

```
In [1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [2]: df = pd.read_csv('umbrellas_sold_1.csv')
```

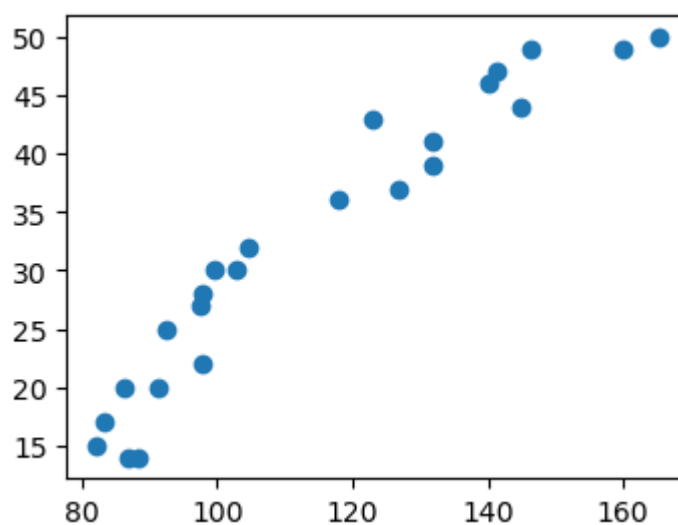
```
In [3]: df.head()
```

```
Out[3]:
```

	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 [5]: plt.figure(figsize=[4,3])
plt.scatter(df['rainfall_mm'],df['umbrellas_sold'])
```

```
Out[5]: <matplotlib.collections.PathCollection at 0x1fb98404790>
```



```
In [6]: from sklearn.linear_model import LinearRegression
```

```
In [10]: att = df[['rainfall_mm']]
label = df['umbrellas_sold']
```

```
In [8]: label
```

```
Out[8]:
```

0	15
1	25
2	17
3	28
4	41
5	47
6	50
7	46
8	37
9	22
10	20
11	30
12	14
13	27
14	14
15	30
16	43
17	49
18	49
19	44
20	39
21	36
22	20
23	32

Name: umbrellas_sold, dtype: int64

```
In [11]: att
```

Out[11]:

	rainfall_mm
0	82.0
1	92.5
2	83.2
3	97.7
4	131.9
5	141.3
6	165.4
7	140.0
8	126.7
9	97.8
10	86.2
11	99.6
12	87.0
13	97.5
14	88.2
15	102.7
16	123.0
17	146.3
18	160.0
19	145.0
20	131.7
21	118.0
22	91.2
23	104.6

In [13]: `model = LinearRegression()`In [14]: `model.fit(att,label)`Out[14]:

▼ LinearRegression

LinearRegression()

In [15]:

```
# Y = a+bX
# Y Label , X = att
a = model.intercept_
b = model.coef_
```

In [16]: `a`Out[16]: `-19.07410899414429`

In [17]:

b

Out[17]:

array([0.45000132])

In [18]:

ans = model.predict(att)

In [19]:

ans

Out[19]:

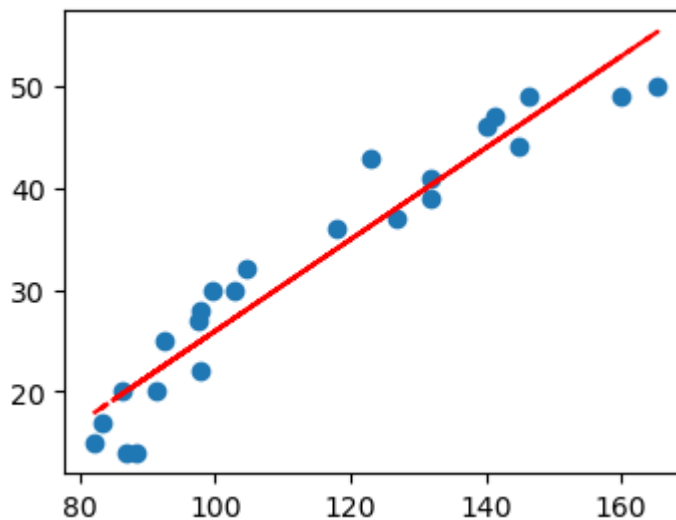
```
array([17.82599924, 22.5510131 , 18.36600082, 24.89101996, 40.2810651 ,
       44.51107751, 55.35610932, 43.92607579, 37.94105824, 24.93602009,
       19.71600478, 25.74602247, 20.07600584, 24.8010197 , 20.61600742,
       27.14102656, 36.27605335, 46.76108411, 52.92610219, 46.17608239,
       40.19106484, 34.02604675, 21.96601138, 27.99602907])
```

In [21]:

```
plt.figure(figsize=[4,3])
plt.scatter(df['rainfall_mm'],df['umbrellas_sold'])
plt.plot(att,ans,'r--')
```

Out[21]:

[<matplotlib.lines.Line2D at 0x1fb98ef8850>]



In [22]:

```
from sklearn.linear_model import LinearRegression
df = pd.read_csv('umbrellas_sold_1.csv')
att = df[['rainfall_mm']]
label = df['umbrellas_sold']

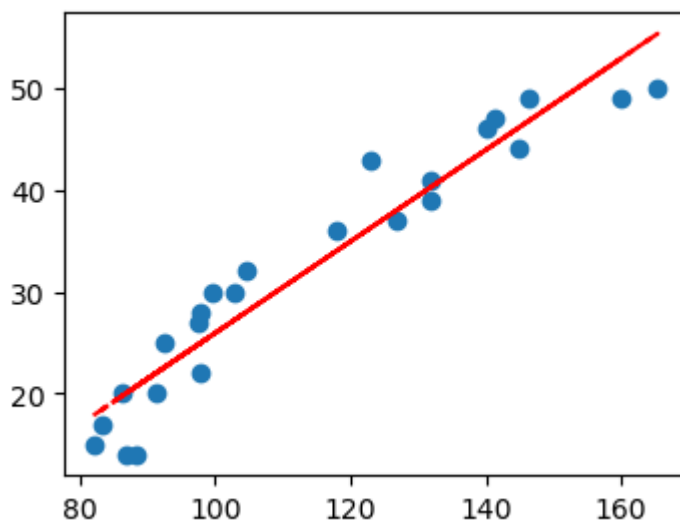
model = LinearRegression()
model.fit(att,label)

ans = model.predict(att)
plt.figure(figsize=[4,3])
plt.scatter(df['rainfall_mm'],df['umbrellas_sold'])
plt.plot(att,ans,'r--')

model.score(att,label)
#model.predict([[200]])  อยากทราบว่าค่าน้ำฝนมีอัตราเท่าไร
```

Out[22]:

0.9171256969082437



```
In [23]: df = pd.read_csv('electricity-consumptions.csv')
```

```
In [24]: df.head()
```

```
Out[24]:
```

	home_size	kilowatt_hours_per_month
0	1290	1182
1	1350	1172
2	1470	1264
3	1600	1493
4	1710	1571

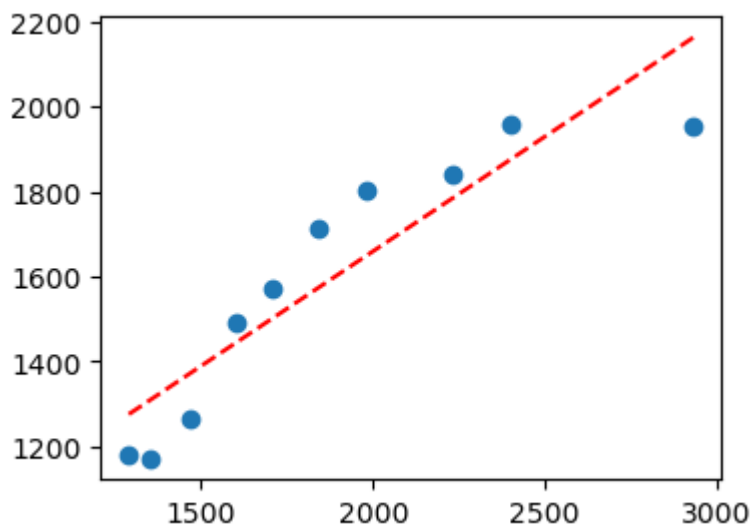
```
In [25]: from sklearn.linear_model import LinearRegression
df = pd.read_csv('electricity-consumptions.csv')
att = df[['home_size']]
label = df['kilowatt_hours_per_month']

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

ans = model.predict(att)
plt.figure(figsize=[4,3])
plt.scatter(df['home_size'],df['kilowatt_hours_per_month'])
plt.plot(att,ans,'r--')

model.score(att,label)
```

```
Out[25]: 0.831705383789123
```



```
In [30]: 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']

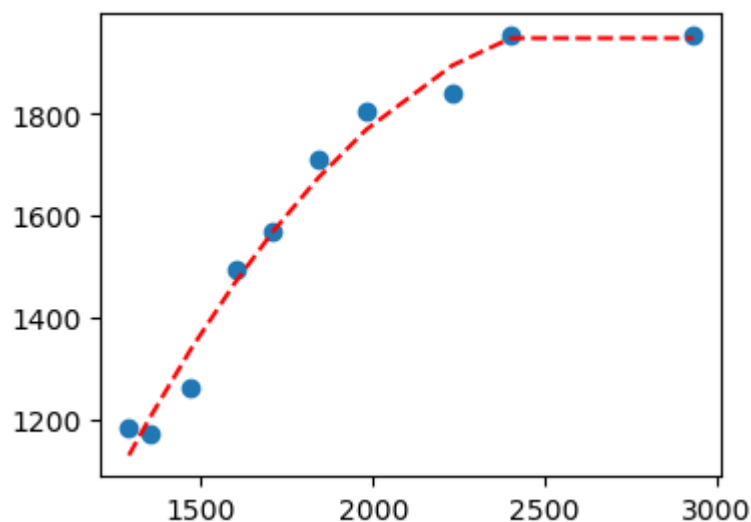
pf = PolynomialFeatures(degree =2) #degree ทำให้เส้นโค้งหาข้อมูลมากขึ้น
pf.fit(att)
att_new = pf.transform(att)

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

ans = model.predict(att_new)
plt.figure(figsize=[4,3])
plt.scatter(df['home_size'],df['kilowatt_hours_per_month'])
plt.plot(att['home_size'],ans,'r--')

model.score(att_new,label)
```

Out[30]: 0.9818850241163604



In [29]: att_new

```
Out[29]: 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],
       [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 [31]: df.sample(n = 5) #สุ่มเอาข้อมูลออกมาโชว์ //กรณีข้อมูลเยอะมากๆๆ
```

```
Out[31]:
```

	home_size	kilowatt_hours_per_month
4	1710	1571
6	1980	1804
1	1350	1172
8	2400	1956
9	2930	1954

```
In [36]: basketData = pd.read_csv('MarketBasketOptimization.csv', header = None)
```

```
In [37]: basketData.head()
```

```
Out[37]:
```

	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 [42]: 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 [43]: basketData.shape[1] #จำนวนคอลัมน์
```

```
Out[43]: 20
```

```
In [44]: dataset #รายการซื้อ
```

```

Out[44]: [['shrimp',
          'almonds',
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```
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...]
```

```
In [48]: from mlxtend.preprocessing import TransactionEncoder
```

```
In [49]: te = TransactionEncoder()
```

```
In [51]: te_ary = te.fit(dataset).transform(dataset)
```

```
In [52]: te_ary
```

```
Out[52]: array([[False,  True,  True, ...,  True, False, False],
        [False, False, False, ..., False, False, False],
        [False, False, False, ..., False, False, False],
        ...,
        [False, False, False, ..., False, False, False],
        [False, False, False, ..., False, False, False],
        [False, False, False, ..., False,  True, False]])
```

```
In [55]: df = pd.DataFrame(te_ary, columns = te.columns_)
```

```
In [56]: df
```

```
Out[56]:
```

	asparagus	almonds	antioxydant juice	asparagus	avocado	babies food	bacon	barbecue sauce	black tea	blu
0	False	True	True	False	True	False	False	False	False	
1	False	False	False	False	False	False	False	False	False	
2	False	False	False	False	False	False	False	False	False	
3	False	False	False	False	True	False	False	False	False	
4	False	False	False	False	False	False	False	False	False	
...
7496	False	False	False	False	False	False	False	False	False	
7497	False	False	False	False	False	False	False	False	False	
7498	False	False	False	False	False	False	False	False	False	
7499	False	False	False	False	False	False	False	False	False	
7500	False	False	False	False	False	False	False	False	False	

7501 rows × 120 columns

```
In [60]: from mlxtend.frequent_patterns import apriori
```

```
In [72]: frequent_itemsets = apriori(df ,use_colnames= True ,min_support = 0.01)
```

```
In [73]: from mlxtend.frequent_patterns import association_rules

In [74]: rules = association_rules(frequent_itemsets,metric='confidence',min_threshold=0)

In [75]: rules
```

Out[75]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(mineral water)	(avocado)	0.238368	0.033329	0.011598	0.048658	1.459926	0.003654
1	(avocado)	(mineral water)	0.033329	0.238368	0.011598	0.348000	1.459926	0.003654
2	(burgers)	(cake)	0.087188	0.081056	0.011465	0.131498	1.622319	0.004398
3	(cake)	(burgers)	0.081056	0.087188	0.011465	0.141447	1.622319	0.004398
4	(burgers)	(chocolate)	0.087188	0.163845	0.017064	0.195719	1.194537	0.002779
...
427	(mineral water, spaghetti)	(pancakes)	0.059725	0.095054	0.011465	0.191964	2.019529	0.005788
428	(pancakes, spaghetti)	(mineral water)	0.025197	0.238368	0.011465	0.455026	1.908923	0.005459
429	(mineral water)	(pancakes, spaghetti)	0.238368	0.025197	0.011465	0.048098	1.908923	0.005459
430	(pancakes)	(mineral water, spaghetti)	0.095054	0.059725	0.011465	0.120617	2.019529	0.005788
431	(spaghetti)	(mineral water, pancakes)	0.174110	0.033729	0.011465	0.065850	1.952333	0.005593

432 rows × 10 columns



```
In [ ]:
```