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localhost:8080/notebooks/LogisticIpyb

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JupyterLab Python 3 (ipykernel)

```
[1]: import pandas as pd
import numpy as np
from sklearn import linear_model
from sklearn.model_selection import train_test_split
from sklearn import metrics
data = pd.read_csv('iris.csv')

data.head(10)
data.shape
```

[1]: (150, 5)

```
[2]: X = data.drop('Name', axis=1)
y = data['Name']
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.20)
logr = linear_model.LogisticRegression()
logr.fit(X_train,y_train)

#predict if tumor is cancerous where the size is 3.46mm:
predicted = logr.predict([[5.0,3.6,1.4,0.2]])

print(predicted)
y_pred = logr.predict(X_test)
print(X_test,y_pred )

['Iris-setosa']
```

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JupyterLab Python 3 (ipykernel)

	SepalLength	SepalWidth	PetalLength	PetalWidth
131	7.9	3.8	6.4	2.0
39	5.1	3.4	1.5	0.2
38	4.4	3.0	1.3	0.2
141	6.9	3.1	5.1	2.3
33	5.5	4.2	1.4	0.2
10	5.4	3.7	1.5	0.2
2	4.7	3.2	1.3	0.2
23	5.1	3.3	1.7	0.5
52	6.9	3.1	4.9	1.5
68	6.2	2.2	4.5	1.5
78	6.0	2.9	4.5	1.5
60	5.0	2.0	3.5	1.0
127	6.1	3.0	4.9	1.8
0	5.1	3.5	1.4	0.2
63	6.1	2.9	4.7	1.4
12	4.8	3.0	1.4	0.1
61	5.9	3.0	4.2	1.5
21	5.1	3.7	1.5	0.4
145	6.7	3.0	5.2	2.3
69	5.6	2.5	3.9	1.1
142	5.8	2.7	5.1	1.9
34	4.9	3.1	1.5	0.1
86	6.7	3.1	4.7	1.5
35	5.0	3.2	1.2	0.2
135	7.7	3.0	6.1	2.3
148	6.2	3.4	5.4	2.3
44	5.1	3.8	1.9	0.4
147	6.5	3.0	5.2	2.0
22	4.6	3.6	1.0	0.2
56	6.3	3.3	4.7	1.6
['Iris-virginica' 'Iris-setosa' 'Iris-setosa' 'Iris-virginica' 'Iris-setosa' 'Iris-setosa' 'Iris-setosa' 'Iris-setosa' 'Iris-versicolor']				

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JupyterLab Python 3 (ipykernel)

```
'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica'
'Iris-setosa' 'Iris-versicolor' 'Iris-setosa' 'Iris-versicolor'
'Iris-setosa' 'Iris-virginica' 'Iris-versicolor' 'Iris-virginica'
'Iris-setosa' 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica'
'Iris-virginica' 'Iris-setosa' 'Iris-virginica' 'Iris-setosa'
'Iris-versicolor']
```

C:\Users\MGM\anaconda3\envs\tanya\Lib\site-packages\sklearn\linear_model_logistic.py:465: ConvergenceWarning: lbfgs failed to converge (status=1):
STOP: TOTAL NO. OF ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
<https://scikit-learn.org/stable/modules/preprocessing.html>
Please also refer to the documentation for alternative solver options:
https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression
n_iter_i = _check_optimize_result(
C:\Users\MGM\anaconda3\envs\tanya\Lib\site-packages\sklearn\utils\validation.py:2739: UserWarning: X does not have valid feature names, but LogisticRegression was fitted with feature names
warnings.warn(
n_iter_i, ConvergenceWarning)

```
[3]: from sklearn.metrics import classification_report, confusion_matrix

print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))
```

```
[[13  0  0]
 [ 0  9  0]
 [ 0  0  8]]
```

	precision	recall	f1-score	support
Iris-setosa	1.00	1.00	1.00	13
Iris-versicolor	1.00	1.00	1.00	9
Iris-virginica	1.00	1.00	1.00	8

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JupyterLab Python 3 (ipykernel)

```
accuracy          1.00          1.00          1.00          30
macro avg         1.00          1.00          1.00          30
weighted avg      1.00          1.00          1.00          30
```

```
[4]: X = data.drop('Name', axis=1)
y = data['Name']
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.30)
logr = linear_model.LogisticRegression()
logr.fit(X_train,y_train)

#predict if tumor is cancerous where the size is 3.45mm:
predicted = logr.predict([[5.0,3.6,1.4,0.2]])

print(predicted)
y_pred = logr.predict(X_test)
print(X_test,y_pred )
```

```
['Iris-setosa']
Sepallength SepalWidth Petallength PetalWidth
83          6.0         2.7         5.1         1.6
129         7.2         3.0         5.8         1.6
127         6.1         3.0         4.9         1.8
55          5.7         2.8         4.5         1.3
101         5.8         2.7         5.1         1.9
132         6.4         2.8         5.6         2.2
77          6.7         3.0         5.0         1.7
75          6.6         3.0         4.4         1.4
131         7.9         3.8         6.4         2.0
```

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Code

JupyterLab Python 3 (ipykernel)

107	7.3	2.9	6.3	1.8
45	4.8	3.0	1.4	0.3
18	5.7	3.8	1.7	0.3
74	6.4	2.9	4.3	1.3
138	6.0	3.0	4.8	1.8
76	6.8	2.8	4.8	1.4
14	5.8	4.0	1.2	0.2
47	4.6	3.2	1.4	0.2
108	6.7	2.5	5.8	1.8
43	5.0	3.5	1.6	0.6
67	5.8	2.7	4.1	1.0
0	5.1	3.5	1.4	0.2
42	4.4	3.2	1.3	0.2
19	5.1	3.8	1.5	0.3
86	6.7	3.1	4.7	1.5
137	6.4	3.1	5.5	1.8
50	7.0	3.2	4.7	1.4
17	5.1	3.5	1.4	0.3
88	5.6	3.0	4.1	1.3
3	4.6	3.1	1.5	0.2
39	5.1	3.4	1.5	0.2
52	6.9	3.1	4.9	1.5
105	7.6	3.0	6.6	2.1
91	6.1	3.0	4.6	1.4
82	5.8	2.7	3.9	1.2
24	4.8	3.4	1.9	0.2
69	5.6	2.5	3.9	1.1
13	4.3	3.0	1.1	0.1
36	5.5	3.5	1.3	0.2
140	6.7	3.1	5.6	2.4
110	6.5	3.2	5.1	2.0

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JupyterLab Python 3 (ipykernel)

```
'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor' 'Iris-setosa'
'Iris-setosa' 'Iris-virginica' 'Iris-setosa' 'Iris-versicolor'
'Iris-setosa' 'Iris-setosa' 'Iris-setosa' 'Iris-versicolor'
'Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-versicolor'
'Iris-setosa' 'Iris-setosa' 'Iris-versicolor' 'Iris-virginica'
'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa' 'Iris-versicolor'
'Iris-setosa' 'Iris-setosa' 'Iris-virginica' 'Iris-virginica'
'Iris-versicolor']
```

C:\Users\MGM\anaconda3\envs\tanya\Lib\site-packages\sklearn\utils\validation.py:2739: UserWarning: X does not have valid feature names, but LogisticRegression was fitted with feature names
warnings.warn(

```
[5]: from sklearn.metrics import classification_report, confusion_matrix

print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))
```

```
[[17  0  0]
 [ 0 14  2]
 [ 0  0 12]]
```

	precision	recall	f1-score	support
Iris-setosa	1.00	1.00	1.00	17
Iris-versicolor	1.00	0.88	0.93	16
Iris-virginica	0.86	1.00	0.92	12
accuracy			0.96	45
macro avg	0.95	0.96	0.95	45
weighted avg	0.96	0.96	0.96	45

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```
[6]: X = data.drop('Name', axis=1)
```

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JupyterLab Python 3 (ipykernel)

weighted avg 0.96 0.96 0.96 45

```
[6]: X = data.drop('Name', axis=1)
y = data['Name']
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.40)
logr = linear_model.LogisticRegression()
logr.fit(X_train,y_train)

#predict if tumor is cancerous where the size is 3.46mm:
predicted = logr.predict([[5.0,3.6,1.4,0.2]])

print(predicted)
y_pred = logr.predict(X_test)
print(X_test,y_pred )
```

	SepalLength	SepalWidth	PetalLength	PetalWidth
35	5.0	3.2	1.2	0.2
89	5.5	2.5	4.0	1.3
146	6.3	2.5	5.0	1.9
78	6.0	2.9	4.5	1.5
114	5.8	2.8	5.1	2.4
74	6.4	2.9	4.3	1.3
80	5.5	2.4	3.8	1.1
22	4.6	3.6	1.0	0.2
103	6.3	2.9	5.6	1.8
97	6.2	2.9	4.3	1.3
145	6.7	3.0	5.2	2.3
61	5.9	3.0	4.2	1.5

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JupyterLab Python 3 (ipykernel)

149	5.9	3.0	5.1	1.8
39	5.1	3.4	1.5	0.2
34	4.9	3.1	1.5	0.1
116	6.5	3.0	5.5	1.8
102	7.1	3.0	5.9	2.1
104	6.5	3.0	5.8	2.2
73	6.1	2.8	4.7	1.2
87	6.3	2.3	4.4	1.3
135	7.7	3.0	6.1	2.3
41	4.5	2.3	1.3	0.3
101	5.8	2.7	5.1	1.9
117	7.7	3.8	6.7	2.2
36	5.5	3.5	1.3	0.2
113	5.7	2.5	5.0	2.0
50	7.0	3.2	4.7	1.4
79	5.7	2.6	3.5	1.0
72	6.3	2.5	4.9	1.5
90	5.5	2.6	4.4	1.2
109	7.2	3.6	6.1	2.5
122	7.7	2.8	6.7	2.0
107	7.3	2.9	6.3	1.8
55	5.7	2.8	4.5	1.3
65	6.7	3.1	4.4	1.4
82	5.8	2.7	3.9	1.2
81	5.5	2.4	3.7	1.0
142	5.8	2.7	5.1	1.9
125	7.2	3.2	6.0	1.8
64	5.6	2.9	3.6	1.3
120	6.9	3.2	5.7	2.3
118	7.7	2.6	6.9	2.3
139	6.9	3.1	5.4	2.1

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JupyterLab Python 3 (ipykernel)

```
88      5.6      3.0      4.1      1.3
115     6.4      3.2      5.3      2.3
42      4.4      3.2      1.3      0.2
49      5.0      3.3      1.4      0.2
40      5.0      3.5      1.3      0.3
137     6.4      3.1      5.5      1.8
25      5.0      3.0      1.6      0.2
123     6.3      2.7      4.9      1.8
11      4.8      3.4      1.6      0.2
62      6.0      2.2      4.0      1.0
32      5.2      4.1      1.5      0.1
127     6.1      3.0      4.9      1.8
100     6.3      3.3      6.0      2.5 ['Iris-setosa' 'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor'
'Iris-virginica' 'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa'
'Iris-virginica' 'Iris-versicolor' 'Iris-virginica' 'Iris-versicolor'
'Iris-setosa' 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica'
'Iris-virginica' 'Iris-setosa' 'Iris-setosa' 'Iris-virginica'
'Iris-virginica' 'Iris-virginica' 'Iris-versicolor' 'Iris-versicolor'
'Iris-virginica' 'Iris-setosa' 'Iris-virginica' 'Iris-virginica'
'Iris-setosa' 'Iris-virginica' 'Iris-versicolor' 'Iris-versicolor'
'Iris-versicolor' 'Iris-versicolor' 'Iris-virginica' 'Iris-virginica'
'Iris-virginica' 'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor'
'Iris-versicolor' 'Iris-virginica' 'Iris-virginica' 'Iris-versicolor'
'Iris-virginica' 'Iris-virginica' 'Iris-virginica' 'Iris-versicolor'
'Iris-virginica' 'Iris-setosa' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-setosa' 'Iris-virginica' 'Iris-setosa'
'Iris-versicolor' 'Iris-setosa' 'Iris-virginica' 'Iris-virginica']

C:\Users\MGM\anaconda3\envs\tanya\Lib\site-packages\sklearn\utils\validation.py:2739: UserWarning: X does not have valid feature names, but LogisticRegression was fitted with feature names
warnings.warn(
```

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JupyterLab Python 3 (ipykernel)

```
[7]: from sklearn.metrics import classification_report, confusion_matrix

print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))
```

```
[[14  0  0]
 [ 0 20  0]
 [ 0  0 26]]
```

	precision	recall	f1-score	support
Iris-setosa	1.00	1.00	1.00	14
Iris-versicolor	1.00	1.00	1.00	20
Iris-virginica	1.00	1.00	1.00	26
accuracy			1.00	60
macro avg	1.00	1.00	1.00	60
weighted avg	1.00	1.00	1.00	60

```
[8]: X = data.drop('Name', axis=1)
y = data['Name']
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.50)
logr = linear_model.LogisticRegression()
logr.fit(X_train, y_train)

#predict if tumor is cancerous where the size is 3.46mm:
predicted = logr.predict([[5.0, 3.6, 1.4, 0.2]])

print(predicted)
y_pred = logr.predict(X_test)
```

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JupyterLab Python 3 (ipykernel)

```
print(X_test,y_pred )
```

	Sepallength	SepalWidth	PetalLength	PetalWidth
112	6.8	3.0	5.5	2.1
58	6.6	2.9	4.6	1.3
70	5.9	3.2	4.8	1.8
120	6.9	3.2	5.7	2.3
136	6.3	3.4	5.6	2.4
..
77	6.7	3.0	5.0	1.7
63	6.1	2.9	4.7	1.4
132	6.4	2.8	5.6	2.2
11	4.8	3.4	1.6	0.2
34	4.9	3.1	1.5	0.1

[75 rows x 4 columns] ['Iris-virginica' 'Iris-versicolor' 'Iris-virginica' 'Iris-virginica'
'Iris-virginica' 'Iris-virginica' 'Iris-versicolor' 'Iris-virginica'
'Iris-setosa' 'Iris-setosa' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-virginica' 'Iris-setosa' 'Iris-versicolor'
'Iris-virginica' 'Iris-versicolor' 'Iris-setosa' 'Iris-setosa'
'Iris-versicolor' 'Iris-versicolor' 'Iris-setosa' 'Iris-virginica'
'Iris-virginica' 'Iris-virginica' 'Iris-setosa' 'Iris-setosa'
'Iris-setosa' 'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor'
'Iris-virginica' 'Iris-versicolor' 'Iris-virginica' 'Iris-setosa'
'Iris-setosa' 'Iris-versicolor' 'Iris-versicolor' 'Iris-versicolor'
'Iris-versicolor' 'Iris-setosa' 'Iris-setosa' 'Iris-setosa'
'Iris-virginica' 'Iris-virginica' 'Iris-virginica' 'Iris-versicolor'
'Iris-setosa' 'Iris-virginica' 'Iris-versicolor' 'Iris-versicolor'
'Iris-versicolor' 'Iris-virginica' 'Iris-setosa' 'Iris-versicolor'
'Iris-versicolor' 'Iris-virginica' 'Iris-virginica' 'Iris-versicolor'
'Iris-virginica' 'Iris-setosa' 'Iris-versicolor' 'Iris-setosa']

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JupyterLab Python 3 (ipykernel)

```
Warning: Model was fitted with feature names
warnings.warn(

[9]: from sklearn.metrics import classification_report, confusion_matrix

print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))

[[23  0  0]
 [ 0 24  3]
 [ 0  2 23]]

      precision    recall  f1-score   support

 Iris-setosa       1.00      1.00      1.00        23
 Iris-versicolor   0.92      0.89      0.91        27
 Iris-virginica    0.88      0.92      0.90        25

 accuracy          0.93          0.93          0.93        75
 macro avg         0.94          0.94          0.94        75
 weighted avg      0.93          0.93          0.93        75
```

[]:

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