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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

Hyperparameter Tuning / Model Optimization

DT HPT

```
[178] dt.get_params().keys()
```

```
dict_keys(['ccp_alpha', 'class_weight', 'criterion', 'max_depth', 'max_features', 'max_leaf_nodes', 'min_impurity_decrease', 'min_impurity_split', 'min_samples_leaf', 'min_samples_split', 'min_weight_fraction_leaf', 'presort', 'random_state', 'splitter'])
```

```
#example of grid searching key hyperparametres for logistic regression
from sklearn.model_selection import RepeatedStratifiedKFold
from sklearn.model_selection import GridSearchCV

# define models and parameters
model = DecisionTreeClassifier()
criterion = ["gini", "entropy"]
splitter = ["best", "random"]
min_samples_split = [2,4,6,8,10]

# define grid search
grid = dict(splitter=splitter, criterion=criterion, min_samples_split=min_samples_split)
```

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ENG

```
# define grid search
grid = dict(splitter=splitter, criterion=criterion, min_samples_split=min_samples_split)
cv = RepeatedStratifiedKFold(n_splits=10, n_repeats=3, random_state=1)
grid_search_dt = GridSearchCV(estimator=model, param_grid=grid, n_jobs=-1, cv=cv,
                               scoring='accuracy', error_score=0, iid=True)
grid_search_dt.fit(X_train, Y_train)

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

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

print("Training Score:", grid_search_dt.score(X_train, Y_train)*100)
print("Testing Score:", grid_search_dt.score(X_test, Y_test)*100)
```

[216]

Python

```
... Best: 0.590 using {'criterion': 'gini', 'min_samples_split': 10, 'splitter': 'best'}
0.584 (0.029) with: {'criterion': 'gini', 'min_samples_split': 2, 'splitter': 'best'}
0.569 (0.030) with: {'criterion': 'gini', 'min_samples_split': 2, 'splitter': 'random'}
0.584 (0.028) with: {'criterion': 'gini', 'min_samples_split': 4, 'splitter': 'best'}
0.571 (0.025) with: {'criterion': 'gini', 'min_samples_split': 4, 'splitter': 'random'}
0.588 (0.029) with: {'criterion': 'gini', 'min_samples_split': 6, 'splitter': 'best'}
0.584 (0.031) with: {'criterion': 'gini', 'min_samples_split': 6, 'splitter': 'random'}
0.594 (0.031) with: {'criterion': 'gini', 'min_samples_split': 8, 'splitter': 'best'}
```

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Output exceeds the size limit. Open the full output data in a text editor

KeyboardInterruptTraceback (most recent call last)

<ipython-input-217-e8cc3119bf88> in <module>

8

9 nested_score = cross_val_score(grid_search_dt, X=X_train, y=Y_train, cv=cv,

--> 10 scoring=make_scorer(classification_report_with_accuracy_score))

11 print (nested_score)

~\Anaconda3\lib\site-packages\sklearn\utils\validation.py in inner_f(*args, **kwargs)

70 FutureWarning)

71 kwargs.update({k: arg for k, arg in zip(sig.parameters, args)})

--> 72 return f(**kwargs)

73 return inner_f

74

~\Anaconda3\lib\site-packages\sklearn\model_selection_validation.py in cross_val_score(estimator, X, y, groups, scoring, cv, n_jobs, verbose, fit_params, pre_dispatch, error_score)

404 fit_params=fit_params,

405 pre_dispatch=pre_dispatch,

--> 406 error_score=error_score)

407 return cv_results['test_score']

408

~\Anaconda3\lib\site-packages\sklearn\utils\validation.py in inner_f(*args, **kwargs)

70 FutureWarning)

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```
~\Anaconda3\lib\site-packages\sklearn\utils\validation.py in inner_f(*args, **kwargs)
    70         FutureWarning)
    71         kwargs.update({k: arg for k, arg in zip(sig.parameters, args)})
    ...
--> 296         waiter.acquire()
    297         gotit = True
    298     else:
```

KeyboardInterrupt:

```
dt_y_predicted = grid_search_dt.predict(X_test)
dt_y_predicted
```

[218]

Python

... Output exceeds the size limit. Open the full output data in a text editor

```
array([1, 1, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 1,
       1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0,
       0, 0, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0, 1,
       0, 1, 0, 1, 0, 1, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0, 0, 0, 0, 0, 1,
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       0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0])
```

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