Question: Use abline Function in Matplotlib

Authored by

stats writer

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The abline function in Matplotlib is used to add a line to a graph. It takes two parameters, the slope and intercept, and it draws a line with the given slope and intercept on the current axes. This line can be used to show the linear relationship between two variables or make a comparison between two different sets of data on the same chart. It can also be used to highlight a trend in the data. Abline is a useful tool to help visualise data and draw conclusions quickly and easily.

The function in R can be used to add a straight line to a plot.

Unfortunately this function doesn't exist in Matplotlib, but we can define the following function to replicate the abline function in Python:

```
import matplotlib.pyplot as plt
import numpy as np

def abline(slope, intercept):
axes = plt.gca()
x_vals = np.array(axes.get_xlim())
y_vals = intercept + slope * x_vals
plt.plot(x_vals, y_vals, '--')
```

The following examples show how to use this syntax in practice with the following pandas DataFrame:

```
import pandas as pd

#create DataFrame
df = pd.DataFrame({'x': ,
'y': })

#view first five rows of DataFrame
df.head()
```

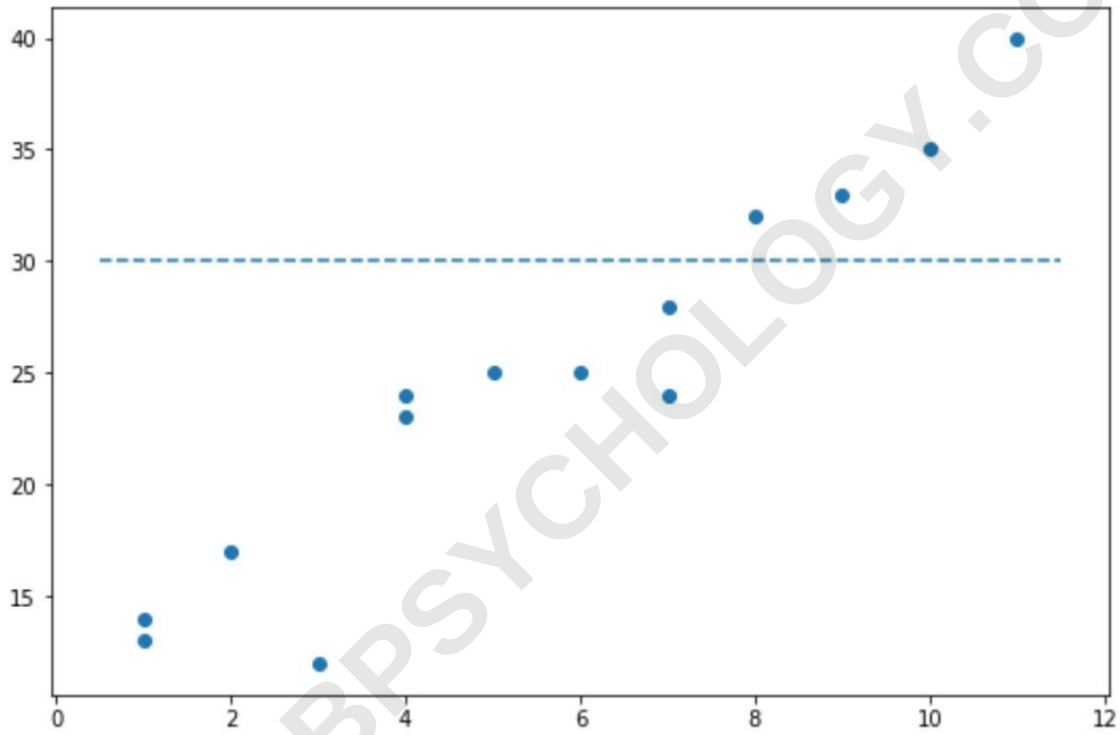
x y
0 1 13
1 1 14
2 2 17
3 3 12
4 4 23

Example 1: Use abline to Plot Horizontal Line

We can use the following code to plot a horizontal line with the **abline** function defined earlier:

#create scatterplot
plt.scatter(df.x, df.y)

#add horizontal line at y=30
abline(0, 30)



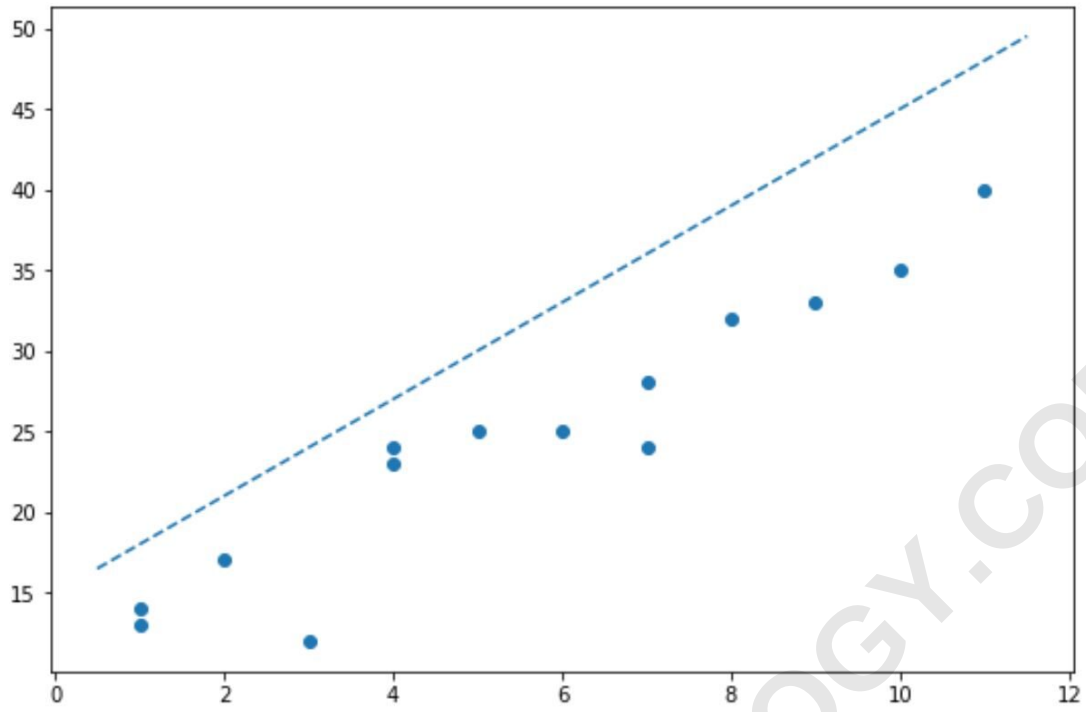
The result is a horizontal line at y=30.

Example 2: Use abline to Plot Line with Specific Slope & Intercept

We can use the following code to plot a straight line with a slope of **3** and an intercept of **15**:

#create scatterplot
plt.scatter(df.x, df.y)

#add straight line with slope=3 and intercept=15
abline(3, 15)



The result is a straight line with a slope of 3 and an intercept of 15.

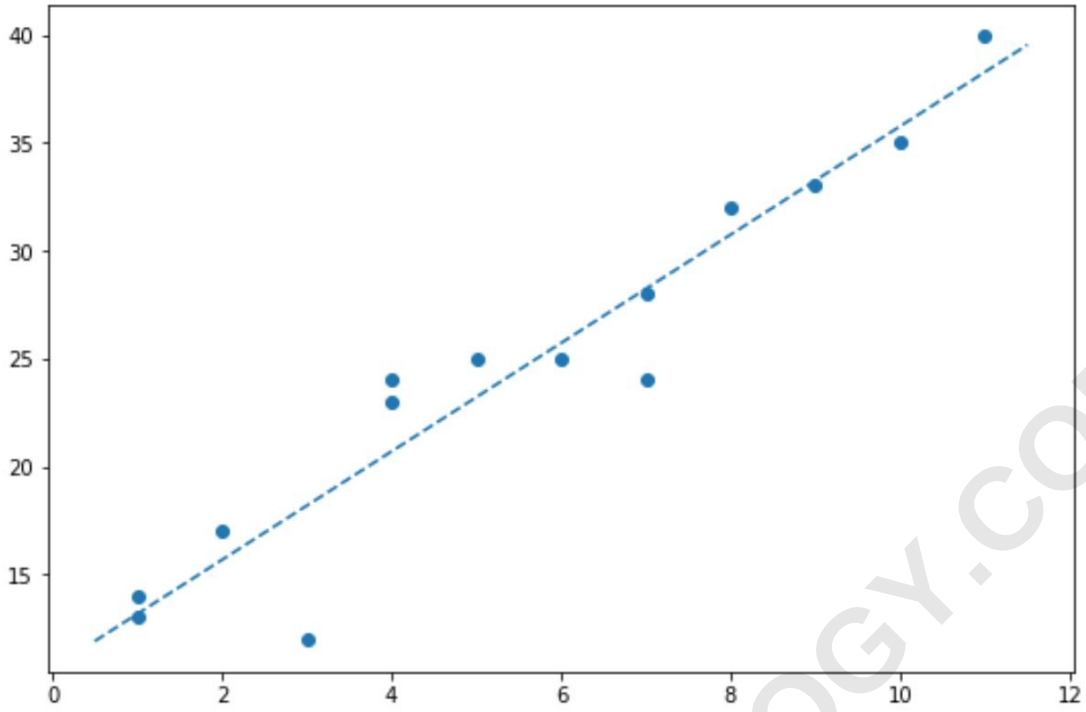
Example 3: Use abline to Plot Regression Line

We can use the following code to plot a regression line with the **abline** function defined earlier:

#calculate slope and intercept of regression line
slope = np.polyfit(df.x, df.y,1)
intercept = np.polyfit(df.x, df.y,1)

#create scatterplot
plt.scatter(df.x, df.y)

#add regression line
abline(slope, intercept)



The result is a fitted regression line that runs directly through the points in the plot.

Note: You can find the complete documentation for the **polyfit** function in NumPy .