

```
In [ ]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

C:\Users\pawar\AppData\Local\Temp\ipykernel_3056\265554930.py:2: DeprecationWarning: Pyarrow will become a required dependency of pandas in the next major release of pandas (pandas 3.0), (to allow more performant data types, such as the Arrow string type, and better interoperability with other libraries) but was not found to be installed on your system. If this would cause problems for you, please provide us feedback at <https://github.com/pandas-dev/pandas/issues/54466>

```
import pandas as pd
```

```
In [ ]: df = pd.read_csv('umbrellas_sold_1.csv')
```

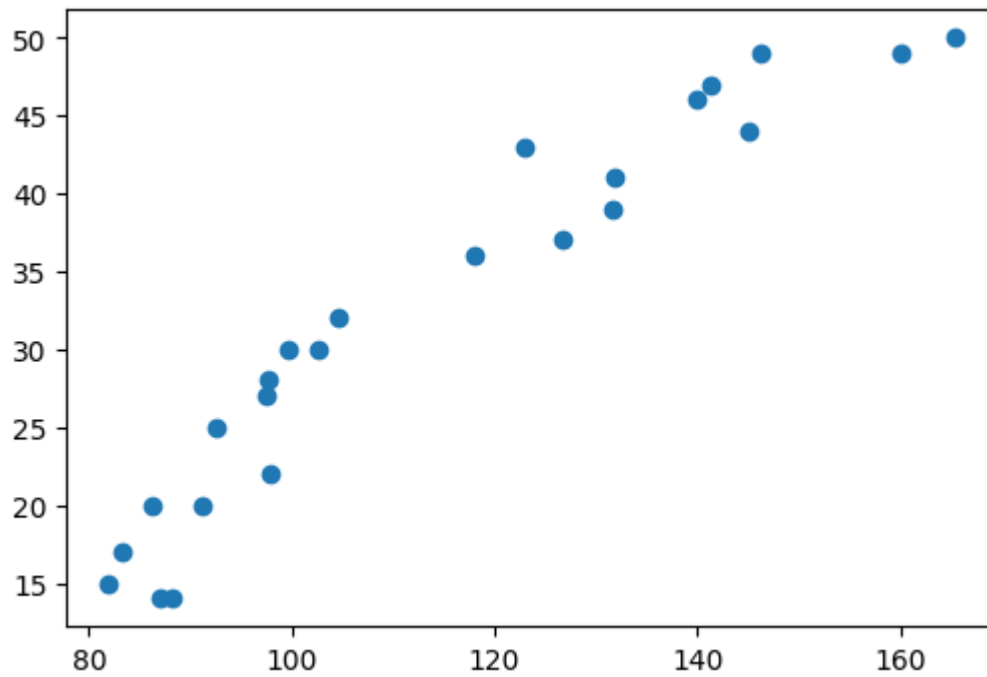
```
In [ ]: df.head()
```

```
Out[ ]:
```

	month	rainfall_mm	umbrellas_sold
0	Jan	82.0	15
1	Feb	92.5	25
2	Mar	83.2	17
3	Apr	97.7	28
4	May	131.9	41

```
In [ ]: plt.figure(figsize=[6,4])
plt.scatter(df['rainfall_mm'],df['umbrellas_sold'])
```

```
Out[ ]: <matplotlib.collections.PathCollection at 0x1b3d33e9350>
```



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

```
att = df[['rainfall_mm']]
label = df[['umbrellas_sold']]
```

```
model = LinearRegression()
model.fit(att, label)
```

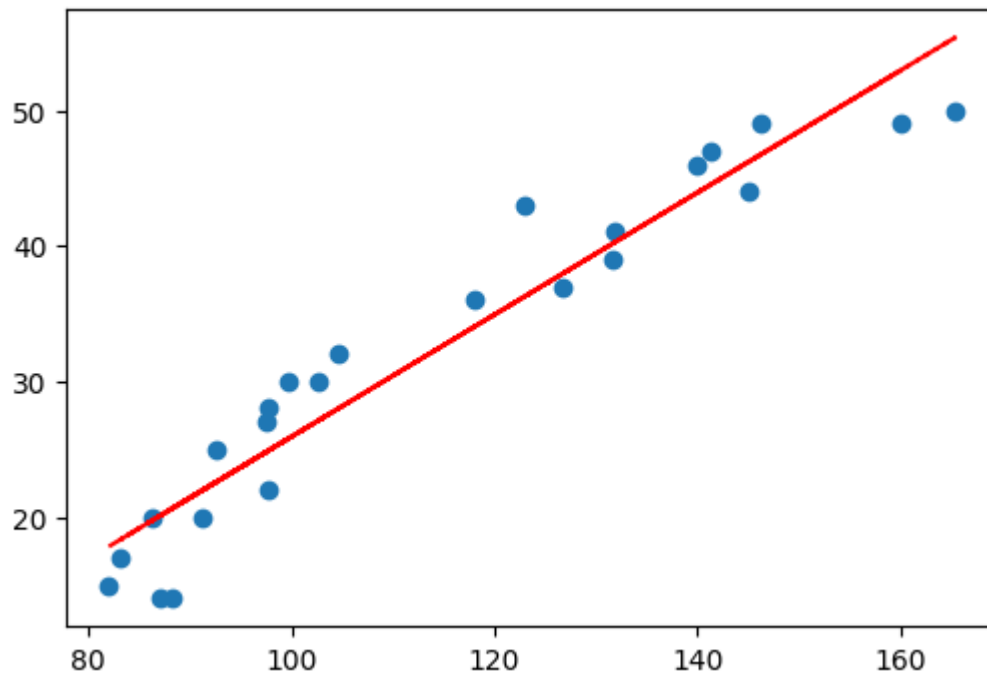
```
Out [ ]: LinearRegression
LinearRegression()
```

```
In [ ]: # Y = a + bX
# Y = label X = att
a = model.intercept_
b = model.coef_
```

```
In [ ]: ans = model.predict(att)
```

```
In [ ]: plt.figure(figsize=[6,4])
plt.scatter(df[['rainfall_mm']],df[['umbrellas_sold']])
plt.plot(att,ans,'r--')
```

```
Out [ ]: [<matplotlib.lines.Line2D at 0x1b3d581fb10>]
```



```
In [ ]: model.predict([[100]])
```

c:\Users\pawar\Desktop\Code\Data-Science\.venv\Lib\site-packages\sklearn\base.py:493: UserWarning: X does not have valid feature names, but LinearRegression was fitted with feature names
warnings.warn(

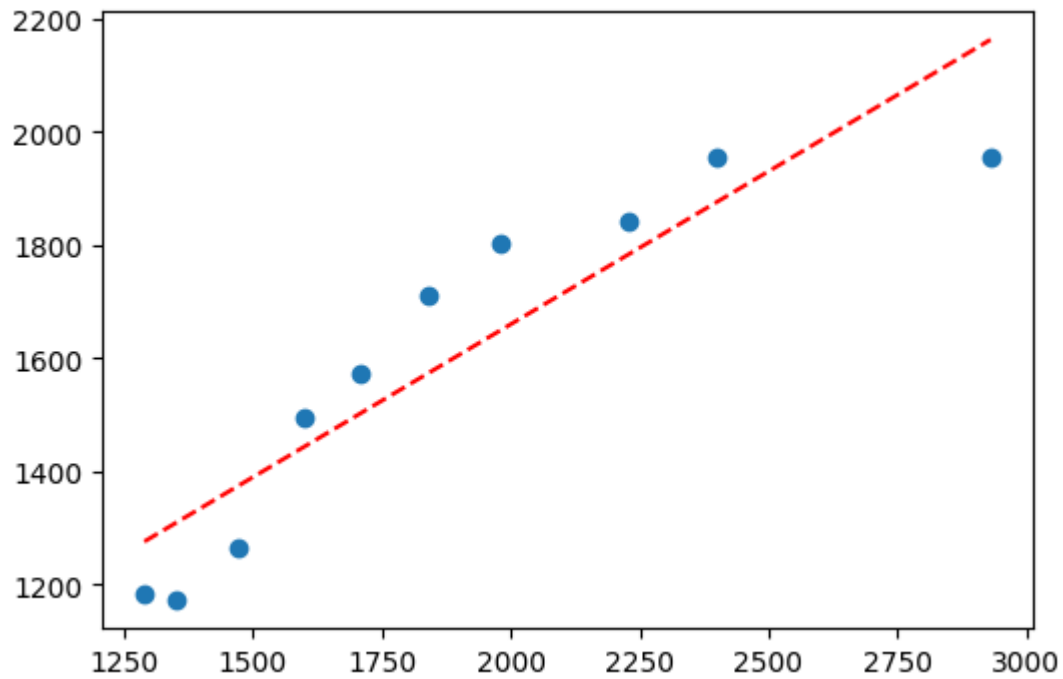
```
Out[ ]: array([25.926023])
```

```
In [ ]: df = pd.read_csv('electricity-consumptions.csv')
att = df[['home_size']]
label = df['kilowatt_hours_per_month']

model = LinearRegression()
model.fit(att, label)

ans = model.predict(att)
plt.figure(figsize=[6,4])
plt.scatter(df['home_size'],df['kilowatt_hours_per_month'])
plt.plot(att,ans,'r--')
```

```
Out[ ]: [<matplotlib.lines.Line2D at 0x1b3d581e0d0>]
```



```
In [ ]: from sklearn.linear_model import LinearRegression
        from sklearn.preprocessing import PolynomialFeatures

        df = pd.read_csv('electricity-consumptions.csv')
        att = df[['home_size']]
        label = df['kilowatt_hours_per_month']

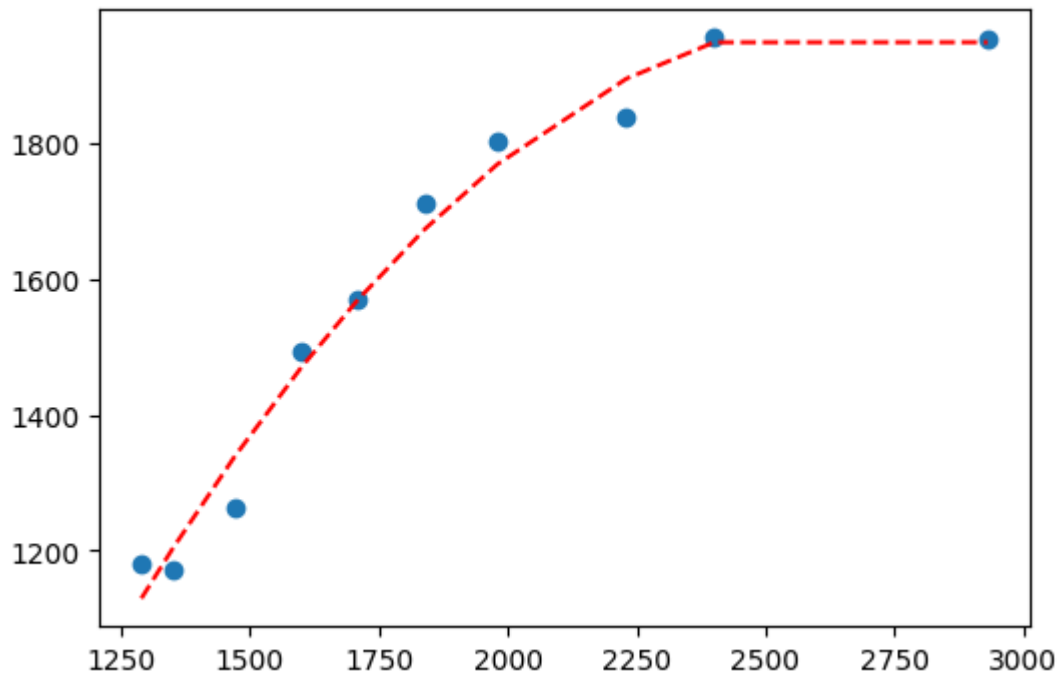
        pf = PolynomialFeatures()
        pf.fit(att)
        att_new = pf.transform(att)

        model = LinearRegression()
        model.fit(att_new, label)

        ans = model.predict(att_new)
        plt.figure(figsize=[6,4])
        plt.scatter(df['home_size'],df['kilowatt_hours_per_month'])
        plt.plot(att['home_size'],ans,'r--')

        model.score(att_new,label)
```

```
Out[ ]: 0.9818850241163605
```



```
In [ ]: att_new
```

```
Out[ ]: array([[1.0000e+00, 1.2900e+03, 1.6641e+06],
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               [1.0000e+00, 1.4700e+03, 2.1609e+06],
               [1.0000e+00, 1.6000e+03, 2.5600e+06],
               [1.0000e+00, 1.7100e+03, 2.9241e+06],
               [1.0000e+00, 1.8400e+03, 3.3856e+06],
               [1.0000e+00, 1.9800e+03, 3.9204e+06],
               [1.0000e+00, 2.2300e+03, 4.9729e+06],
               [1.0000e+00, 2.4000e+03, 5.7600e+06],
               [1.0000e+00, 2.9300e+03, 8.5849e+06]])
```

```
In [ ]: df.sample(frac=0.2)
```

```
Out[ ]:   home_size  kilowatt_hours_per_month
2      1470                1264
3      1600                1493
```

```
In [ ]: basketData = pd.read_csv('MarketBasketOptimization.csv',header=None)
```

```
In [ ]: basketData.head()
```

Out[]:	0	1	2	3	4	5	6	7	8	9
0	shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tomato juice
1	burgers	meatballs	eggs	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	chutney	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	turkey	avocado	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	mineral water	milk	energy bar	whole wheat rice	green tea	NaN	NaN	NaN	NaN	NaN

In []:

```
dataset = []
for i in range(0,basketData.shape[0]) :
    temp = []
    for j in range(0,basketData.shape[1]) :
        if basketData.loc[i,j] is not np.nan :
            temp.append(basketData.loc[i,j])
    dataset.append(temp)
```

In []: dataset

```
Out[ ]: [['shrimp',
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```

```
In [ ]: from mlxtend.preprocessing import TransactionEncoder
```

```

-----
ModuleNotFoundError                                Traceback (most recent call last)
Cell In[18], line 1
----> 1 from mlxtend.preprocessing import TransactionEncoder

ModuleNotFoundError: No module named 'mlxtend'

```

```
In [ ]: te = TransactionEncoder()
```

```
In [ ]: te_ary = te.fit(dataset).transform(dataset)
```

```
In [ ]: df = pd.DataFrame(te_ary, columns=te.columns_)
```

```
In [ ]: from mlxtend.frequent_patterns import apriori
```

```
In [ ]: frequent_itemsets = apriori(df, use_colnames = True, min_support=0.05)
```

```
In [ ]: frequent_itemsets
```

```
In [ ]: from mlxtend.frequent_patterns import association_rules
```

```
In [ ]: rules = association_rules(frequent_itemsets, metric='confidence', min_threshold=0)
```

```
In [ ]: rules
```