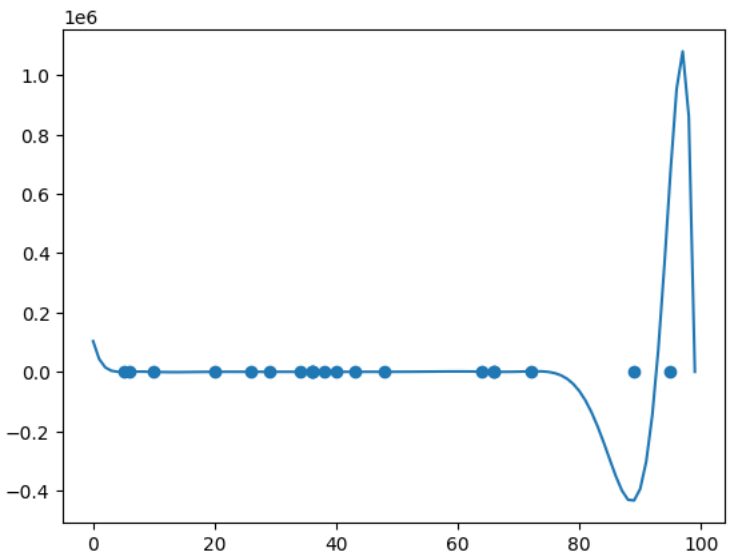
Bad Fit

```
import numpy as np
import matplotlib.pyplot as plt
x=[89,43,36,36,95,10,66,34,38,20,26,29,48,64,6,5,36,66,72,40]
y=[21,46,3,35,67,95,53,72,58,10,26,34,90,33,38,20,56,2,47,15]
model = np.poly1d(np.polyfit(x,y,15)) # 3 degree curve
myline = np.linspace(1,95,100) # 100 is showing no of sample point
plt.scatter(x,y)
plt.plot(model(myline))
plt.show()

```




```
# R square value
from sklearn.metrics import r2_score
print(r2_score(y,model(x)))
```

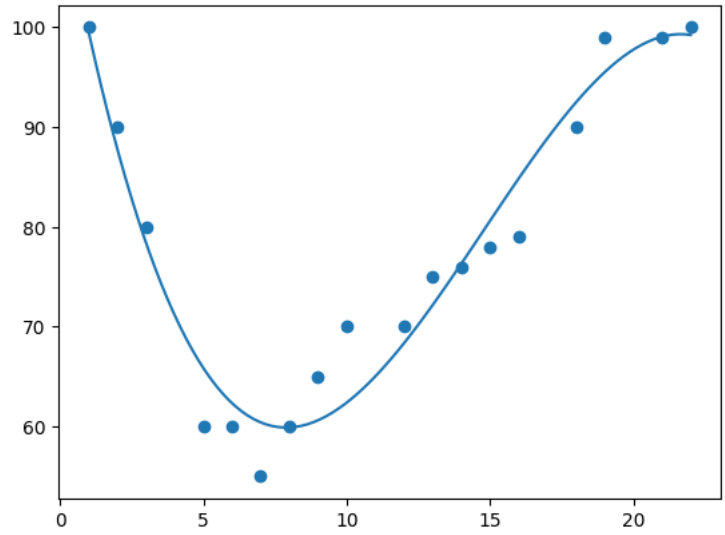
```
0.6819377387390237
```

Bad Fit

```
 # Step-1 Data
import matplotlib.pyplot as plt
x = [1,2,3,5,6,7,8,9,10,12,13,14,15,16,18,19,21,22]
y = [100,90,80,60,60,55,60,65,70,70,75,76,78,79,90,99,99,100]
plt.scatter(x,y, color ="green")
plt.show()
```


```
# Step-2 Darw line
model = np.poly1d(np.polyfit(x,y,3)) # 3 degree curve
myline = np.linspace(1,22,100) # 100 is no of sample points showing
plt.scatter(x,y)
plt.plot(myline, model(myline))
plt.show()

```




```
 # step-3 Required
from sklearn.metrics import r2_score
print(r2_score(y,model(x)))
```

```
0.9432150416451026
```

```
# Prediction
model = np.poly1d(np.polyfit(x,y,3))
pred = model(1)
print(pred)

```

```
99.54274392967326
```

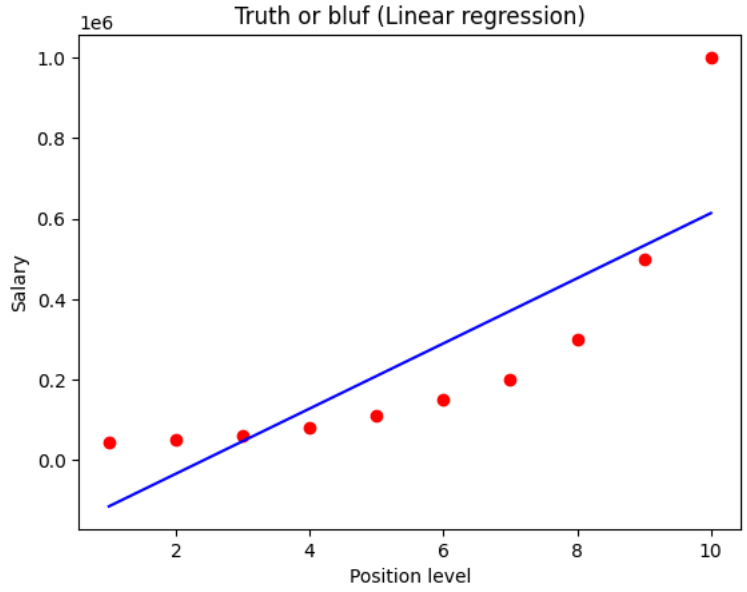
3 Hands on Example

```
# Another important example
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
dataset = pd.read_csv('https://s3.us-west-2.amazonaws.com/public.gamelab.fun/dataset/position_salaries.csv')
X= dataset[['Level']]
y= dataset['Salary']
```

```
# spliting data set into training and testing from sklearn.model_selection import train_test_split
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X,y,test_size=0.3,random_state=0)
```

```
# fitting linear regression to dataset
from sklearn.linear_model import LinearRegression
lin_reg = LinearRegression().fit(X,y)
# Visualizing the linear regression model result
def viz_linear():
  plt.scatter(X,y,color="red")
  plt.plot(X,lin_reg.predict(X),color="blue")
  plt.title("Truth or bluf (Linear regression)")
```

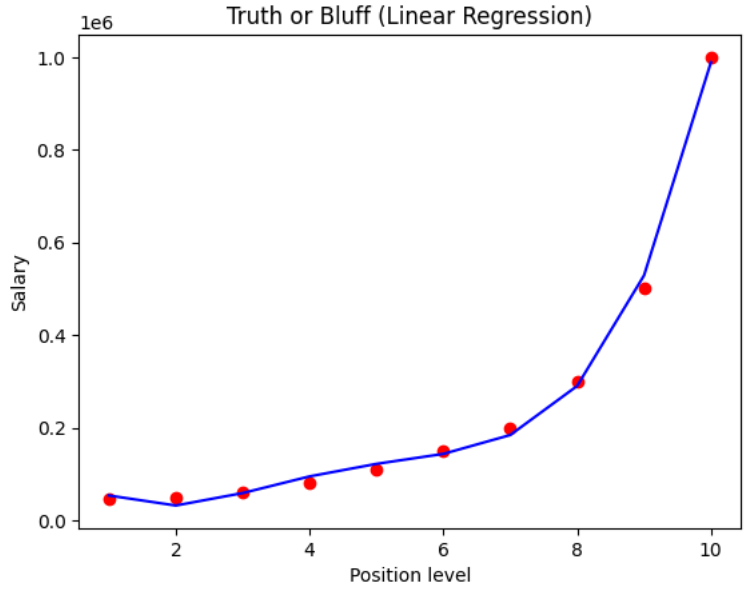
```
    plt.xlabel("Position level")
    plt.ylabel("Salary")
    plt.show()
    return
viz_linear()
```




```
# Fitting Polynomial Regression to the dataset
from sklearn.preprocessing import PolynomialFeatures
poly_reg = PolynomialFeatures(degree=4)

```

```
X_poly = poly_reg.fit_transform(X)
pol_reg = LinearRegression()
pol_reg.fit(X_poly, y)
# Visualizing the Polymonial Regression results
def viz_polymonial():
 plt.scatter(X, y, color='red')
 plt.plot(X, pol_reg.predict(poly_reg.fit_transform(X)), color='blue')
 plt.title('Truth or Bluff (Linear Regression)')
 plt.xlabel('Position level')
 plt.ylabel('Salary')
 plt.show()
 return
viz_polymonial()
```



```
1  # Predicting a new result with linear regression
2 pred_linear = lin_reg.predict([[11]])
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439: UserWarning: X does not have valid feature names, but LinearRegression was
  warnings.warn(
```

```
1  # Predicting a new result with polynomial regression
2 pred_poly = pol_reg.predict(poly_reg.fit_transform([[11]]))
```

```
1 print("Linear Regression Results: = ", pred_linear)
2 print("polynomial Regression Results: = ", pred_poly)
```

```
Linear Regression Results: =  [694333.33333333]
polynomial Regression Results: =  [1780833.33333358]
```