Polynomial Regression

October 17, 2021

1 Polynomial Regression

1.1 Importing the Libraries

[2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

[11]:
```
from sklearn.model_selection import train_test_split
```

[13]:
```
from sklearn.linear_model import LinearRegression
```

[17]:
```
from sklearn.preprocessing import PolynomialFeatures
```

1.2 Importing the data set

[3]:
```
dataset = pd.read_csv("Position_Salaries.csv")
```

[5]:
```
print(dataset)
```

```
            Position  Level   Salary
0   Business Analyst      1    45000
1  Junior Consultant      2    50000
2  Senior Consultant      3    60000
3            Manager      4    80000
4    Country Manager      5   110000
5     Region Manager      6   150000
6            Partner      7   200000
7     Senior Partner      8   300000
8            C-level      9   500000
9                CEO     10  1000000
```

[6]:
```
x = dataset.iloc[:,1:-1].values
y = dataset.iloc[:,-1].values
```

[7]:
```
print(x)
```

```
[[ 1]
 [ 2]
```

```
 [ 3]
 [ 4]
 [ 5]
 [ 6]
 [ 7]
 [ 8]
 [ 9]
 [10]]
```

[10]:
```
print(y)
```

```
[  45000   50000   60000   80000  110000  150000  200000  300000  500000
 1000000]
```

1.3 Spliting dataset into training and testing set

[12]:
```
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.2,␣
↪random_state = 0)
```

1.4 Training the Linear Regression model on the whole dataset

[15]:
```
linear_Regressor = LinearRegression()
linear_Regressor.fit(x,y)
```

[15]:
```
LinearRegression()
```

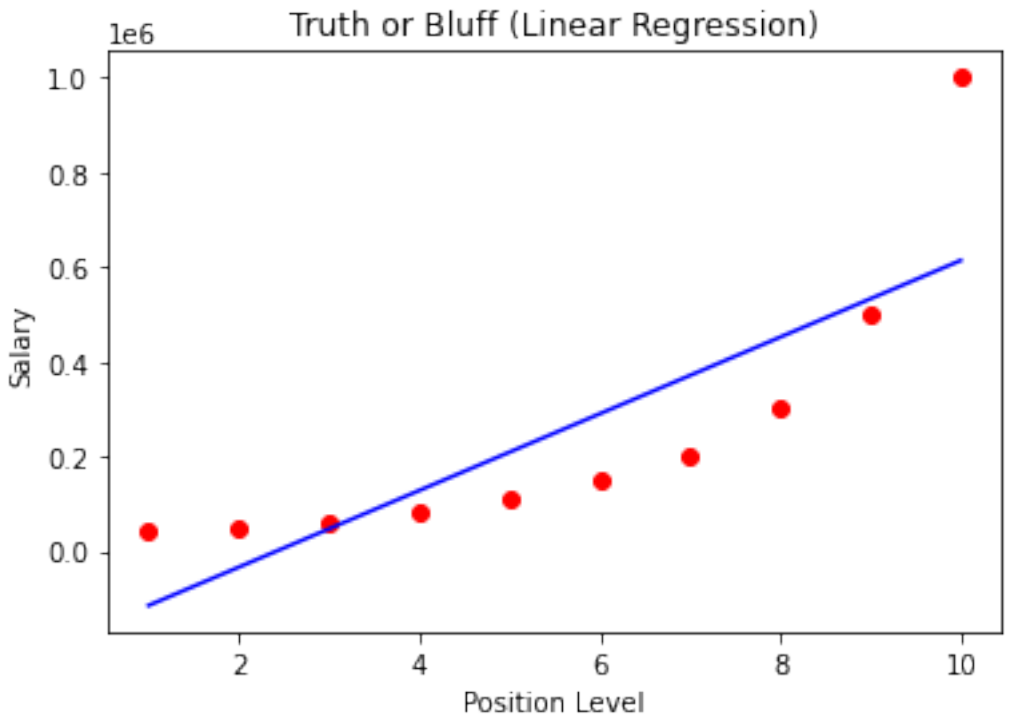
1.5 Training the Polynomial Regression model on the whole dataset

[19]:
```
poly_reg = PolynomialFeatures(degree = 2)
x_poly= poly_reg.fit_transform(x)
linear_Reg = LinearRegression()
linear_Reg.fit(x_poly,y)
```

[19]:
```
LinearRegression()
```

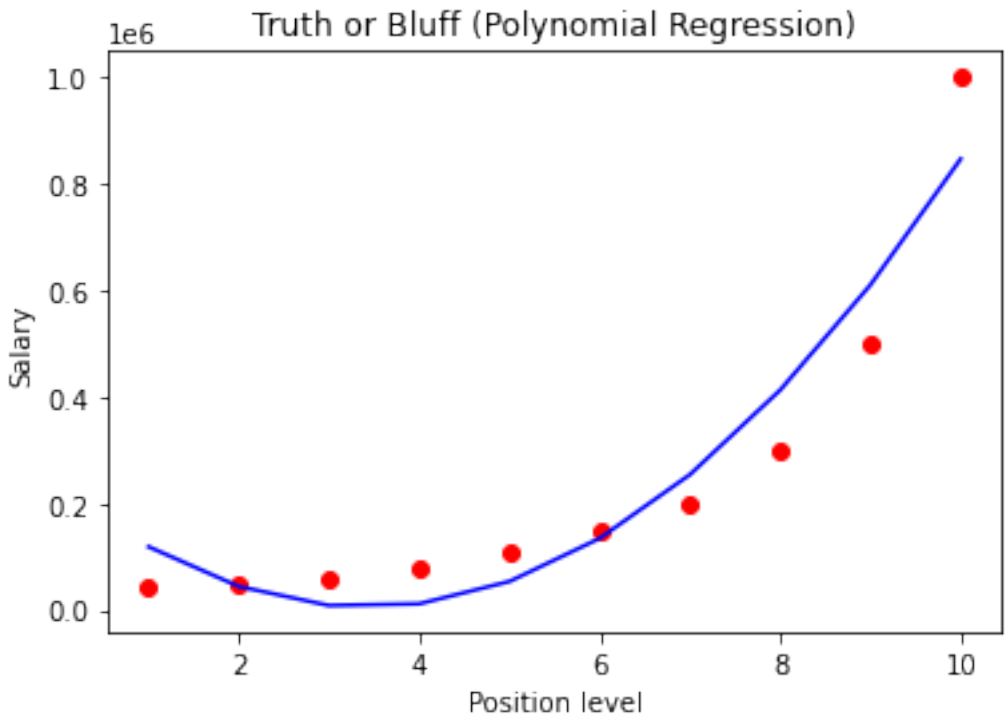
1.6 Visualising the Linear Regression results

[23]:
```
plt.scatter(x, y, color = 'red')
plt.plot(x, linear_Regressor.predict(x), color = 'blue')
plt.title('Truth or Bluff (Linear Regression)')
plt.xlabel('Position Level')
plt.ylabel('Salary')
plt.show()
```



1.7 Visualising the Polynomial Regression result

[24]:
```
plt.scatter(x, y, color = 'red')
plt.plot(x, linear_Reg.predict(poly_reg.fit_transform(x)), color = 'blue')
plt.title('Truth or Bluff (Polynomial Regression)')
plt.xlabel('Position level')
plt.ylabel('Salary')
plt.show()
```



1.8 Predicting a new result with Linear Regression

[26]:
```
linear_Regressor.predict([[6.5]])
```

[26]:
```
array([330378.78787879])
```

1.9 Predicting a new result with Polynomial Regression

[28]:
```
linear_Reg.predict(poly_reg.fit_transform([[6.5]]))
```

[28]:
```
array([189498.10606061])
```

thus you can see difference in polynominal regression and linear Regression, prediction using polynominal in more accurate