assignment06

November 8, 2018

This script demonstrates Line of best fit, using line fitting algorithm

Name : Ji-Su Lee

Student ID : 20141718

github link : https://github.com/Jisu-Lee/HII

import packages for plotting graphs and manipulating data

```
In [ ]: import numpy as np
        import matplotlib.pyplot as plt
```

setting variables

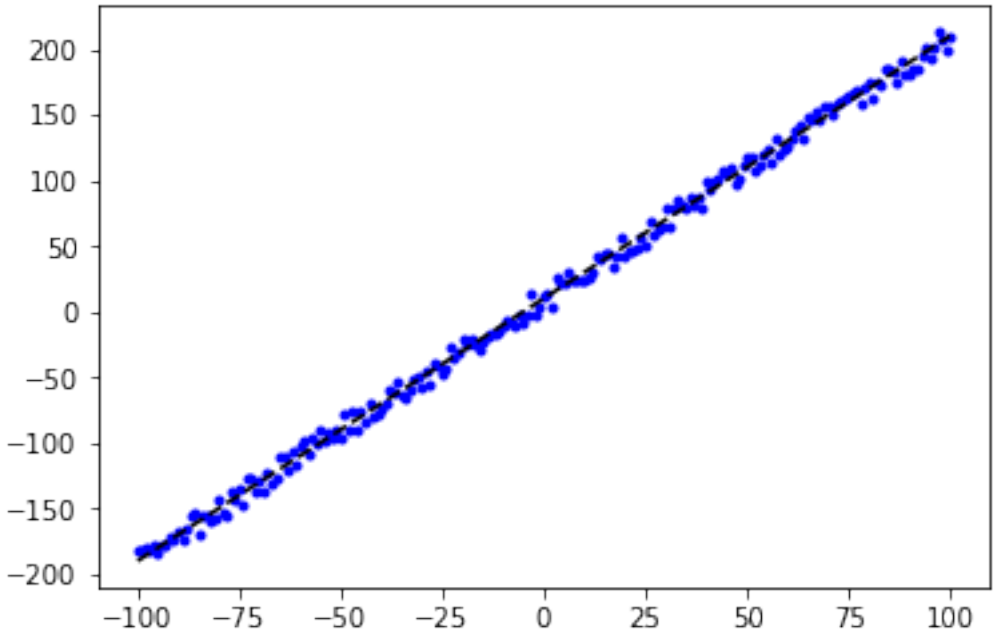
```
In [26]: num     = 201
         std     = 20
         a       = 2
         b       = 10

         # x  : x-coordinate data
         # y1 : (noisy) y-coordinate data
         # y2 : (clean) y-coordinate data
         # y = f(x) = a * x + b
         n       = np.random.rand(num)
         nn      = n - np.mean(n)
         x       = np.linspace(-100,100,num)
         y1      = a * x + nn * std + b
         y2      = a * x + b
```

show noisy data and clean data

blue dot : noisy data

black line : clean data

```
In [31]: plt.plot(x, y1, 'b.', x, y2, 'k--')
         plt.show()
```



calculate slope of the line of best fit

```
In [32]: xm = np.mean(x)
         ym = np.mean(y)
         xt = [t - xm for t in x]
         yt = [u - ym for u in y1]
         af = np.sum(np.multiply(xt, yt)) \
                 /float(np.sum(np.square([t - xm for t in x])))
```

calculate y-intercept

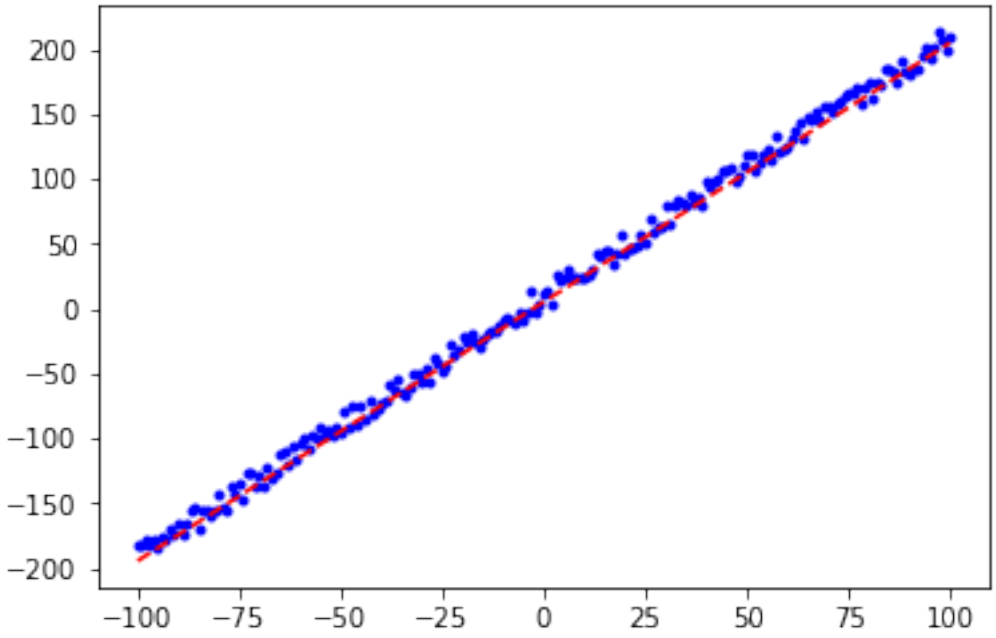
```
In [33]: bf = ym - af*xm
```

let me show the line of best fit

blue dot : noisy data

red line : best fit

```
In [30]: y3 = af * x + bf
         plt.plot(x, y1, 'b.', x, y3, 'r--')
         plt.show()
```



this is the funtion of line of best fit

```
In [34]: print(str(af) + "x + " + str(bf))
```

```
1.9967109533073408x + 5.0
```