



FileEditSelectionViewGoRunTerminalHelp

←→Search

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. ManageLearn More

Get StartedWater Quality Prediction .ipynb

C: > Users > ELCOT > Desktop > Water-Quality- > Water Quality Prediction .ipynb > M•Exploratory Data Analysis > df.isnull().sum()

+ Code+ Markdown...

Select Kernel

```
grid_search_knn.fit(X_train, Y_train)

# summarize results
print(f"Best: {grid_search_knn.best_score_:.3f} using {grid_search_knn.best_params_}")
means = grid_search_knn.cv_results_['mean_test_score']
stds = grid_search_knn.cv_results_['std_test_score']
params = grid_search_knn.cv_results_['params']

for mean, stdev, param in zip(means, stds, params):
    print(f"{mean:.3f} ({stdev:.3f}) with: {param}")
```

[151]Python

...

Output exceeds the [size limit](#). Open the full output data [in a text editor](#)

Best: 0.603 using {'metric': 'manhattan', 'n\_neighbors': 22, 'weights': 'uniform'}  
0.536 (0.029) with: {'metric': 'euclidean', 'n\_neighbors': 1, 'weights': 'uniform'}  
0.536 (0.029) with: {'metric': 'euclidean', 'n\_neighbors': 1, 'weights': 'distance'}  
0.579 (0.020) with: {'metric': 'euclidean', 'n\_neighbors': 2, 'weights': 'uniform'}  
0.536 (0.029) with: {'metric': 'euclidean', 'n\_neighbors': 2, 'weights': 'distance'}  
0.542 (0.023) with: {'metric': 'euclidean', 'n\_neighbors': 3, 'weights': 'uniform'}  
0.542 (0.024) with: {'metric': 'euclidean', 'n\_neighbors': 3, 'weights': 'distance'}  
0.574 (0.017) with: {'metric': 'euclidean', 'n\_neighbors': 4, 'weights': 'uniform'}  
0.542 (0.016) with: {'metric': 'euclidean', 'n\_neighbors': 4, 'weights': 'distance'}  
0.545 (0.020) with: {'metric': 'euclidean', 'n\_neighbors': 5, 'weights': 'uniform'}  
0.544 (0.020) with: {'metric': 'euclidean', 'n\_neighbors': 5, 'weights': 'distance'}  
0.579 (0.020) with: {'metric': 'euclidean', 'n\_neighbors': 6, 'weights': 'uniform'}  
0.556 (0.025) with: {'metric': 'euclidean', 'n\_neighbors': 6, 'weights': 'distance'}  
0.561 (0.022) with: {'metric': 'euclidean', 'n\_neighbors': 7, 'weights': 'uniform'}  
0.564 (0.018) with: {'metric': 'euclidean', 'n\_neighbors': 7, 'weights': 'distance'}

Restricted Mode0/0

Cell 5 of 80

Type here to search

29°C

16:32

19-11-2022

```
0.542 (0.016) with: {'metric': 'euclidean', 'n_neighbors': 4, 'weights': 'distance'}
0.545 (0.020) with: {'metric': 'euclidean', 'n_neighbors': 5, 'weights': 'uniform'}
0.544 (0.020) with: {'metric': 'euclidean', 'n_neighbors': 5, 'weights': 'distance'}
0.579 (0.020) with: {'metric': 'euclidean', 'n_neighbors': 6, 'weights': 'uniform'}
0.556 (0.025) with: {'metric': 'euclidean', 'n_neighbors': 6, 'weights': 'distance'}
0.561 (0.022) with: {'metric': 'euclidean', 'n_neighbors': 7, 'weights': 'uniform'}
0.564 (0.018) with: {'metric': 'euclidean', 'n_neighbors': 7, 'weights': 'distance'}
0.580 (0.028) with: {'metric': 'euclidean', 'n_neighbors': 8, 'weights': 'uniform'}
0.564 (0.027) with: {'metric': 'euclidean', 'n_neighbors': 8, 'weights': 'distance'}
0.560 (0.024) with: {'metric': 'euclidean', 'n_neighbors': 9, 'weights': 'uniform'}
0.569 (0.026) with: {'metric': 'euclidean', 'n_neighbors': 9, 'weights': 'distance'}
0.585 (0.020) with: {'metric': 'euclidean', 'n_neighbors': 10, 'weights': 'uniform'}
0.566 (0.027) with: {'metric': 'euclidean', 'n_neighbors': 10, 'weights': 'distance'}
0.557 (0.021) with: {'metric': 'euclidean', 'n_neighbors': 11, 'weights': 'uniform'}
0.566 (0.025) with: {'metric': 'euclidean', 'n_neighbors': 11, 'weights': 'distance'}
0.584 (0.015) with: {'metric': 'euclidean', 'n_neighbors': 12, 'weights': 'uniform'}
0.563 (0.025) with: {'metric': 'euclidean', 'n_neighbors': 12, 'weights': 'distance'}
...
0.589 (0.018) with: {'metric': 'minkowski', 'n_neighbors': 29, 'weights': 'uniform'}
0.590 (0.015) with: {'metric': 'minkowski', 'n_neighbors': 29, 'weights': 'distance'}
0.590 (0.015) with: {'metric': 'minkowski', 'n_neighbors': 30, 'weights': 'uniform'}
0.588 (0.020) with: {'metric': 'minkowski', 'n_neighbors': 30, 'weights': 'distance'}
```

"removed in 0.24.", FutureWarning



"removed in 0.24.", FutureWarning

```
from sklearn.metrics import make_scorer
from sklearn.model_selection import cross_val_score

def classification_report_with_accuracy_score(Y_test, y_pred2):
    print(classification_report(Y_test, y_pred2)) # print classification report
    return accuracy_score(Y_test, y_pred2) # return accuracy score

nested_score = cross_val_score(grid_search_knn, X=X_train, y=Y_train, cv=cv,
                                scoring=make_scorer(classification_report_with_accuracy_score))
print(nested_score)
```

[154]

## Python

```
"removed in 0.24.", FutureWarning
```

|           | precision | recall | f1-score | support |
|-----------|-----------|--------|----------|---------|
| 0         | 0.61      | 0.90   | 0.73     | 159     |
| 1         | 0.43      | 0.12   | 0.18     | 103     |
| accuracy  |           |        | 0.59     | 262     |
| macro avg | 0.52      | 0.51   | 0.46     | 262     |

FileEditSelectionViewGoRunTerminalHelp

←→Search

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. ManageLearn More

Get StartedWater Quality Prediction .ipynb

C: > Users > ELCOT > Desktop > Water-Quality- > Water Quality Prediction .ipynb > Exploratory Data Analysis > df.isnull().sum()

+ Code+ Markdown...

Select Kernel

|              |      |      |      |     |
|--------------|------|------|------|-----|
| accuracy     |      |      | 0.59 | 262 |
| macro avg    | 0.52 | 0.51 | 0.46 | 262 |
| weighted avg | 0.54 | 0.59 | 0.51 | 262 |

C:\Users\thero\Anaconda3\lib\site-packages\sklearn\model\_selection\\_search.py:849: FutureWarning: The parameter 'iid' is deprecated in 0.22 and will be removed in 0.24.  
"removed in 0.24.", FutureWarning

|   |           |        |          |         |
|---|-----------|--------|----------|---------|
|   | precision | recall | f1-score | support |
| 0 | 0.62      | 0.94   | 0.74     | 159     |
| 1 | 0.52      | 0.11   | 0.18     | 103     |

|              |      |      |      |     |
|--------------|------|------|------|-----|
| accuracy     |      |      | 0.61 | 262 |
| macro avg    | 0.57 | 0.52 | 0.46 | 262 |
| weighted avg | 0.58 | 0.61 | 0.52 | 262 |

C:\Users\thero\Anaconda3\lib\site-packages\sklearn\model\_selection\\_search.py:849: FutureWarning: The parameter 'iid' is deprecated in 0.22 and will be removed in 0.24.  
"removed in 0.24.", FutureWarning

|   |           |        |          |         |
|---|-----------|--------|----------|---------|
|   | precision | recall | f1-score | support |
| 0 | 0.62      | 0.92   | 0.74     | 159     |

Restricted Mode0/0/0Cell 5 of 80

Type here to search29°C16:3219-11-2022

FileEditSelectionViewGoRunTerminalHelp

←→Search

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. ManageLearn More

Get StartedWater Quality Prediction .ipynb

C: > Users > ELCOT > Desktop > Water-Quality- > Water Quality Prediction .ipynb > Exploratory Data Analysis > df.isnull().sum()

+ Code+ Markdown...

Select Kernel

|              | precision | recall | f1-score | support |
|--------------|-----------|--------|----------|---------|
| 0            | 0.62      | 0.92   | 0.74     | 159     |
| 1            | 0.50      | 0.13   | 0.20     | 103     |
| accuracy     |           |        | 0.61     | 262     |
| macro avg    | 0.56      | 0.52   | 0.47     | 262     |
| weighted avg | 0.57      | 0.61   | 0.53     | 262     |

C:\Users\thero\Anaconda3\lib\site-packages\sklearn\model\_selection\\_search.py:849: FutureWarning: The parameter 'iid' is deprecated in 0.22 and will be removed in 0.24.  
"removed in 0.24.", FutureWarning

|              | precision | recall | f1-score | support |
|--------------|-----------|--------|----------|---------|
| 0            | 0.60      | 0.91   | 0.72     | 159     |
| 1            | 0.32      | 0.07   | 0.11     | 103     |
| accuracy     |           |        | 0.58     | 262     |
| macro avg    | 0.46      | 0.49   | 0.42     | 262     |
| weighted avg | 0.49      | 0.58   | 0.48     | 262     |

C:\Users\thero\Anaconda3\lib\site-packages\sklearn\model\_selection\\_search.py:849: FutureWarning: The parameter 'iid' is deprecated in 0.22 and will be removed in 0.24.  
"removed in 0.24." FutureWarning

Restricted Mode0/0/0

Cell 5 of 80

Type here to search

29°C

16:32  
19-11-2022

ENG

20

"removed in 0.24.", FutureWarning

|              | precision | recall | f1-score | support |
|--------------|-----------|--------|----------|---------|
| 0            | 0.61      | 0.88   | 0.72     | 160     |
| 1            | 0.34      | 0.10   | 0.15     | 102     |
| accuracy     |           |        | 0.58     | 262     |
| macro avg    | 0.47      | 0.49   | 0.44     | 262     |
| weighted avg | 0.50      | 0.58   | 0.50     | 262     |

"removed in 0.24.", FutureWarning

|              | precision | recall | f1-score | support |
|--------------|-----------|--------|----------|---------|
| 0            | 0.61      | 0.85   | 0.71     | 160     |
| 1            | 0.40      | 0.16   | 0.23     | 102     |
| accuracy     |           |        | 0.58     | 262     |
| macro avg    | 0.51      | 0.50   | 0.47     | 262     |
| weighted avg | 0.53      | 0.58   | 0.52     | 262     |



FileEditSelectionViewGoRunTerminalHelp

←→Search

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. ManageLearn More

Get StartedWater Quality Prediction .ipynb

C: > Users > ELCOT > Desktop > Water-Quality- > Water Quality Prediction .ipynb > Exploratory Data Analysis > df.isnull().sum()

+ Code + Markdown ...

Select Kernel

C:\Users\thero\Anaconda3\lib\site-packages\sklearn\model\_selection\\_search.py:849: FutureWarning: The parameter 'iid' is deprecated in 0.22 and will be removed in 0.24.  
"removed in 0.24.", FutureWarning

|              | precision | recall | f1-score | support |
|--------------|-----------|--------|----------|---------|
| 0            | 0.61      | 0.93   | 0.74     | 160     |
| 1            | 0.39      | 0.07   | 0.12     | 102     |
| accuracy     |           |        | 0.60     | 262     |
| macro avg    | 0.50      | 0.50   | 0.43     | 262     |
| weighted avg | 0.52      | 0.60   | 0.50     | 262     |

C:\Users\thero\Anaconda3\lib\site-packages\sklearn\model\_selection\\_search.py:849: FutureWarning: The parameter 'iid' is deprecated in 0.22 and will be removed in 0.24.  
"removed in 0.24.", FutureWarning

|              | precision | recall | f1-score | support |
|--------------|-----------|--------|----------|---------|
| 0            | 0.60      | 0.85   | 0.70     | 160     |
| 1            | 0.31      | 0.11   | 0.16     | 102     |
| accuracy     |           |        | 0.56     | 262     |
| macro avg    | 0.46      | 0.48   | 0.43     | 262     |
| weighted avg | 0.49      | 0.56   | 0.49     | 262     |

Restricted Mode000

Cell 5 of 80

Type here to search

29°C

16:33  
19-11-2022

ENG



|              |      |      |      |     |
|--------------|------|------|------|-----|
| weighted avg | 0.49 | 0.56 | 0.49 | 262 |
|--------------|------|------|------|-----|

```
"removed in 0.24.", FutureWarning
```

```
precision    recall  f1-score   support
```

|   |      |      |      |     |
|---|------|------|------|-----|
| 0 | 0.62 | 0.93 | 0.74 | 160 |
|---|------|------|------|-----|

|   |      |      |      |     |
|---|------|------|------|-----|
| 1 | 0.48 | 0.11 | 0.18 | 102 |
|---|------|------|------|-----|

|          |      |     |
|----------|------|-----|
| accuracy | 0.61 | 262 |
|----------|------|-----|

|           |      |      |      |     |
|-----------|------|------|------|-----|
| macro avg | 0.55 | 0.52 | 0.46 | 262 |
|-----------|------|------|------|-----|

|              |      |      |      |     |
|--------------|------|------|------|-----|
| weighted avg | 0.56 | 0.61 | 0.52 | 262 |
|--------------|------|------|------|-----|

```
precision    recall  f1-score   support
```

|   |      |      |      |     |
|---|------|------|------|-----|
| 0 | 0.62 | 0.89 | 0.73 | 160 |
|---|------|------|------|-----|

|   |      |      |      |     |
|---|------|------|------|-----|
| 1 | 0.45 | 0.14 | 0.21 | 102 |
|---|------|------|------|-----|

|          |      |     |
|----------|------|-----|
| accuracy | 0.60 | 262 |
|----------|------|-----|

|           |      |      |      |     |
|-----------|------|------|------|-----|
| macro avg | 0.54 | 0.52 | 0.47 | 262 |
|-----------|------|------|------|-----|

|              |      |      |      |     |
|--------------|------|------|------|-----|
| weighted avg | 0.55 | 0.60 | 0.53 | 262 |
|--------------|------|------|------|-----|

```
[0.59160305 0.61068702 0.60687023 0.57633588 0.57633588 0.58015267
```

+ Code + Markdown ...

[191]

## Python

[192]

## Python

[illegible]

FileEditSelectionViewGoRunTerminalHelp

←→Search

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. ManageLearn More

Get StartedWater Quality Prediction .ipynb

C: > Users > ELCOT > Desktop > Water-Quality- > Water Quality Prediction .ipynb > Exploratory Data Analysis > df.isnull().sum()

+ Code+ Markdown...

Select Kernel

array([0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0,  
0,  
0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0,  
0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0,  
0,  
0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0,  
0,  
0,  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0,  
0, 1, 0, 0,  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1,  
0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0,  
0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0,  
0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0,  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0,  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0,  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0,  
0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
0, 0, 1, 0,  
0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0,  
0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0,  
0, 1, 0,  
0, 0,)

Restricted Mode0/0/0Cell 5 of 80

Type here to search29°C16:3419-11-2022ENG20

```
knn_grid_score=accuracy_score(Y_test, knn_y_predicted)
```

```
grid_search_knn.best_params_
```

```
confusion_matrix(Y_test, knn_y_predicted)
```

Cell 5 of 80



