linear-regression

July 8, 2023

#INTERNSHIP PROJECT #Title : Linear Regression

[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error,r2_score

data = pd.read_csv('insurance.csv')
data.head()
```

[1]:

	age	sex	bmi	children	smoker	region	charges
0	19	female	27.900	0	yes	southwest	16884.92400
1	18	male	33.770	1	no	southeast	1725.55230
2	28	male	33.000	3	no	southeast	4449.46200
3	33	male	22.705	0	no	northwest	21984.47061
4	32	male	28.880	0	no	northwest	3866.85520

[2]:
```
# check for missing values
data.isnull().sum()
```

[2]:
```
age         0
sex         0
bmi         0
children    0
smoker      0
region      0
charges     0
dtype: int64
```

[3]:
```
def perform_one_hot_encoding(df,column_name):
  dummies = pd.get_dummies(df [column_name], prefix=column_name)

  df= pd.concat([df.drop(column_name,axis=1),dummies],axis=1)

  return df
```

[4]:
```
data=perform_one_hot_encoding(data,"sex")
data=perform_one_hot_encoding(data,"region")
data=perform_one_hot_encoding(data,"smoker")
```

[5]:
```
data.head()
```

[5]:

	age	bmi	children	charges	sex_female	sex_male	region_northeast	\
0	19	27.900	0	16884.92400	1	0	0	
1	18	33.770	1	1725.55230	0	1	0	
2	28	33.000	3	4449.46200	0	1	0	
3	33	22.705	0	21984.47061	0	1	0	
4	32	28.880	0	3866.85520	0	1	0	

	region_northwest	region_southeast	region_southwest	smoker_no	smoker_yes
0	0	0	1	0	1
1	0	1	0	1	0
2	0	1	0	1	0
3	1	0	0	1	0
4	1	0	0	1	0

[6]:
```
#split the data into feature(x) and target variable(y)
x=data.drop("charges",axis=1)
y=data["charges"]
```

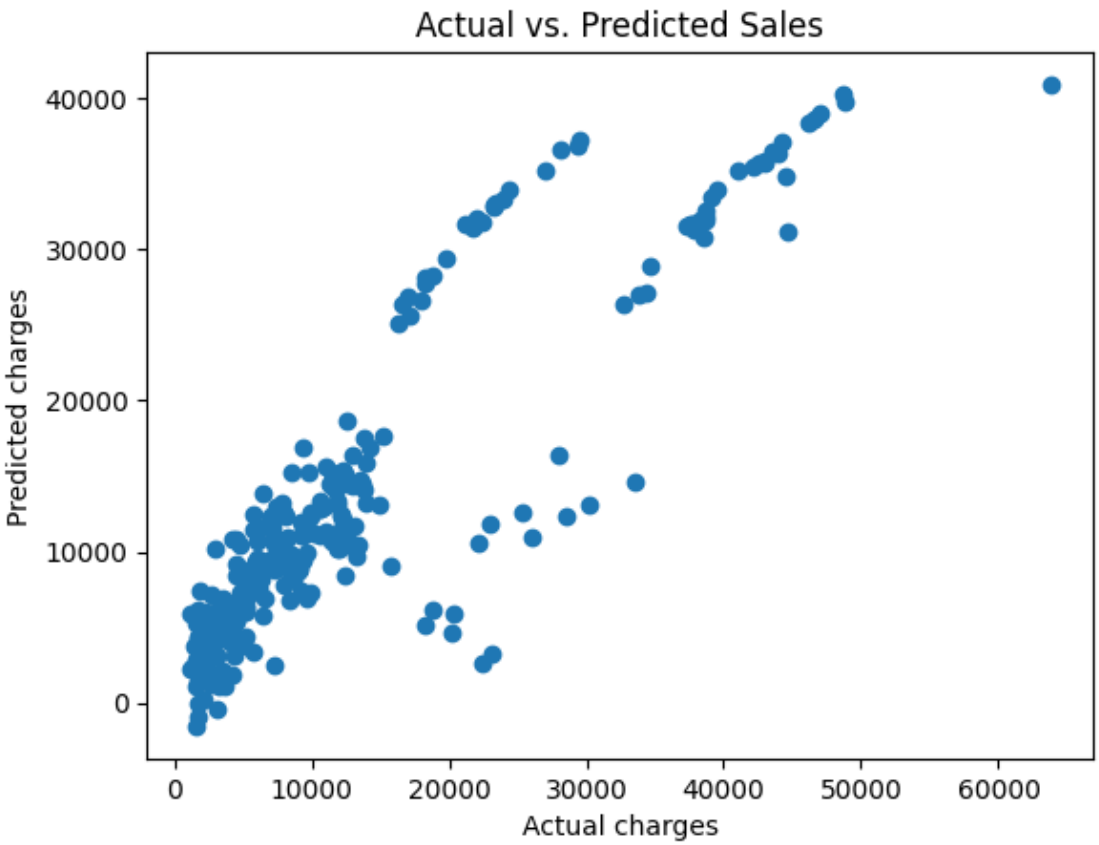
[7]:
```
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2,␣
↪random_state=42)
```

[8]:
```
model = LinearRegression()
model.fit(x_train,y_train)
y_pred = model.predict(x_test)
```

[9]:
```
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)
print("Mean Squared Error:", mse)
print("R-squared:", r2)
```

```
Mean Squared Error: 33596915.851361476
R-squared: 0.7835929767120722
```

[10]:
```
plt.scatter(y_test, y_pred)
plt.xlabel('Actual charges')
plt.ylabel('Predicted charges')
plt.title('Actual vs. Predicted Sales')
plt.show()
```


Actual vs. Predicted Sales
Predicted charges
Actual charges
0
10000
20000
30000
40000
50000
60000