fit a line that specifies the relationship between x and y. Unwriting the line with a single forecast or independent variable is called Univariate Linear Regression.

The equation given below is used to show the Linear Regression model:
$y = mx + c + e$
Where m is the line slope, c breaks(intercepts), and e represents an error in the model.

Implementation:

Implementation on diabetes dataset(regression dataset) univariate linear regression as follows,

Load dataset and important libraries:

In this section we import important libraries like numpy, pandas, matplotlib, import dataset, accuracy and linear regression model as follows,

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.datasets import load_diabetes
from sklearn.model_selection import train_test_split
from sklearn.metrics import r2_score
from sklearn.linear_model import LinearRegression
```

Split dataset for training and testing purpose:

Here we have chosen single independent variable(x) and single dependent variable(y)

```
x,y = load_diabetes(return_X_y=True)
x = x[:, np.newaxis, 2]#univariate x(single independent variable)
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.20
,random_state=32)
```

Create the model, train the model and predict for testing data:

In this section we train our linear model on training dataset and test on testing dataset,

```
model=LinearRegression()
model.fit(x_train,y_train)
y_pred=model.predict(x_test)
```

Evaluation:

Generate the R2 score of each model as follows,

```
r2_score = model.score(x_test,y_test)
print("Univariate Linear Regression Score",r2_score*100,'%')
```

Output:

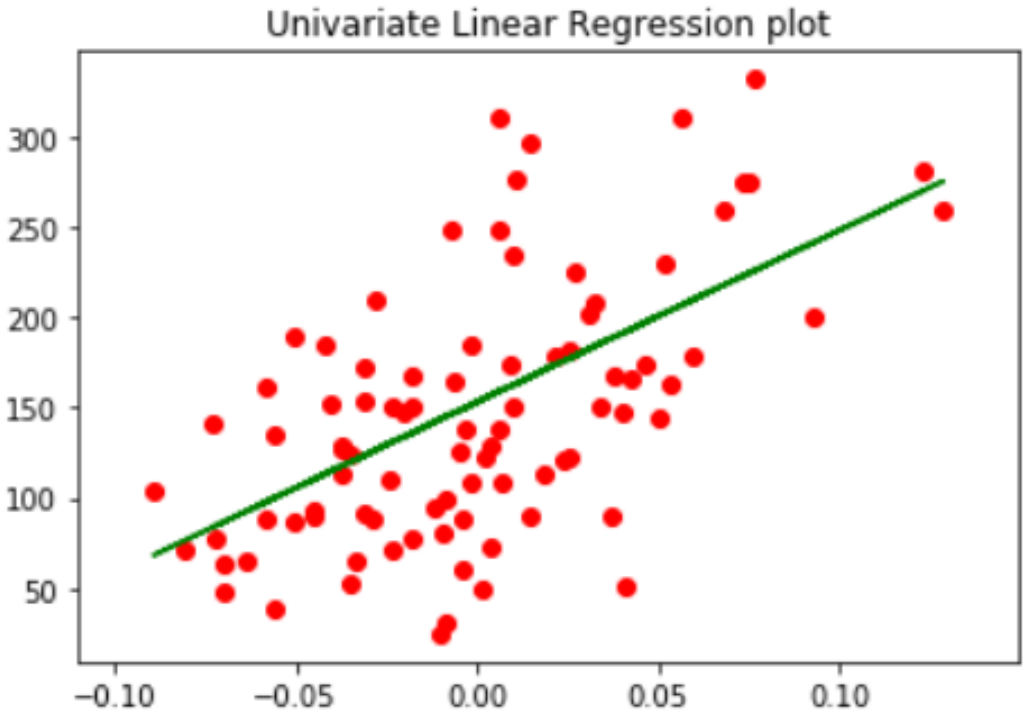
```
Univariate Linear Regression Score 33.3423573361 %
```

Regression model plot:

Univariate Linear Regression plot using scatterplot as follows,

```
import matplotlib.pyplot as plt
plt.scatter(x_test,y_test, color='red')
plt.title("Univariate Linear Regression plot")
plt.plot(x_test, y_pred, color='green')
plt.show()
```

Output:



Hence from above visualization Univariate Linear Regression predicted very well.