

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

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

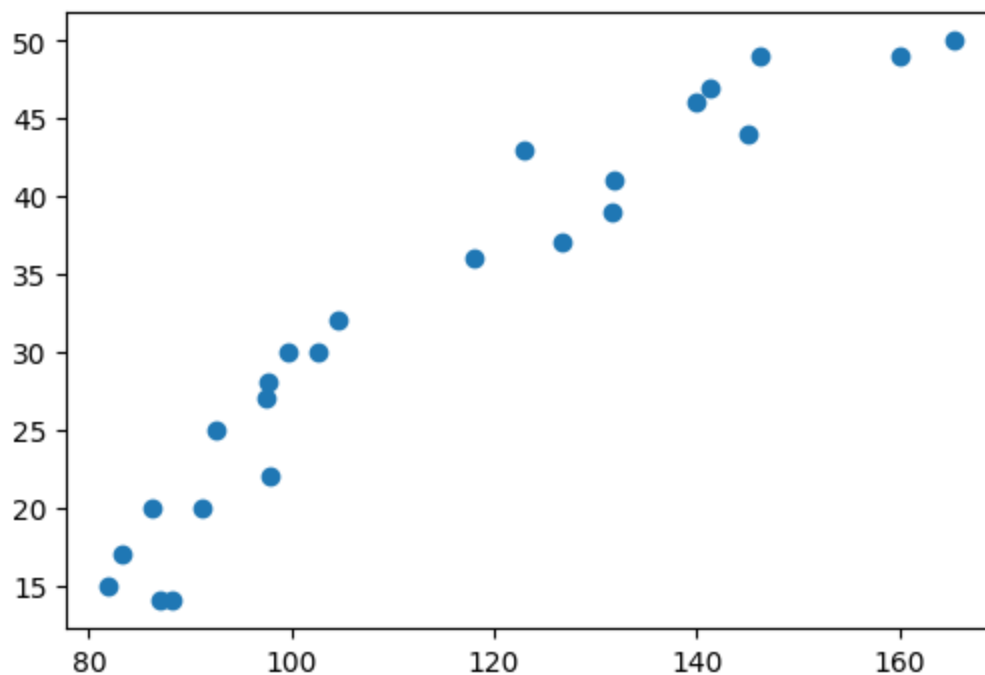
```
In [ ]: df.head()
```

```
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 0x1f45d462210>
```



```
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_
```

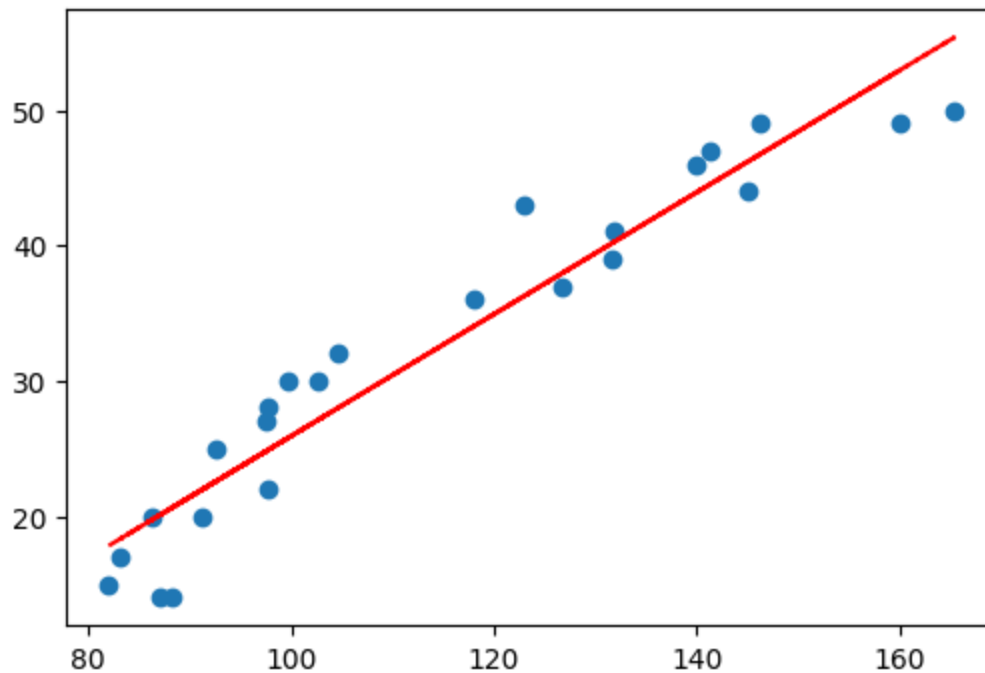
In []:

```
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 0x1f45d611590>]



In []:

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

c:\Users\HP\Desktop\DataSci\.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']
```

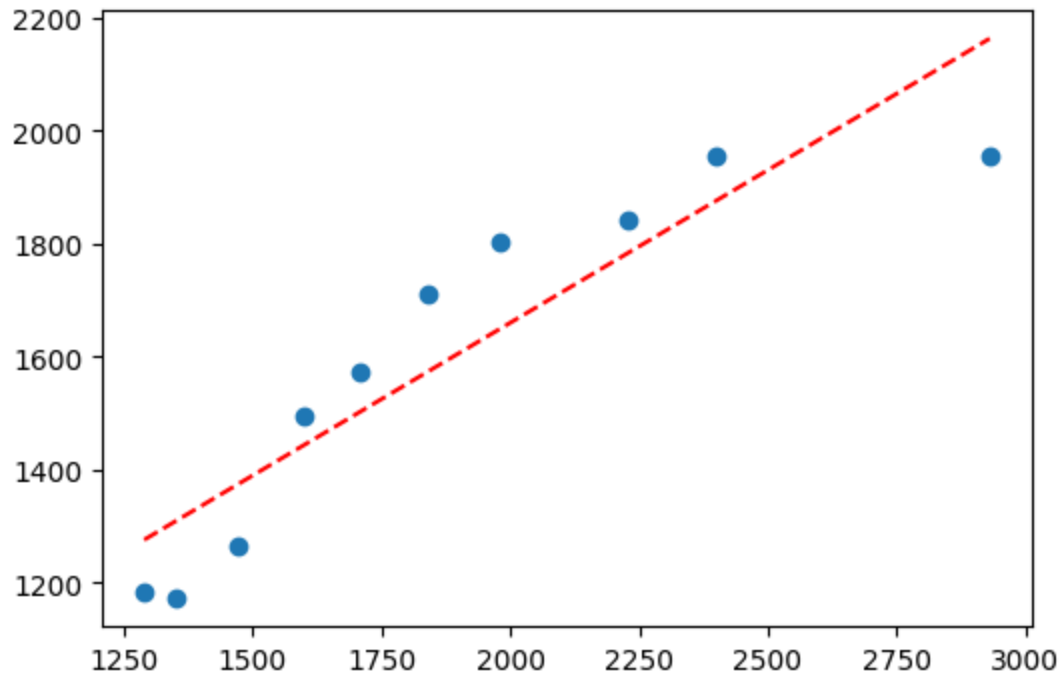
```

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 0x1f45d65b590>]



```

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(degree=2)
pf.fit(att)
att_new = pf.transform(att)

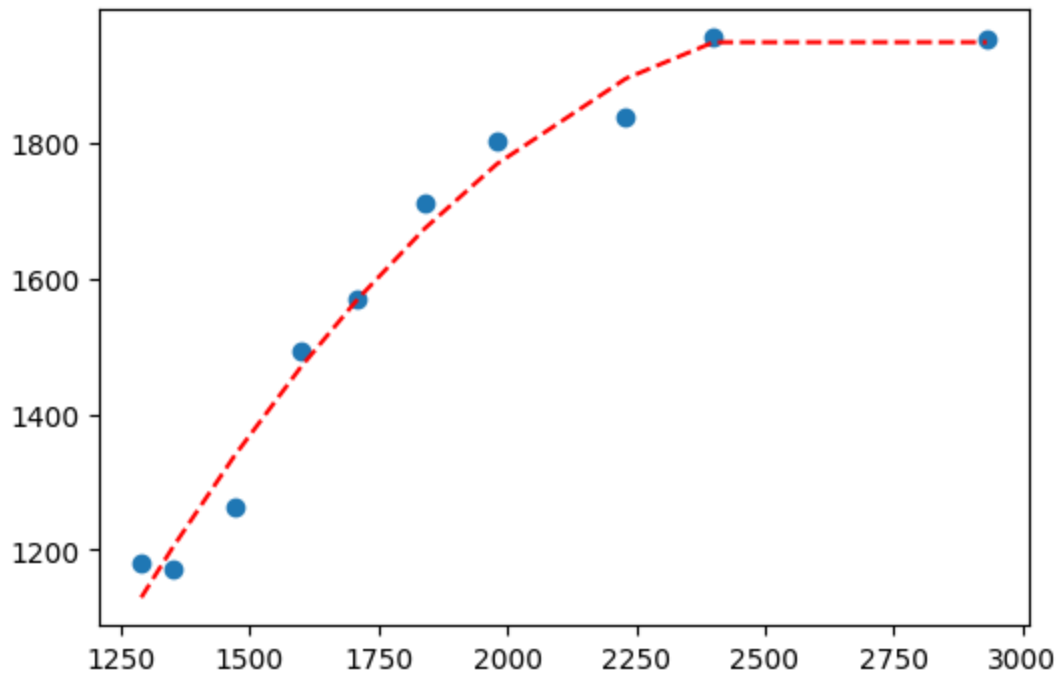
model = LinearRegression()
model.fit(att_new, label)

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],
               [1.0000e+00, 1.3500e+03, 1.8225e+06],
               [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],
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               [1.0000e+00, 2.4000e+03, 5.7600e+06],
               [1.0000e+00, 2.9300e+03, 8.5849e+06]])
```

```
In [ ]: df.sample(frac=0.7)
```

```
Out[ ]:   home_size  kilowatt_hours_per_month
0      1290                1182
6      1980                1804
8      2400                1956
2      1470                1264
5      1840                1711
9      2930                1954
4      1710                1571
```

```
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
```

```
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
```

Out[]:

	support	itemsets
0	0.087188	(burgers)
1	0.081056	(cake)
2	0.059992	(chicken)
3	0.163845	(chocolate)
4	0.080389	(cookies)
5	0.051060	(cooking oil)
6	0.179709	(eggs)
7	0.079323	(escalope)
8	0.170911	(french fries)
9	0.063325	(frozen smoothie)
10	0.095321	(frozen vegetables)
11	0.052393	(grated cheese)
12	0.132116	(green tea)
13	0.098254	(ground beef)
14	0.076523	(low fat yogurt)
15	0.129583	(milk)
16	0.238368	(mineral water)
17	0.065858	(olive oil)
18	0.095054	(pancakes)
19	0.071457	(shrimp)
20	0.050527	(soup)
21	0.174110	(spaghetti)
22	0.068391	(tomatoes)
23	0.062525	(turkey)
24	0.058526	(whole wheat rice)
25	0.052660	(mineral water, chocolate)
26	0.050927	(mineral water, eggs)
27	0.059725	(mineral water, spaghetti)

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


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

```
In [ ]: rules
```

Out[]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	lev
0	(mineral water)	(chocolate)	0.238368	0.163845	0.052660	0.220917	1.348332	0.0
1	(chocolate)	(mineral water)	0.163845	0.238368	0.052660	0.321400	1.348332	0.0
2	(mineral water)	(eggs)	0.238368	0.179709	0.050927	0.213647	1.188845	0.0
3	(eggs)	(mineral water)	0.179709	0.238368	0.050927	0.283383	1.188845	0.0
4	(mineral water)	(spaghetti)	0.238368	0.174110	0.059725	0.250559	1.439085	0.0
5	(spaghetti)	(mineral water)	0.174110	0.238368	0.059725	0.343032	1.439085	0.0

```
In [ ]:
```