

```
In [11]: 1 import numpy as np
          2 import pandas as pd
          3 import matplotlib.pyplot as plt
          4 import seaborn as sns
          5 df = pd.read_csv('umbrellas_sold_1.csv', encoding = 'iso-8859-1')
```

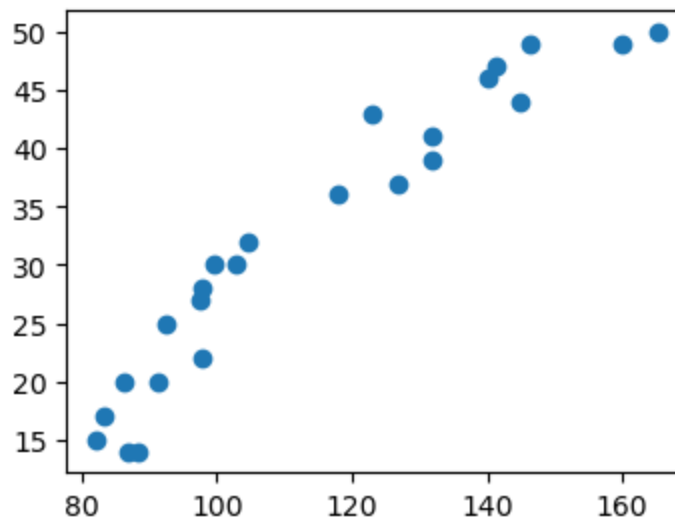
```
In [12]: 1 df.head()
```

```
Out[12]:
```

	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 [14]: 1 plt.figure(figsize=[4, 3])
          2 plt.scatter(df["rainfall_mm"], df["umbrellas_sold"])
```

```
Out[14]: <matplotlib.collections.PathCollection at 0x199af9cb2d0>
```



```

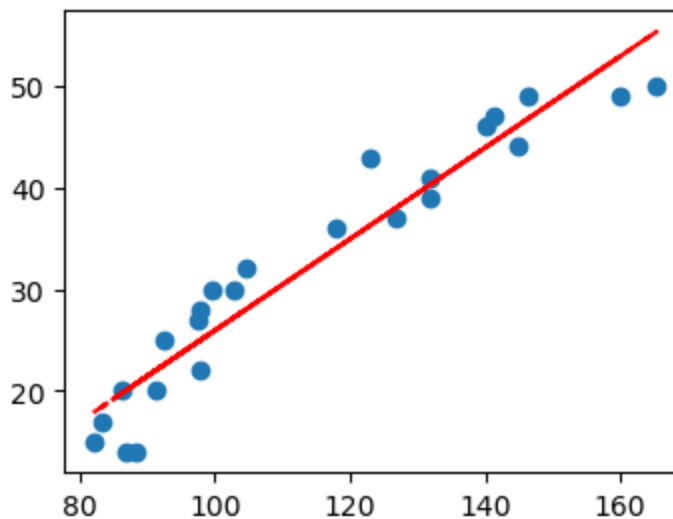
In [38]: 1 from sklearn.linear_model import LinearRegression
2 df = pd.read_csv('umbrellas_sold_1.csv', encoding = 'iso-8859-1')
3 att = df[["rainfall_mm"]]
4 label = df["umbrellas_sold"]
5
6 model = LinearRegression()
7 model.fit(att, label)
8
9 ans = model.predict(att)
10 plt.figure(figsize = [4, 3])
11 plt.scatter(df["rainfall_mm"], df["umbrellas_sold"])
12 plt.plot(att, ans, "r--")
13 model.score(att, label)
14
15 model.predict([[200]])

```

C:\Users\dekdo\anaconda3\Lib\site-packages\sklearn\base.py:464: UserWarning:  
X does not have valid feature names, but LinearRegression was fitted with fea  
ture names

warnings.warn(

Out[38]: array([70.92615499])



```

In [29]: 1 a = model.intercept_
2 b = model.coef_

```

```

In [30]: 1 b

```

Out[30]: array([0.45000132])

```

In [36]: 1 model.predict([[200]])

```

C:\Users\dekdo\anaconda3\Lib\site-packages\sklearn\base.py:464: UserWarning:  
X does not have valid feature names, but LinearRegression was fitted with fea  
ture names

warnings.warn(

Out[36]: array([70.92615499])

```
In [44]: 1 df = pd.read_csv('electricity-consumptions.csv')
         2 df.info()
```

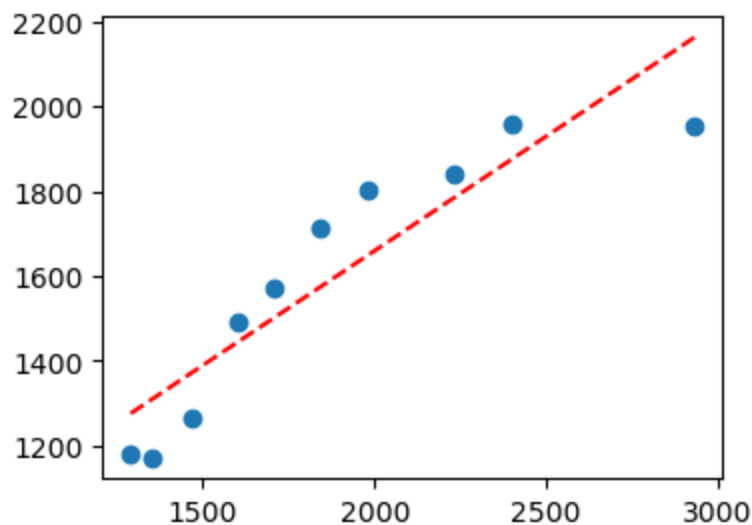
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10 entries, 0 to 9
Data columns (total 2 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   home_size                            10 non-null     int64
1   kilowatt_hours_per_month            10 non-null     int64
dtypes: int64(2)
memory usage: 292.0 bytes
```

```
In [45]: 1 # electricity-consumptions.csv
         2 from sklearn.linear_model import LinearRegression
         3 df = pd.read_csv('electricity-consumptions.csv', encoding = 'iso-8859-1')
         4 att = df[["home_size"]]
         5 label = df[["kilowatt_hours_per_month"]]
         6
         7 model = LinearRegression()
         8 model.fit(att, label)
         9
        10 ans = model.predict(att)
        11 plt.figure(figsize = [4, 3])
        12 plt.scatter(df[["home_size"]], df[["kilowatt_hours_per_month"]])
        13 plt.plot(att, ans, "r--")
        14 model.score(att, label)
        15
        16 model.predict([[200]])
```

C:\Users\dekdo\anaconda3\Lib\site-packages\sklearn\base.py:464: UserWarning:  
X does not have valid feature names, but LinearRegression was fitted with fea  
ture names

```
warnings.warn(
```

```
Out[45]: array([686.98862901])
```

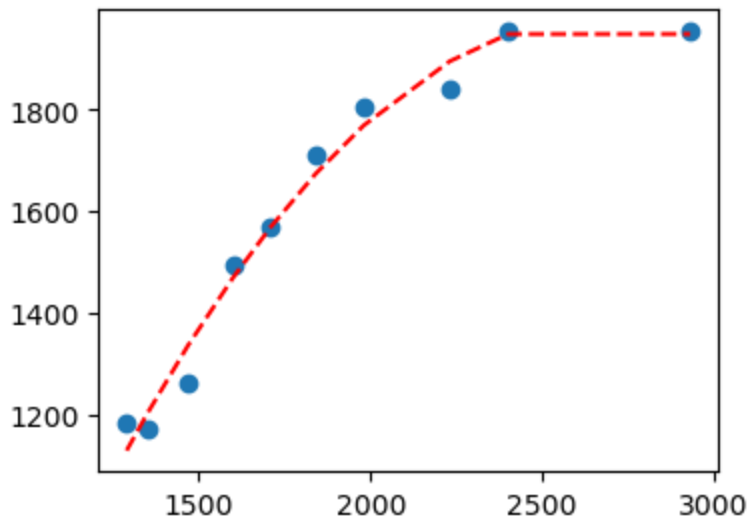


```

In [60]: 1 from sklearn.linear_model import LinearRegression
2 from sklearn.preprocessing import PolynomialFeatures
3
4 df = pd.read_csv('electricity-consumptions.csv')
5 att = df[['home_size']]
6 label = df['kilowatt_hours_per_month']
7
8 pf = PolynomialFeatures(degree = 2)
9 # or
10 # pf = PolynomialFeatures()
11
12 pf.fit(att)
13 att_new = pf.transform(att)
14
15 model = LinearRegression()
16 model.fit(att_new, label)
17
18 ans = model.predict(att_new)
19 plt.figure(figsize = [4, 3])
20 plt.scatter(df["home_size"], df["kilowatt_hours_per_month"])
21 plt.plot(att["home_size"], ans, "r--")
22
23 model.score(att_new, label)

```

Out[60]: 0.9818850241163604



```

In [61]: 1 df.sample(n = 5)

```

Out[61]:

	home_size	kilowatt_hours_per_month
2	1470	1264
7	2230	1840
1	1350	1172
0	1290	1182
6	1980	1804

In [62]: 1 df.sample(frac = .7)

Out[62]:

	home_size	kilowatt_hours_per_month
5	1840	1711
1	1350	1172
3	1600	1493
4	1710	1571
9	2930	1954
6	1980	1804
0	1290	1182

In [64]: 1 basketData = pd.read\_csv('MarketBasketOptimization.csv', header = None)  
2 basketData.head()

Out[64]:

	0	1	2	3	4	5	6	7	8	9	10
0	shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tomato juice	low fat yogurt
1	burgers	meatballs	eggs	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	chutney	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	turkey	avocado	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	mineral water	milk	energy bar	whole wheat rice	green tea	NaN	NaN	NaN	NaN	NaN	NaN

In [65]: 1 dataset = []  
2 for i in range(0, basketData.shape[0]):  
3 tmp = []  
4 for j in range(0, basketData.shape[1]):  
5 if basketData.loc[i, j] is not np.nan:  
6 tmp.append(basketData.loc[i, j])  
7 dataset.append(tmp)

In [66]:

1	dataset
---	---------

```

Out[66]: [['shrimp',
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```

```
In [79]: 1 from mlxtend.preprocessing import TransactionEncoder
        2 te = TransactionEncoder()
        3 te_arr = te.fit(dataset).transform(dataset)
        4 df = pd.DataFrame(te_arr, columns = te.columns_)
```

```
In [78]: 1 from mlxtend.frequent_patterns import apriori
```

```
In [84]: 1 frequent_itemsets = apriori(df, use_colnames = True, min_support = .05)
```

```
In [83]: 1 from mlxtend.frequent_patterns import association_rules
```

In [85]:

1

rules = association\_rules(frequent\_itemsets,metric='confidence',min\_thresh

2

rules

Out[85]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(chocolate)	(mineral water)	0.163845	0.238368	0.052660	0.321400	1.348332	0.013604
1	(mineral water)	(chocolate)	0.238368	0.163845	0.052660	0.220917	1.348332	0.013604
2	(eggs)	(mineral water)	0.179709	0.238368	0.050927	0.283383	1.188845	0.008090
3	(mineral water)	(eggs)	0.238368	0.179709	0.050927	0.213647	1.188845	0.008090
4	(mineral water)	(spaghetti)	0.238368	0.174110	0.059725	0.250559	1.439085	0.018223
5	(spaghetti)	(mineral water)	0.174110	0.238368	0.059725	0.343032	1.439085	0.018223

In [ ]:

1