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TASK 2:Tea Leaves Disease Prediction

Submitted by
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```python
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score,accuracy_score
```

In [3]:
```python
data=pd.read_csv("PlantDisease.csv")
```

In [4]:
```python
data.head()
```

Out[4]:

	Anthracnose	algal leaf	bird eye spot	brown blight	gray light	red leaf spot	white spot	healthy
0	1	1	1	0	0	0	0	0
1	0	0	0	1	1	0	0	1
2	0	0	0	0	0	0	1	0
3	1	0	0	0	0	0	0	0
4	1	1	0	0	0	0	1	0

In [5]:
```python
data.info()
```

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```python
In [5]:   data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 42 entries, 0 to 41
Data columns (total 8 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Anthracnose    42 non-null     int64
 1   algal leaf     42 non-null     int64
 2   bird eye spot  42 non-null     int64
 3   brown blight   42 non-null     int64
 4   gray light     42 non-null     int64
 5   red leaf spot  42 non-null     int64
 6   white spot     42 non-null     int64
 7   healthy        42 non-null     int64
dtypes: int64(8)
memory usage: 2.8 KB
```

```python
In [6]:   data.shape
```

```
Out[6]:   (42, 8)
```

```python
In [7]:   data.describe
```

```
Out[7]:  <bound method NDFrame.describe of     Anthracnose  algal leaf  bird eye spot  brown blight  gray light  \
         0              1           1              1             0           0
         1              0           0              0             1           1
         2              0           0              0             0           0
         3              1           0              0             0           0
         4              1           1              0             0           0
```

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8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0	0	0
12	0	0	0	0	0
13	0	0	0	0	0
14	1	0	0	0	0
15	0	0	0	0	0
16	1	1	0	0	0
17	0	1	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0
20	1	0	0	0	0
21	0	0	0	0	0
22	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
25	0	0	0	0	0
26	0	0	0	1	0
27	0	0	0	0	0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	0	0
31	0	0	0	0	0
32	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36	0	0	0	0	0
37	0	1	0	0	0
38	0	0	0	0	0
39	0	1	0	0	0
40	0	1	0	0	0
41	1	1	0	0	0

41	1	1	0	0	0

	red leaf spot	white spot	healthy
0	0	0	0
1	0	0	1
2	0	1	0
3	0	0	0
4	0	1	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	1
16	0	0	0
17	1	0	1
18	0	0	1
19	1	0	0
20	0	0	0
21	0	0	0
22	1	0	0
23	1	0	0
24	0	0	0
25	0	0	1
26	0	0	1
27	0	0	1
28	0	0	0
29	0	0	0
30	0	0	0

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In [8]:
```python
data.corr()
```

Out[8]:

	Anthracnose	algal leaf	bird eye spot	brown blight	gray light	red leaf spot	white spot	healthy
Anthracnose	1.000000	0.433861	0.349215	-0.100000	-0.069843	-1.825742e-01	0.200000	-2.000000e-01
algal leaf	0.433861	1.000000	0.321960	-0.108465	-0.075755	1.485221e-01	0.176256	-5.423261e-02
bird eye spot	0.349215	0.321960	1.000000	-0.034922	-0.024390	-6.375767e-02	-0.034922	-6.984303e-02
brown blight	-0.100000	-0.108465	-0.034922	1.000000	0.698430	-9.128709e-02	-0.050000	5.000000e-01
gray light	-0.069843	-0.075755	-0.024390	0.698430	1.000000	-6.375767e-02	-0.034922	3.492151e-01
red leaf spot	-0.182574	0.148522	-0.063758	-0.091287	-0.063758	1.000000e+00	-0.091287	8.868040e-18
white spot	0.200000	0.176256	-0.034922	-0.050000	-0.034922	-9.128709e-02	1.000000	-1.000000e-01
healthy	-0.200000	-0.054233	-0.069843	0.500000	0.349215	8.868040e-18	-0.100000	1.000000e+00

In [10]:
```python
features=data.drop('healthy',axis=1)
labels=data['healthy']
```

In [11]:
```python
X_train,X_test,y_train,y_test=train_test_split(features,labels,test_size=0.2,random_state=100)
```

In [12]:
```python
regressor=LinearRegression()
```

In [13]:
```python
regressor.fit(X_train,y_train)
```

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In [13]:
```python
regressor.fit(X_train,y_train)
```

Out[13]: LinearRegression()

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [14]:
```python
y_pred=regressor.predict(X_test)
```

In [15]:
```python
mse=mean_squared_error(y_test,y_pred)
```

In [16]:
```python
r2=r2_score(y_test,y_pred)
```

In [18]:
```python
print(X_train)
```

```
    Anthracnose  algal leaf  bird eye spot  brown blight  gray light  \
36            0           0              0             0           0
18            0           0              0             0           0
7             0           0              0             0           0
39            0           1              0             0           0
32            0           0              0             0           0
25            0           0              0             0           0
28            0           0              0             0           0
19            0           0              0             0           0
13            0           0              0             0           0
1             0           0              0             1           1
26            0           0              0             1           0
12            0           0              0             0           0
31            0           0              0             0           0
```

```
33        0        0        0        0        0
14        1        0        0        0        0
2         0        0        0        0        0
34        0        0        0        0        0
30        0        0        0        0        0
10        0        0        0        0        0
15        0        0        0        0        0
23        0        0        0        0        0
3         1        0        0        0        0
24        0        0        0        0        0
8         0        0        0        0        0


      red leaf spot  white spot
36        0        0
18        0        0
7         0        0
39        1        0
32        0        0
25        0        0
28        0        0
19        1        0
13        0        0
1         0        0
26        0        0
12        0        0
31        0        0
22        1        0
9         0        0
29        0        0
11        0        0
4         0        1
37        0        0
40        0        0
16        0        0
```

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```
 3          0          0
24          0          0
 8          0          0
```

In [19]:
```
print(X_test)
```

```
    Anthracnose  algal leaf  bird eye spot  brown blight  gray light  \
27            0           0              0             0           0
5             0           0              0             0           0
6             0           0              0             0           0
38            0           0              0             0           0
21            0           0              0             0           0
0             1           1              1             0           0
20            1           0              0             0           0
41            1           1              0             0           0
35            0           0              0             0           0
```

```
    red leaf spot  white spot
27              0           0
5               0           0
6               0           0
38              0           0
21              0           0
0               0           0
20              0           0
41              0           0
35              0           0
```

In [20]:
```
print(y_train)
```

```
36    0
18    1
7     0
```

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```
                  35          0          0
```

In [20]:
```python
print(y_train)
```

```
36    0
18    1
7     0
39    0
32    0
25    1
28    0
19    0
13    0
1     1
26    1
12    0
31    0
22    0
9     0
29    0
11    0
4     0
37    0
40    0
16    0
17    1
33    0
14    0
2     0
34    0
30    0
10    0
15    1
23    0
```

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```
24      0
8       0
Name: healthy, dtype: int64
```

In [21]:
```python
print(y_test)
```

```
27      1
5       0
6       0
38      0
21      0
0       0
20      0
41      0
35      0
Name: healthy, dtype: int64
```

In [22]:
```python
print(f"Mean Squared Error:{mse}")
```

Mean Squared Error:0.09455985828254297

In [23]:
```python
print(f"R-squared score:{r2}")
```

R-squared score:0.04258143488925237

In [33]:
```python
print(y_pred)
```

```
[ 0.13824885  0.13824885  0.13824885  0.13824885  0.13824885  0.07834101
 -0.02419355  0.07834101  0.13824885]
```

In [72]:
```python
new=[[0,0,1,1,0,1,1]]
```

main

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- TASK 3
- TASK1
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```
35     0
Name: healthy, dtype: int64
```

In [22]:
```python
print(f"Mean Squared Error:{mse}")
```

```
Mean Squared Error:0.09455985828254297
```

In [23]:
```python
print(f"R-squared score:{r2}")
```

```
R-squared score:0.04258143488925237
```

In [33]:
```python
print(y_pred)
```

```
[ 0.13824885  0.13824885  0.13824885  0.13824885  0.13824885  0.07834101
 -0.02419355  0.07834101  0.13824885]
```

In [72]:
```python
new=[[0,0,1,1,0,1,1]]
```

In [76]:
```python
predicted= regressor.predict(new)
```

```
C:\ProgramData\anaconda3\Lib\site-packages\sklearn\base.py:439: UserWarning: X does not have valid feature names, but LinearRegression was fitted with feature names
  warnings.warn(
```

In [77]:
```python
print(f"Prediction: {predicted}")
```

```
Prediction: [0.8859447]
```