

Iris_analysis_ML(MLR)

August 15, 2025

Connected to Python 3.13.6

```
[ ]: import numpy as np
[ ]: import pandas as pd
[ ]: import matplotlib.pyplot as plt
[ ]: from sklearn.linear_model import LogisticRegression
[ ]: from sklearn.model_selection import train_test_split
[ ]: from sklearn.model_selection import train_test_split
[ ]: import os
[ ]: os.getcwd()
[ ]: 'c:\\Users\\HP\\Downloads\\datascience.py'
[ ]: import pandas as pd
[ ]: os.getcwd() # get the current working directory
[ ]: 'c:\\Users\\HP\\Downloads\\datascience.py'
[ ]: os.listdir('c:\\Users\\HP\\Downloads\\datascience.py') # identify files in the
    ↳directory
[ ]: ['data.py',
    'data_files',
    'Iris_analysis.py',
    'macinelearning_of_irisdata.py',
    'practice1.py']
[ ]: os.chdir('c:\\Users\\HP\\Downloads\\datascience.py\\data_files') # change
    ↳directory
```

```
[ ]: os.listdir('c:\\Users\\HP\\Downloads\\datascience.py\\data_files')
```

```
[ ]: ['IRIS.csv', 'irisdata.csv', 'Ng_MLY01_13.pdf']
```

```
[ ]: link_to_Iris_data = "c:\\Users\\HP\\Downloads\\datascience.  
    ↪py\\data_files\\irisdata.csv"
```

```
[ ]: Iris_data = pd.read_csv(link_to_Iris_data)
```

```
[ ]: Iris_data.head(6) # head
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species  
0          5.1          3.5          1.4          0.2  Iris-setosa  
1          4.9          3.0          1.4          0.2  Iris-setosa  
2          4.7          3.2          1.3          0.2  Iris-setosa  
3          4.6          3.1          1.5          0.2  Iris-setosa  
4          5.0          3.6          1.4          0.2  Iris-setosa  
5          5.4          3.9          1.7          0.4  Iris-setosa
```

```
[ ]: Iris_data.tail(6) #tail
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species  
144          6.7          3.3          5.7          2.5  Iris-virginica  
145          6.7          3.0          5.2          2.3  Iris-virginica  
146          6.3          2.5          5.0          1.9  Iris-virginica  
147          6.5          3.0          5.2          2.0  Iris-virginica  
148          6.2          3.4          5.4          2.3  Iris-virginica  
149          5.9          3.0          5.1          1.8  Iris-virginica
```

```
[ ]: Iris_data.shape
```

```
[ ]: (150, 5)
```

```
[ ]: Iris_data.dtypes
```

```
[ ]: sepal_length    float64  
     sepal_width    float64  
     petal_length    float64  
     petal_width    float64  
     species         object  
     dtype: object
```

```
[ ]: Iris_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>  
RangeIndex: 150 entries, 0 to 149  
Data columns (total 5 columns):  
#   Column          Non-Null Count  Dtype  
---  ---  
-----
```

```

0    sepal_length  150 non-null    float64
1    sepal_width   150 non-null    float64
2    petal_length  150 non-null    float64
3    petal_width   150 non-null    float64
4    species       150 non-null    object
dtypes: float64(4), object(1)
memory usage: 6.0+ KB

```

```
[ ]: Iris_data.describe()
```

```

[ ]:
      sepal_length  sepal_width  petal_length  petal_width
count    150.000000    150.000000    150.000000    150.000000
mean         5.843333         3.054000         3.758667         1.198667
std          0.828066         0.433594         1.764420         0.763161
min          4.300000         2.000000         1.000000         0.100000
25%          5.100000         2.800000         1.600000         0.300000
50%          5.800000         3.000000         4.350000         1.300000
75%          6.400000         3.300000         5.100000         1.800000
max          7.900000         4.400000         6.900000         2.500000

```

```
[ ]: Iris_data.columns # all column are relevant
```

```

[ ]: Index(['sepal_length', 'sepal_width', 'petal_length', 'petal_width',
          'species'],
          dtype='object')

```

```
[ ]: Iris_data.isna().sum()
```

```

[ ]: sepal_length    0
      sepal_width    0
      petal_length    0
      petal_width    0
      species        0
      dtype: int64

```

```
[ ]: Iris_data.duplicated()
```

```

[ ]: 0    False
      1    False
      2    False
      3    False
      4    False
      ...
      145  False
      146  False
      147  False
      148  False
      149  False

```

Length: 150, dtype: bool

```
[ ]: Iris_data.loc[Iris_data.duplicated()]
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
34          4.9          3.1          1.5          0.1  Iris-setosa
37          4.9          3.1          1.5          0.1  Iris-setosa
142         5.8          2.7          5.1          1.9  Iris-virginica
```

```
[ ]: Iris_data.loc[Iris_data.duplicated()]
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
34          4.9          3.1          1.5          0.1  Iris-setosa
37          4.9          3.1          1.5          0.1  Iris-setosa
142         5.8          2.7          5.1          1.9  Iris-virginica
```

```
[ ]: Iris_data.query('sepal_width == 2.7 & sepal_length == 5.8 & petal_length == 5.
↪1')
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
101         5.8          2.7          5.1          1.9  Iris-virginica
142         5.8          2.7          5.1          1.9  Iris-virginica
```

```
[ ]: Iris_data.loc[Iris_data.duplicated()]
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
34          4.9          3.1          1.5          0.1  Iris-setosa
37          4.9          3.1          1.5          0.1  Iris-setosa
142         5.8          2.7          5.1          1.9  Iris-virginica
```

```
[ ]: Iris_data.loc[Iris_data.duplicated()]
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
34          4.9          3.1          1.5          0.1  Iris-setosa
37          4.9          3.1          1.5          0.1  Iris-setosa
142         5.8          2.7          5.1          1.9  Iris-virginica
```

```
[ ]: Iris_data.query('sepal_width == 2.7 & sepal_length == 5.8 & petal_length == 5.
↪1')
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
101         5.8          2.7          5.1          1.9  Iris-virginica
142         5.8          2.7          5.1          1.9  Iris-virginica
```

```
[ ]: Iris_data1 = Iris_data.loc[~Iris_data.duplicated(subset_
↪=['sepal_length', 'sepal_width', 'petal_length', 'petal_width'])]
```

```
[ ]: Iris_data1.head(6)
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
0          5.1          3.5          1.4          0.2  Iris-setosa
1          4.9          3.0          1.4          0.2  Iris-setosa
2          4.7          3.2          1.3          0.2  Iris-setosa
3          4.6          3.1          1.5          0.2  Iris-setosa
4          5.0          3.6          1.4          0.2  Iris-setosa
5          5.4          3.9          1.7          0.4  Iris-setosa
```

```
[ ]: Iris_data1.loc[Iris_data.duplicated()]
```

```
[ ]: Empty DataFrame
Columns: [sepal_length, sepal_width, petal_length, petal_width, species]
Index: []
```

```
[ ]: Iris_data1.head(6)
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
0          5.1          3.5          1.4          0.2  Iris-setosa
1          4.9          3.0          1.4          0.2  Iris-setosa
2          4.7          3.2          1.3          0.2  Iris-setosa
3          4.6          3.1          1.5          0.2  Iris-setosa
4          5.0          3.6          1.4          0.2  Iris-setosa
5          5.4          3.9          1.7          0.4  Iris-setosa
```

```
[ ]: Iris_data1.head(6)
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
0          5.1          3.5          1.4          0.2  Iris-setosa
1          4.9          3.0          1.4          0.2  Iris-setosa
2          4.7          3.2          1.3          0.2  Iris-setosa
3          4.6          3.1          1.5          0.2  Iris-setosa
4          5.0          3.6          1.4          0.2  Iris-setosa
5          5.4          3.9          1.7          0.4  Iris-setosa
```

```
[ ]: Iris_data1.shape
```

```
[ ]: (147, 5)
```

```
[ ]: Iris_data = Iris_data.rename(columns = {'species' : 'flower_type'})
```

```
[ ]: from sklearn.linear_model import LogisticRegression
```

```
[ ]: from sklearn.model_selection import train_test_split
```

```
[ ]: from sklearn.metrics import accuracy_score
```

```
[ ]: Iris_data1
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
0          5.1          3.5          1.4          0.2      Iris-setosa
1          4.9          3.0          1.4          0.2      Iris-setosa
2          4.7          3.2          1.3          0.2      Iris-setosa
3          4.6          3.1          1.5          0.2      Iris-setosa
4          5.0          3.6          1.4          0.2      Iris-setosa
..          ...          ...          ...          ...          ...
145         6.7          3.0          5.2          2.3      Iris-virginica
146         6.3          2.5          5.0          1.9      Iris-virginica
147         6.5          3.0          5.2          2.0      Iris-virginica
148         6.2          3.4          5.4          2.3      Iris-virginica
149         5.9          3.0          5.1          1.8      Iris-virginica
```

[147 rows x 5 columns]

```
[ ]: Iris_data = Iris_data.rename(columns = {'species' : 'flower_type'})
```

```
[ ]: Iris_data1
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width      species
0          5.1          3.5          1.4          0.2      Iris-setosa
1          4.9          3.0          1.4          0.2      Iris-setosa
2          4.7          3.2          1.3          0.2      Iris-setosa
3          4.6          3.1          1.5          0.2      Iris-setosa
4          5.0          3.6          1.4          0.2      Iris-setosa
..          ...          ...          ...          ...          ...
145         6.7          3.0          5.2          2.3      Iris-virginica
146         6.3          2.5          5.0          1.9      Iris-virginica
147         6.5          3.0          5.2          2.0      Iris-virginica
148         6.2          3.4          5.4          2.3      Iris-virginica
149         5.9          3.0          5.1          1.8      Iris-virginica
```

[147 rows x 5 columns]

```
[ ]: Iris_data1 = Iris_data1.rename(columns = {'species' : 'flower_type'})
```

```
[ ]: Iris_data1
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width  flower_type
0          5.1          3.5          1.4          0.2      Iris-setosa
1          4.9          3.0          1.4          0.2      Iris-setosa
2          4.7          3.2          1.3          0.2      Iris-setosa
3          4.6          3.1          1.5          0.2      Iris-setosa
4          5.0          3.6          1.4          0.2      Iris-setosa
..          ...          ...          ...          ...          ...
145         6.7          3.0          5.2          2.3      Iris-virginica
146         6.3          2.5          5.0          1.9      Iris-virginica
```

| | | | | | |
|-----|-----|-----|-----|-----|----------------|
| 147 | 6.5 | 3.0 | 5.2 | 2.0 | Iris-virginica |
| 148 | 6.2 | 3.4 | 5.4 | 2.3 | Iris-virginica |
| 149 | 5.9 | 3.0 | 5.1 | 1.8 | Iris-virginica |

[147 rows x 5 columns]

```
[ ]: Iris_data1['sepal_length']
```

```
[ ]: 0      5.1
      1      4.9
      2      4.7
      3      4.6
      4      5.0
      ...
      145    6.7
      146    6.3
      147    6.5
      148    6.2
      149    5.9
      Name: sepal_length, Length: 147, dtype: float64
```

```
[ ]: X, Y = Iris_data1.drop('flower_type',axis=1), Iris_data1['flower_type']
```

```
[ ]: X, Y = Iris_data1.drop('flower_type',axis=1), Iris_data1['flower_type']
```

```
[ ]: X, Y
```

```
[ ]: (   sepal_length  sepal_width  petal_length  petal_width
      0          5.1          3.5          1.4          0.2
      1          4.9          3.0          1.4          0.2
      2          4.7          3.2          1.3          0.2
      3          4.6          3.1          1.5          0.2
      4          5.0          3.6          1.4          0.2
      ..          ...          ...          ...          ...
      145         6.7          3.0          5.2          2.3
      146         6.3          2.5          5.0          1.9
      147         6.5          3.0          5.2          2.0
      148         6.2          3.4          5.4          2.3
      149         5.9          3.0          5.1          1.8
```

[147 rows x 4 columns],

```
0      Iris-setosa
1      Iris-setosa
2      Iris-setosa
3      Iris-setosa
4      Iris-setosa
      ...
```

```

145     Iris-virginica
146     Iris-virginica
147     Iris-virginica
148     Iris-virginica
149     Iris-virginica
Name: flower_type, Length: 147, dtype: object)

```

```
[ ]: X_train, X_test, Y_train, Y_test = train_test_split(X,Y, test_size= 0.2,
                                                    random_state=2)
```

```
[ ]: X_train, X_test, Y_train, Y_test
```

```
[ ]: (
      sepal_length  sepal_width  petal_length  petal_width
14              5.8           4.0           1.2           0.2
101             5.8           2.7           5.1           1.9
130             7.4           2.8           6.1           1.9
122             7.7           2.8           6.7           2.0
47              4.6           3.2           1.4           0.2
..             ...           ...           ...           ...
77              6.7           3.0           5.0           1.7
45              4.8           3.0           1.4           0.3
22              4.6           3.6           1.0           0.2
74              6.4           2.9           4.3           1.3
15              5.7           4.4           1.5           0.4

```

```
[117 rows x 4 columns],
```

```

      sepal_length  sepal_width  petal_length  petal_width
93              5.0           2.3           3.3           1.0
129             7.2           3.0           5.8           1.6
3              4.6           3.1           1.5           0.2
36             5.5           3.5           1.3           0.2
136            6.3           3.4           5.6           2.4
84             5.4           3.0           4.5           1.5
131            7.9           3.8           6.4           2.0
12             4.8           3.0           1.4           0.1
44             5.1           3.8           1.9           0.4
128            6.4           2.8           5.6           2.1
5              5.4           3.9           1.7           0.4
55             5.7           2.8           4.5           1.3
95             5.7           3.0           4.2           1.2
124            6.7           3.3           5.7           2.1
50             7.0           3.2           4.7           1.4
61             5.9           3.0           4.2           1.5
24             4.8           3.4           1.9           0.2
88             5.6           3.0           4.1           1.3
43             5.0           3.5           1.6           0.6
79             5.7           2.6           3.5           1.0

```


| | | | | |
|--|-----------------|-----|-----|------|
| 87 | 6.3 | 2.3 | 4.4 | 1.3 |
| 125 | 7.2 | 3.2 | 6.0 | 1.8 |
| 25 | 5.0 | 3.0 | 1.6 | 0.2 |
| 2 | 4.7 | 3.2 | 1.3 | 0.2 |
| 116 | 6.5 | 3.0 | 5.5 | 1.8 |
| 66 | 5.6 | 3.0 | 4.5 | 1.5 |
| 148 | 6.2 | 3.4 | 5.4 | 2.3 |
| 23 | 5.1 | 3.3 | 1.7 | 0.5 |
| 46 | 5.1 | 3.8 | 1.6 | 0.2 |
| 56 | 6.3 | 3.3 | 4.7 | 1.6, |
| 14 | Iris-setosa | | | |
| 101 | Iris-virginica | | | |
| 130 | Iris-virginica | | | |
| 122 | Iris-virginica | | | |
| 47 | Iris-setosa | | | |
| | ... | | | |
| 77 | Iris-versicolor | | | |
| 45 | Iris-setosa | | | |
| 22 | Iris-setosa | | | |
| 74 | Iris-versicolor | | | |
| 15 | Iris-setosa | | | |
| Name: flower_type, Length: 117, dtype: object, | | | | |
| 93 | Iris-versicolor | | | |
| 129 | Iris-virginica | | | |
| 3 | Iris-setosa | | | |
| 36 | Iris-setosa | | | |
| 136 | Iris-virginica | | | |
| 84 | Iris-versicolor | | | |
| 131 | Iris-virginica | | | |
| 12 | Iris-setosa | | | |
| 44 | Iris-setosa | | | |
| 128 | Iris-virginica | | | |
| 5 | Iris-setosa | | | |
| 55 | Iris-versicolor | | | |
| 95 | Iris-versicolor | | | |
| 124 | Iris-virginica | | | |
| 50 | Iris-versicolor | | | |
| 61 | Iris-versicolor | | | |
| 24 | Iris-setosa | | | |
| 88 | Iris-versicolor | | | |
| 43 | Iris-setosa | | | |
| 79 | Iris-versicolor | | | |
| 87 | Iris-versicolor | | | |
| 125 | Iris-virginica | | | |
| 25 | Iris-setosa | | | |
| 2 | Iris-setosa | | | |
| 116 | Iris-virginica | | | |

```

66     Iris-versicolor
148     Iris-virginica
23      Iris-setosa
46      Iris-setosa
56     Iris-versicolor
Name: flower_type, dtype: object)

```

```
[ ]: X_train, X_test, Y_train, Y_test = train_test_split(X,Y, test_size= 0.2,
                                                    random_state=2)
```

```
[ ]: print(Y.shape,Y_train.shape,Y_test.shape )
```

```
(147,) (117,) (30,)
```

```
[ ]: print(X,X_test.shape,X_train.shape)
```

| | sepal_length | sepal_width | petal_length | petal_width |
|-----|--------------|-------------|--------------|-------------|
| 0 | 5.1 | 3.5 | 1.4 | 0.2 |
| 1 | 4.9 | 3.0 | 1.4 | 0.2 |
| 2 | 4.7 | 3.2 | 1.3 | 0.2 |
| 3 | 4.6 | 3.1 | 1.5 | 0.2 |
| 4 | 5.0 | 3.6 | 1.4 | 0.2 |
| .. | ... | ... | ... | ... |
| 145 | 6.7 | 3.0 | 5.2 | 2.3 |
| 146 | 6.3 | 2.5 | 5.0 | 1.9 |
| 147 | 6.5 | 3.0 | 5.2 | 2.0 |
| 148 | 6.2 | 3.4 | 5.4 | 2.3 |
| 149 | 5.9 | 3.0 | 5.1 | 1.8 |

```
[147 rows x 4 columns] (30, 4) (117, 4)
```

```
[ ]: print(X.shape,X_test.shape,X_train.shape)
```

```
(147, 4) (30, 4) (117, 4)
```

```
[ ]: X_test
```

| | sepal_length | sepal_width | petal_length | petal_width |
|-----|--------------|-------------|--------------|-------------|
| 93 | 5.0 | 2.3 | 3.3 | 1.0 |
| 129 | 7.2 | 3.0 | 5.8 | 1.6 |
| 3 | 4.6 | 3.1 | 1.5 | 0.2 |
| 36 | 5.5 | 3.5 | 1.3 | 0.2 |
| 136 | 6.3 | 3.4 | 5.6 | 2.4 |
| 84 | 5.4 | 3.0 | 4.5 | 1.5 |
| 131 | 7.9 | 3.8 | 6.4 | 2.0 |
| 12 | 4.8 | 3.0 | 1.4 | 0.1 |
| 44 | 5.1 | 3.8 | 1.9 | 0.4 |
| 128 | 6.4 | 2.8 | 5.6 | 2.1 |
| 5 | 5.4 | 3.9 | 1.7 | 0.4 |

| | | | | |
|-----|-----|-----|-----|-----|
| 55 | 5.7 | 2.8 | 4.5 | 1.3 |
| 95 | 5.7 | 3.0 | 4.2 | 1.2 |
| 124 | 6.7 | 3.3 | 5.7 | 2.1 |
| 50 | 7.0 | 3.2 | 4.7 | 1.4 |
| 61 | 5.9 | 3.0 | 4.2 | 1.5 |
| 24 | 4.8 | 3.4 | 1.9 | 0.2 |
| 88 | 5.6 | 3.0 | 4.1 | 1.3 |
| 43 | 5.0 | 3.5 | 1.6 | 0.6 |
| 79 | 5.7 | 2.6 | 3.5 | 1.0 |
| 87 | 6.3 | 2.3 | 4.4 | 1.3 |
| 125 | 7.2 | 3.2 | 6.0 | 1.8 |
| 25 | 5.0 | 3.0 | 1.6 | 0.2 |
| 2 | 4.7 | 3.2 | 1.3 | 0.2 |
| 116 | 6.5 | 3.0 | 5.5 | 1.8 |
| 66 | 5.6 | 3.0 | 4.5 | 1.5 |
| 148 | 6.2 | 3.4 | 5.4 | 2.3 |
| 23 | 5.1 | 3.3 | 1.7 | 0.5 |
| 46 | 5.1 | 3.8 | 1.6 | 0.2 |
| 56 | 6.3 | 3.3 | 4.7 | 1.6 |

```
[ ]: X_train
```

```
[ ]:      sepal_length  sepal_width  petal_length  petal_width
14          5.8          4.0          1.2          0.2
101         5.8          2.7          5.1          1.9
130         7.4          2.8          6.1          1.9
122         7.7          2.8          6.7          2.0
47          4.6          3.2          1.4          0.2
..          ...          ...          ...          ...
77          6.7          3.0          5.0          1.7
45          4.8          3.0          1.4          0.3
22          4.6          3.6          1.0          0.2
74          6.4          2.9          4.3          1.3
15          5.7          4.4          1.5          0.4
```

[117 rows x 4 columns]

```
[ ]: Y_train
```

```
[ ]: 14      Iris-setosa
101     Iris-virginica
130     Iris-virginica
122     Iris-virginica
47      Iris-setosa
..
77      Iris-versicolor
45      Iris-setosa
```

```
22      Iris-setosa
74      Iris-versicolor
15      Iris-setosa
Name: flower_type, Length: 117, dtype: object
```

```
[ ]: from sklearn.linear_model import LogisticRegression
     from sklearn.model_selection import train_test_split
     from sklearn.metrics import accuracy_score
```

```
[ ]: model = LogisticRegression(multi_class= "multinomial")
```

```
[ ]: model.fit(X_train,Y_train)
```

```
c:\Users\HP\AppData\Local\Programs\Python\Python313\Lib\site-
packages\sklearn\linear_model\_logistic.py:1272: FutureWarning: 'multi_class'
was deprecated in version 1.5 and will be removed in 1.7. From then on, it will
always use 'multinomial'. Leave it to its default value to avoid this warning.
warnings.warn(
```

```
[ ]: LogisticRegression(multi_class='multinomial')
```

```
[ ]: X_test_prediction = model.predict(X_test)
```

```
[ ]: X_test_prediction
```

```
[ ]: array(['Iris-versicolor', 'Iris-virginica', 'Iris-setosa', 'Iris-setosa',
          'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
          'Iris-setosa', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
          'Iris-versicolor', 'Iris-versicolor', 'Iris-virginica',
          'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
          'Iris-versicolor', 'Iris-setosa', 'Iris-versicolor',
          'Iris-versicolor', 'Iris-virginica', 'Iris-setosa', 'Iris-setosa',
          'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
          'Iris-setosa', 'Iris-setosa', 'Iris-versicolor'], dtype=object)
```

```
[ ]: print("Accuracy : " ,test_data_accuracy)
```

```
Accuracy :  1.0
```

```
[ ]: from sklearn.metrics import accuracy_score, precision_score, recall_score,
     ↪confusion_matrix, classification_report
```

```
[ ]: print("Precision (macro):", precision_score(X_test_prediction,Y_test,
     ↪average='macro'))
```

```
Precision (macro): 1.0
```

```
[ ]: print("Recall (macro):", recall_score(X_test_prediction,Y_test,
     ↪average='macro'))
```

Recall (macro): 1.0

```
[ ]: confusion_matrix = confusion_matrix(X_test_prediction,Y_test)
```

```
[ ]: confusion_matrix
```

```
[ ]: array([[11,  0,  0],
          [ 0, 11,  0],
          [ 0,  0,  8]])
```

```
[ ]: Iris_data1.iloc[1,]
```

```
[ ]: sepal_length      4.9
     sepal_width       3.0
     petal_length      1.4
     petal_width       0.2
     flower_type      Iris-setosa
     Name: 1, dtype: object
```

```
[ ]: input_data = (4.9,3.0,1.4,0.2)
```

```
[ ]: input_data = (4.9,3.0,1.4,0.2)
```

```
[ ]: input_data_numpy_array = np.asarray(input_data)
```

```
[ ]: input_data_reshape = input_data_numpy_array.reshape(1,-1)
```

```
[ ]: input_data_reshape
```

```
[ ]: array([[4.9, 3. , 1.4, 0.2]])
```

```
[ ]: input_data_reshape.shape
```

```
[ ]: (1, 4)
```

```
[ ]: input_data_numpy_array.shape
```

```
[ ]: (4,)
```

```
[ ]: prediction = model.predict(input_data_reshape)
```

```
c:\Users\HP\AppData\Local\Programs\Python\Python313\Lib\site-
packages\sklearn\utils\validation.py:2749: UserWarning: X does not have valid
feature names, but LogisticRegression was fitted with feature names
  warnings.warn(
```

```
[ ]: print(prediction )
```

```
['Iris-setosa']
```