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# -*- coding: utf-8 -*-
"""
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@credits: https://github.com/ageron/handson-ml/blob/master/06_decision_trees.ipynb
"""
##Generate a moons dataset using make_moons(n_samples=10000, noise=0.4).
from sklearn.datasets import make_moons

X, y = make_moons(n_samples=10000, noise=0.4, random_state=42)
##Split it into a training set and a test set using train_test_split().
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

#Use grid search with cross-validation (with the help of the GridSearchCV class) to find good hyperparameter values for a
DecisionTreeClassifier. Hint: try various values for max_leaf_nodes.
from sklearn.model_selection import GridSearchCV
from sklearn.tree import DecisionTreeClassifier

params = {'max_leaf_nodes': list(range(2, 100)), 'min_samples_split': [2, 3, 4]}
grid_search_cv = GridSearchCV(DecisionTreeClassifier(random_state=42), params, n_jobs=-1, verbose=1, cv=3)

grid_search_cv.fit(X_train, y_train)
grid_search_cv.best_estimator_

from sklearn.metrics import accuracy_score

y_pred = grid_search_cv.predict(X_test)
accuracy_score(y_test, y_pred)
```