Tugas Kecil AI 1

Anggota

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Dokumentasi Kelas : http://scikit-learn.org/stable/modules/classes.html (http://scikit-learn.org/stable/modules/classes.html)

Inisialisasi Library

In [1]:

```
## Library Import and Initializations
# Datasets Library
import pandas as pd
import graphviz
from sklearn.datasets import load_iris

# Algorithm Library
from sklearn.naive_bayes import GaussianNB
from sklearn import tree
from sklearn.neighbors import KNeighborsClassifier
from sklearn.neural_network import MLPClassifier

#
from sklearn.model_selection import train_test_split
from sklearn.model_selection import cross_val_score
from sklearn.metrics import confusion_matrix
```

Skema Full-Training

In [2]:

```
# Read iris & play_tennis dataset
iris_data = load_iris()
tennis_data = pd.read_csv('dataset/tennis.csv')
```

Naive Bayes

In [3]:

```
gnb = GaussianNB()
gnb.fit(iris_data.data, iris_data.target).predict(iris_data.data)

# Mencetak peluang tiap kelas
gnb.class_prior_
```

Out[3]:

```
array([ 0.33333333,  0.33333333,  0.33333333])
```

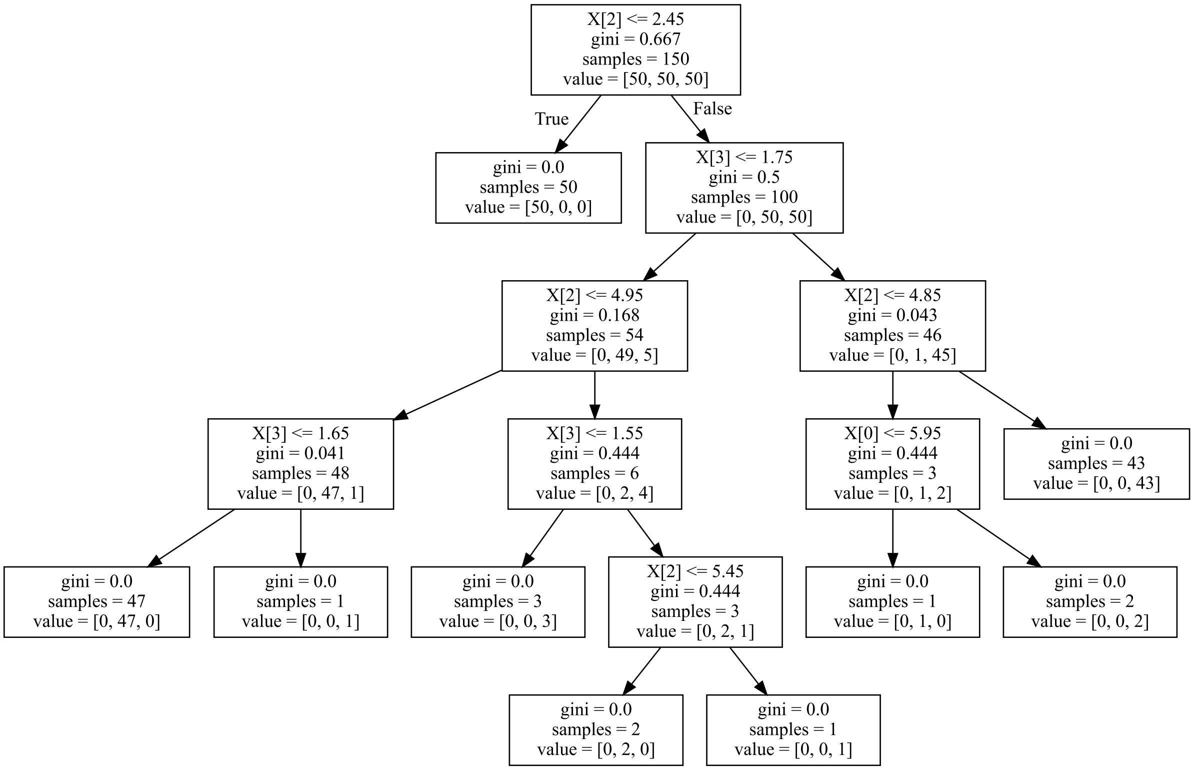
Decision Tree

In [4]:

```
dt = tree.DecisionTreeClassifier()
dt.fit(iris_data.data, iris_data.target)

tree_data = tree.export_graphviz(dt, out_file=None)
graph = graphviz.Source(tree_data)
graph
```

Out[4]:



KNN

KNN Tidak memiliki model

In [5]:

```
knn = KNeighborsClassifier(n_neighbors=5)
knn.fit(iris_data["data"], iris_data["target"])
```

Out[5]:

```
KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
           metric_params=None, n_jobs=1, n_neighbors=5, p=2,
           weights='uniform')
```

MLP

In [6]:

```
mlp = MLPClassifier(solver='lbfgs', alpha=1e-5, hidden_layer_sizes=(5, 2), random_state=1)
mlp.fit(iris_data["data"], iris_data["target"])

# Mencetak Weight pada tiap node
mlp.coefs_
```

Out[6]:

```
[array([[-0.13550239,  0.3597881 , -0.81630916, -0.3227893 , -0.57684476],
        [-0.66570776, -0.51233452, -0.25219808, -0.16857787,  0.06338741],
        [-0.1319547 ,  0.30246194, -0.48262707,  0.6174627 , -0.77177221],
        [ 0.27837206, -0.13504058,  0.09584001, -0.5872452 , -0.49299781]]),
 array([[ 0.73066898, -0.76834821],
        [-0.85350401, -0.61135478],
        [ 0.7001833 , -0.74371656],
        [-0.14608018,  0.84784599],
        [ 0.06141013,  0.35528709]]),
 array([[ 0.73312753, -1.05537667,  0.5480383 ],
        [ 1.07104013,  0.54370328, -0.48102273]])]
```

Skema Split Train 90-10

Split Data

In [7]:

```
x_train, x_test, y_train, y_test = train_test_split(iris_data["data"], iris_data["target"], test_size=0.1)
```

Decision Tree

In [8]:

```
dt = tree.DecisionTreeClassifier()
dt.fit(x_train, y_train)
```

Out[8]:

```
DecisionTreeClassifier(class_weight=None, criterion='gini', max_depth=None,
            max_features=None, max_leaf_nodes=None,
            min_impurity_decrease=0.0, min_impurity_split=None,
            min_samples_leaf=1, min_samples_split=2,
            min_weight_fraction_leaf=0.0, presort=False, random_state=None,
            splitter='best')
```

```
In [9]:  dt_result = dt.predict(x_test)
          dt_conf_matr = confusion_matrix(dt_result, y_test)
          dt_conf_matr

Out[9]:  array([[6, 0, 0],
                 [0, 7, 0],
                 [0, 0, 2]])
```

```
In [10]:  dt_score = dt.score(x_test, y_test)
           dt_score

Out[10]:  1.0
```

Naive Bayes

```
In [11]:  gnb = GaussianNB()
           gnb.fit(x_train, y_train)

Out[11]:  GaussianNB(priors=None)
```

```
In [12]:  dt_result = dt.predict(x_test)
           gnb_conf_matr = confusion_matrix(dt_result, y_test)
           dt_conf_matr

Out[12]:  array([[6, 0, 0],
                  [0, 7, 0],
                  [0, 0, 2]])
```

```
In [13]:  gnb_score = gnb.score(x_test, y_test)
           gnb_score

Out[13]:  1.0
```

KNN

```
In [14]:  knn = KNeighborsClassifier(n_neighbors=5)
           knn.fit(x_train, y_train)

Out[14]:  KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
                      metric_params=None, n_jobs=1, n_neighbors=5, p=2,
                      weights='uniform')
```

```
In [15]:  knn_result = knn.predict(x_test)
           knn_conf_matr = confusion_matrix(knn_result, y_test)
           knn_conf_matr

Out[15]:  array([[6, 0, 0],
                  [0, 7, 0],
                  [0, 0, 2]])
```

```
In [16]: knn_score = knn.score(x_test, y_test)
         knn_score
```

```
Out[16]: 1.0
```

MLP

```
In [17]: mlp = MLPClassifier(solver='lbfgs', alpha=1e-5, hidden_layer_sizes=(5, 2), ran
         dom_state=1)
         mlp.fit(x_train, y_train)
```

```
Out[17]: MLPClassifier(activation='relu', alpha=1e-05, batch_size='auto', beta_1=0.9,
                beta_2=0.999, early_stopping=False, epsilon=1e-08,
                hidden_layer_sizes=(5, 2), learning_rate='constant',
                learning_rate_init=0.001, max_iter=200, momentum=0.9,
                nesterovs_momentum=True, power_t=0.5, random_state=1, shuffle=True,
                solver='lbfgs', tol=0.0001, validation_fraction=0.1, verbose=False,
                warm_start=False)
```

```
In [18]: mlp_result = mlp.predict(x_test)
         mlp_conf_matr = confusion_matrix(knn_result, y_test)
         mlp_conf_matr
```

```
Out[18]: array([[6, 0, 0],
                [0, 7, 0],
                [0, 0, 2]])
```

```
In [19]: mlp_score = mlp.score(x_test, y_test)
         mlp_score
```

```
Out[19]: 0.13333333333333333
```

Skema 10 Fold Cross Validation

Naive Bayes

```
In [20]: gnb = GaussianNB()
         cross_val_score(gnb, iris_data["data"], iris_data["target"], cv=10)
```

```
Out[20]: array([ 0.93333333,  0.93333333,  1.        ,  0.93333333,  0.93333333,
                 0.93333333,  0.86666667,  1.        ,  1.        ,  1.        ])
```

KNN

```
In [21]:  knn = KNeighborsClassifier(n_neighbors=5)
          cross_val_score(knn, iris_data["data"], iris_data["target"], cv=10)

Out[21]:  array([ 1.        ,  0.93333333,  1.        ,  1.        ,  0.86666667,
                  0.93333333,  0.93333333,  1.        ,  1.        ,  1.        ])
```

Decision Tree

```
In [22]:  dt = tree.DecisionTreeClassifier()
          cross_val_score(dt, iris_data["data"], iris_data["target"], cv=10)

Out[22]:  array([ 1.        ,  0.93333333,  1.        ,  0.93333333,  0.93333333,
                  0.86666667,  0.93333333,  1.        ,  1.        ,  1.        ])
```

MLP

```
In [23]:  mlp = MLPClassifier(solver='lbfgs', alpha=1e-5, hidden_layer_sizes=(5, 2), ran
          dom_state=1)
          cross_val_score(mlp, iris_data["data"], iris_data["target"], cv=10)

Out[23]:  array([ 0.33333333,  0.33333333,  0.33333333,  0.33333333,  0.33333333,
                  0.33333333,  0.33333333,  0.33333333,  0.33333333,  0.33333333])
```

External File

```
In [24]:  import pickle
```

Save To File

```
In [25]:  pickle.dump(gnb,open("out.pkl", "wb+"))
          pickle.dump(knn,open("out.pkl", "ab+"))
          pickle.dump(dt,open("out.pkl", "ab+"))
          pickle.dump(mlp,open("out.pkl", "ab+"))
```

Open File

```
In [26]:  pickle.load(open("out.pkl","rb+"))

Out[26]:  GaussianNB(priors=None)
```

New Instance & Predict

Membuat Instance Baru

Karena scikit menyimpan data dalam bentuk list, dibuat data dalam bentuk list

```
In [27]: iris_new = [[5.3, 3.1, 1.7, 0.9]]
```

Prediksi

Inisialisasi Prediksi (Skema Full Training)

```
In [28]: gnb = GaussianNB()
         gnb.fit(iris_data.data, iris_data.target).predict(iris_data.data)

         dt = tree.DecisionTreeClassifier()
         dt.fit(iris_data.data, iris_data.target)

         knn = KNeighborsClassifier(n_neighbors=5)
         knn.fit(iris_data["data"], iris_data["target"])

         mlp = MLPClassifier(solver='lbfgs', alpha=1e-5, hidden_layer_sizes=(5, 2), ran
         dom_state=1)
         mlp.fit(iris_data["data"], iris_data["target"]);
```

Naive Bayes

```
In [29]: gnb_prediction = gnb.predict(iris_new)
         iris_data.target_names[gnb_prediction]
```

```
Out[29]: array(['versicolor'],
               dtype='<U10')
```

Decision Tree

```
In [30]: dt_prediction = dt.predict(iris_new)
         iris_data.target_names[dt_prediction]
```

```
Out[30]: array(['setosa'],
               dtype='<U10')
```

KNN

```
In [31]: knn_prediction = knn.predict(iris_new)
         iris_data.target_names[knn_prediction]
```

```
Out[31]: array(['setosa'],
               dtype='<U10')
```

MLP

```
In [32]: mlp_prediction = mlp.predict(iris_new)
         iris_data.target_names[mlp_prediction]
```

```
Out[32]: array(['virginica'],
               dtype='<U10')
```