Assignment_grid_searchcv

January 23, 2023

[ ]:
```
# Import the necessary libraries
# import libraries
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
df = pd.read_csv('world_population.csv')
X = df[[
       '2022 Population', '2020 Population', '2015 Population',
       '2010 Population', '2000 Population', '1990 Population']]
a = df['World Population Percentage']

from sklearn import preprocessing
from sklearn import utils
lab = preprocessing.LabelEncoder()
y = lab.fit_transform(a)

from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score, f1_score, precision_score,␣
 ↪recall_score
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)
```

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

models = [LogisticRegression(), SVC(), DecisionTreeClassifier(),␣
 ↪RandomForestClassifier(), KNeighborsClassifier()]
model_names = ['Logistic Regression', 'SVM', 'Decision Tree', 'Random Forest',␣
 ↪'KNN']
models_scores = []
```

```python
for model, model_name in zip(models, model_names):
    # Define the grid search parameters
    if model_name == 'Logistic Regression':
        params = {'C': [0.1, 1, 10]}
    elif model_name == 'SVM':
        params = {'C': [0.1, 1, 10], 'kernel': ['linear', 'rbf']}
    elif model_name == 'Decision Tree':
        params = {'max_depth': [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]}
    elif model_name == 'Random Forest':
        params = {'n_estimators': [10, 50, 100], 'max_depth': [1, 2, 3, 4, 5,␣
 ↪6, 7, 8, 9, 10]}
    elif model_name == 'KNN':
        params = {'n_neighbors': [3, 5, 7, 9, 11, 13, 15]}
    else:
        params = {}

    grid_search = GridSearchCV(model, param_grid=params, cv=5)
    grid_search.fit(X_train, y_train)
    model = grid_search.best_estimator_
    y_pred = model.predict(X_test)
    Recall = recall_score(y_test, y_pred, average='micro')
    models_scores.append([model_name,Recall])


print("Best Parameters: ", grid_search.best_params_)
print("Best Score: ", grid_search.best_score_)
```

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Best Parameters:  {'n_neighbors': 3}
Best Score:  0.5453769559032717
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