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Saving a machine learning Model

Difficulty Level : Easy • Last Updated : 24 Jun, 2021

In machine learning, while working with scikit learn library, we need to save the trained models in a file and restore them in order to reuse it to compare the model with other models, to test the model on a new data. The saving of data is called *Serialization*, while restoring the data is called *Deserialization*.
Also, we deal with different types and sizes of data. Some datasets are easily trained i.e- they take less time to train but the datasets whose size is large (more than 1GB) can take very large time to train on a local machine even with GPU. When we need the same trained data in some different project or later sometime, to avoid the wastage of the training time, store trained model so that it can be used anytime in the future.
There are two ways we can save a model in scikit learn:

1. **Pickle string**: The pickle module implements a fundamental, but powerful algorithm for serializing and de-serializing a Python object structure.

Pickle model provides the following functions –
pickle.dump *to serialize an object hierarchy, you simply use dump().*
pickle.load *to deserialize a data stream, you call the loads() function.*

1. **Example:** Let's apply K Nearest Neighbor on iris dataset and then save the model.

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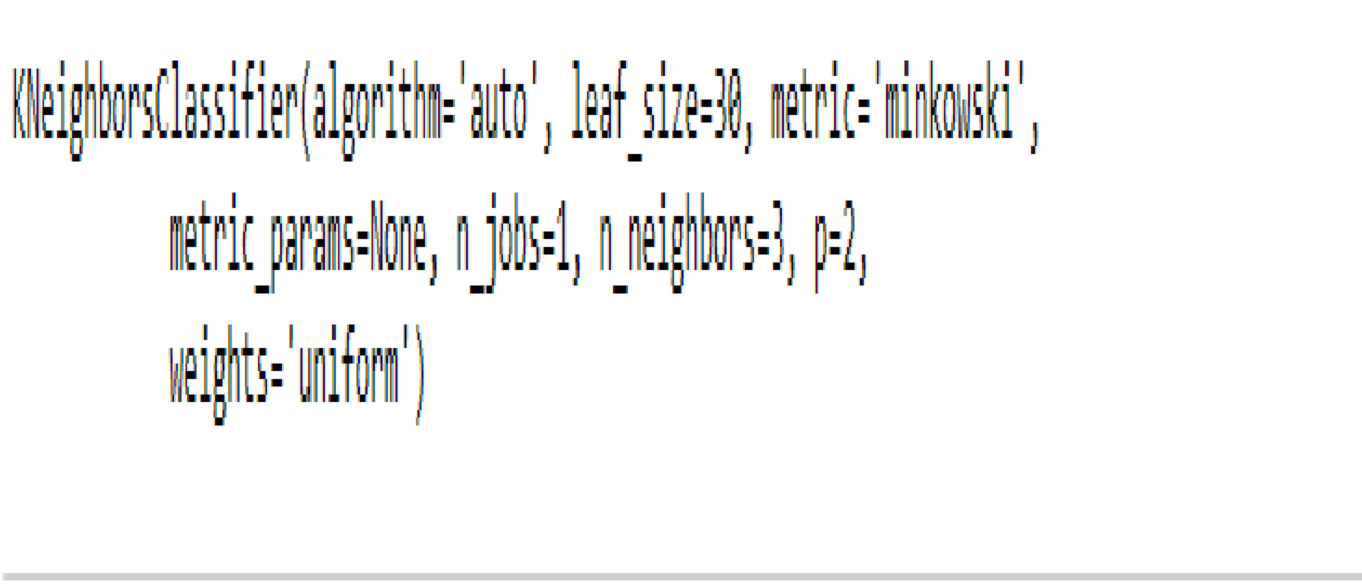
```
import numpy as np

# Load dataset
from sklearn.datasets import load_iris
iris = load_iris()

X = iris.data
y = iris.target

# Split dataset into train and test
X_train, X_test, y_train, y_test = \
    train_test_split(X, y, test_size = 0.3,
                        random_state = 2018)

# import KNeighborsClassifier model
from sklearn.neighbors import KNeighborsClassifier as KNN
knn = KNN(n_neighbors = 3)

# train model
knn.fit(X_train, y_train)
```

1.



```
KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
           metric_params=None, n_jobs=1, n_neighbors=3, p=2,
           weights='uniform')
```

1. Save model to string using pickle –

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```
import pickle

# Save the trained model as a pickle string.
saved_model = pickle.dumps(knn)

# Load the pickled model
knn_from_pickle = pickle.loads(saved_model)

# Use the loaded pickled model to make predictions
knn_from_pickle.predict(X_test)
```

1. **Output:**

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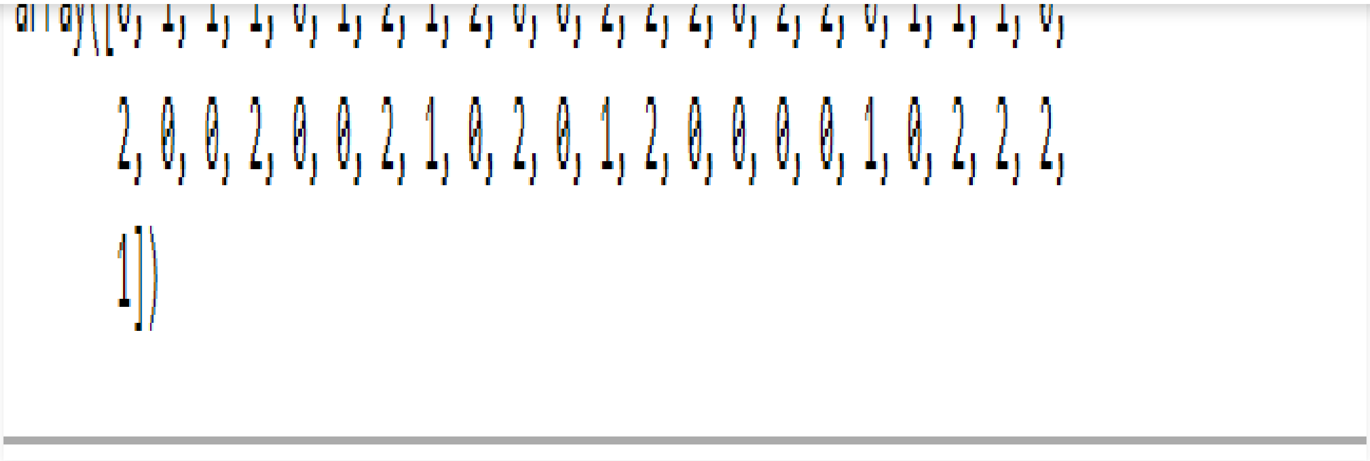

```
array([0, 1, 1, 1, 0, 1, 2, 1, 2, 0, 0, 2, 2, 2, 0, 2, 2, 0, 1, 1, 1, 0,
       2, 0, 0, 2, 0, 0, 2, 1, 0, 2, 0, 1, 2, 0, 0, 0, 0, 1, 0, 2, 2, 2,
       1])
```

1.
2. **Pickled model as a file using joblib**: Joblib is the replacement of pickle as it is more

Related Articles

joblib.dump *to serialize an object hierarchy*

joblib.load *to deserialize a data stream*

1. Save to pickled file using joblib –

Python3

```
from sklearn.externals import joblib

# Save the model as a pickle in a file
joblib.dump(knn, 'filename.pkl')

# Load the model from the file
knn_from_joblib = joblib.load('filename.pkl')

# Use the loaded model to make predictions
knn_from_joblib.predict(X_test)
```

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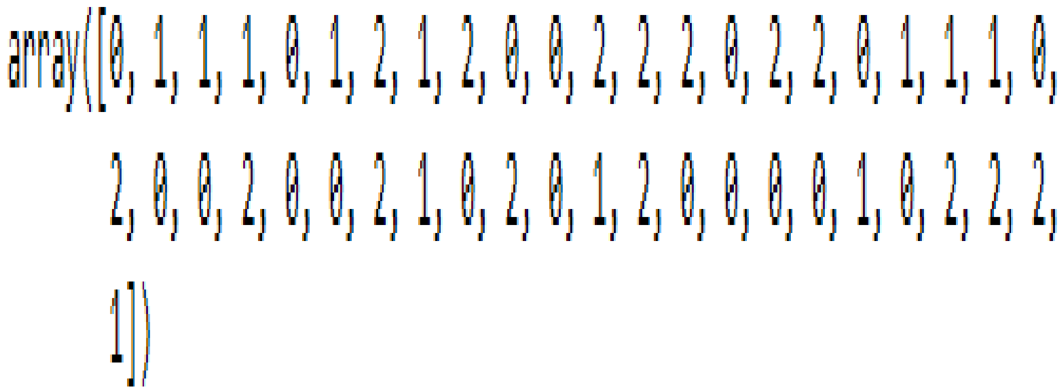

```
array([0, 1, 1, 1, 0, 1, 2, 1, 2, 0, 0, 2, 2, 2, 0, 2, 2, 0, 1, 1, 1, 0,
       2, 0, 0, 2, 0, 0, 2, 1, 0, 2, 0, 1, 2, 0, 0, 0, 0, 1, 0, 2, 2, 2,
       1])
```

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