

r-regression-with-gradient-descent

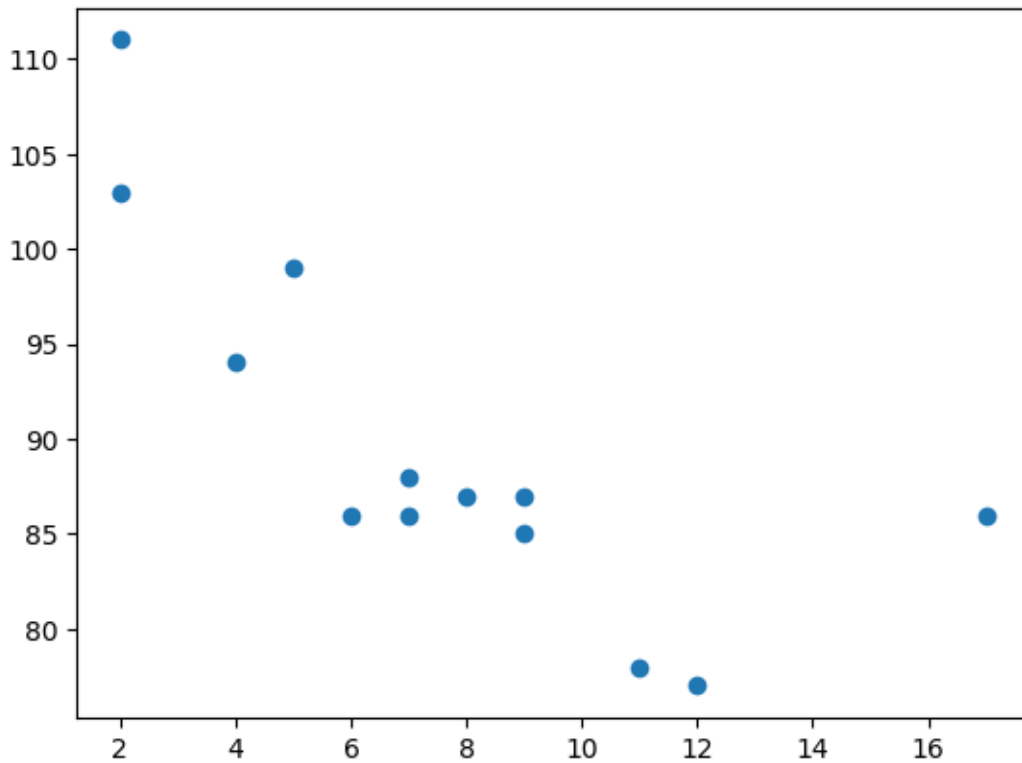
November 10, 2024

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[1]: # gradient_descent - In the gradient descent function we will make the
    ↪ prediction on a dataset and compute the difference between the predicted and
    ↪ actual target value and accordingly we will update the parameter and hence
    ↪ it will return the updated parameter.
    # compute_predictions - In this function, we will compute the prediction using
    ↪ the parameters at each iteration.
    # compute_gradient - In this function we will compute the error which is the
    ↪ difference between the actual and predicted target value and then compute
    ↪ the gradient using this error and training data.
    # update_parameters - In this separate function we will update the parameter
    ↪ using learning rate and gradient that we got from the compute_gradient
    ↪ function.
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[2]: import numpy as np
    import matplotlib.pyplot as plt
```

```
[3]: x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
    y = [99,86,87,88,111,86,103,87,94,78,77,85,86]
```

```
[4]: plt.scatter(x,y)
    plt.show()
```



```
[5]: def ypred(slope,intercept,x):  
      yp=intercept+x*slope  
      return yp
```

```
[6]: def cost(x,y,sl,inter):  
      n=len(x)  
      sum=0  
      for i in range(n):  
          yp=ypred(sl,inter,x[i])  
          sum=sum+(yp-y[i])**2  
      c=0.5*sum/n  
      return c
```

```
[7]: def errrinter(x,y,sl,inter):  
      sum=0  
      n=len(x)  
      for i in range(n):  
          yp=ypred(sl,inter,x[i])  
          sum=sum+(yp-y[i])  
      return sum
```

```
[8]: def errrslope(x,y,sl,inter):
    sum=0
    n=len(x)
    for i in range(n):
        yp=ypred(sl,inter,x[i])
        sum=sum+(yp-y[i])*x[i]
    return sum
```

```
[9]: def gd(x,y,lr):
    slope=-1;
    intercept=100
    c=cost(x,y,slope,intercept)
    #while c>0.00005:
    for epoch in range(500):
        intercept=intercept-lr*errrinter(x,y,slope,intercept)/len(x)
        slope=slope-lr*errrslope(x,y,slope,intercept)/len(x)
        print("Epoch ",epoch,slope,intercept)
        c=cost(x,y,slope,intercept)
    return slope,intercept
```

```
[10]: sl,inter=gd(x,y,0.01)
```

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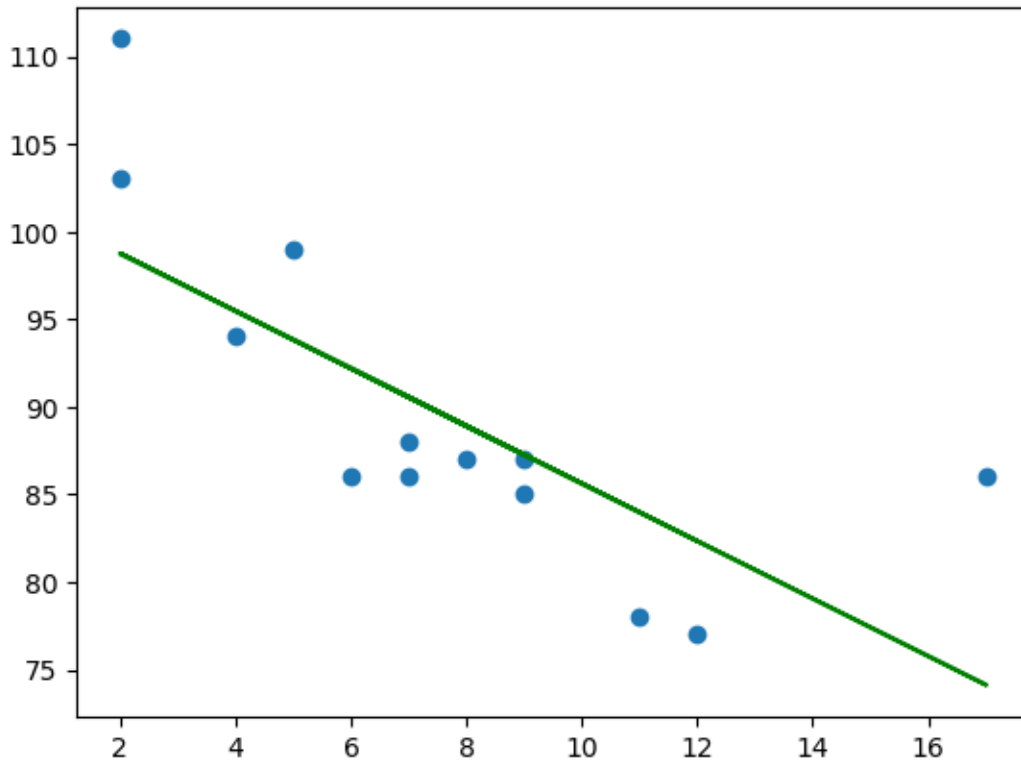
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```

```
[11]: print(sl,inter)
```

```
-1.6416318718853449 102.04011795205749
```

```
[12]: yp=[]
      for i in range(len(x)):
          yi=ypred(sl,inter,x[i])
          yp.append(yi)
```

```
[13]: plt.scatter(x,y)
      plt.plot(x,yp,c='g')
      plt.show()
```



```
[14]: def sse(x,y,sl,inter):
      n=len(x)
      sum=0
      for i in range(n):
          yp=ypred(sl,inter,x[i])
          sum=sum+(yp-y[i])**2
      return sum
```

```
[15]: def varerr(y):
      ymean=np.mean(y)
      n=len(y)
      sum=0
      for i in range(n):
```

```
    sum=sum+(y[i]-ymean)**2  
    return sum
```

```
[16]: def rsquared(x,y,slope,intercept):  
        r=1-sse(x,y,slope,intercept)/ varerr(y)  
        return r
```

```
[17]: rsquared(x,y,s1,inter)
```

```
[17]: 0.5725836702696371
```

```
[ ]:
```

```
[ ]:
```