Tugas Kecil 1 Machine Learning

Dataset table tennis

Jon Felix Germinian - 13518025
Filbert Wijaya - 13518077

Import semua library yang diperlukan

agak banyak library yang diminta, dimaklumin

In [45]:
```
import pandas as pd
import sklearn
import sklearn.datasets
import sklearn.model_selection
import sklearn.metrics
```

Import dataset yang digunakan

In [46]:
```
# dataset play tennis external?
play_tennis = pd.read_csv('PlayTennis.csv')
```

Make dataframe for given dataset

In [47]:
```
df_play_tennis = pd.DataFrame(play_tennis)
df_play_tennis.head()
```

Out[47]:

	Outlook	Temperature	Humidity	Wind	Play Tennis
0	Sunny	Hot	High	Weak	No
1	Sunny	Hot	High	Strong	No
2	Overcast	Hot	High	Weak	Yes
3	Rain	Mild	High	Weak	Yes
4	Rain	Cool	Normal	Weak	Yes

In [48]:
```
df_play_tennis.columns
```

Out[48]:
```
Index(['Outlook', 'Temperature', 'Humidity', 'Wind', 'Play Tennis'], dtype='object')
```

Feature engineering

umm.. apa yang mau dicari?

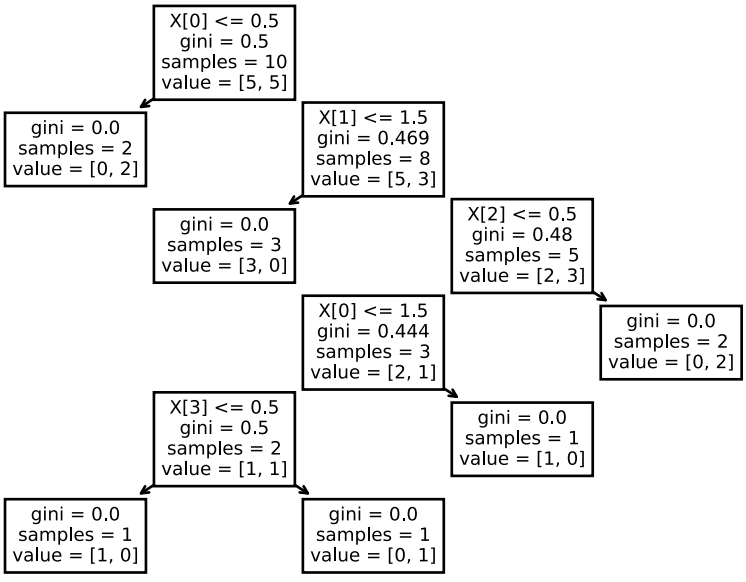
In [49]:
```
from sklearn.preprocessing import LabelEncoder
lb = LabelEncoder()
df_play_tennis['Outlook_'] = lb.fit_transform(df_play_tennis['Outlook'])
df_play_tennis['Temperature_'] = lb.fit_transform(df_play_tennis['Temperature'] )
df_play_tennis['Humidity_'] = lb.fit_transform(df_play_tennis['Humidity'] )
df_play_tennis['Wind_'] = lb.fit_transform(df_play_tennis['Wind'] )
df_play_tennis['Play Tennis_'] = lb.fit_transform(df_play_tennis['Play Tennis'] )
x = df_play_tennis.iloc[:,5:9]
y = df_play_tennis.iloc[:,9]
X_train, X_test, y_train, y_test = sklearn.model_selection.train_test_split(x, y, rando
```

Training

Decision Tree

In [50]:
```
from sklearn import tree
clf1 = tree.DecisionTreeClassifier()
clf1 = clf1.fit(X_train, y_train)
tree.plot_tree(clf1)
```

Out[50]:
```
[Text(111.60000000000001, 199.32, 'X[0] <= 0.5\ngini = 0.5\nsamples = 10\nvalue = [5,
5]'),
 Text(55.800000000000004, 163.07999999999998, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(167.4, 163.07999999999998, 'X[1] <= 1.5\ngini = 0.469\nsamples = 8\nvalue = [5,
3]'),
 Text(111.60000000000001, 126.83999999999999, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(223.20000000000002, 126.83999999999999, 'X[2] <= 0.5\ngini = 0.48\nsamples = 5\nva
lue = [2, 3]'),
 Text(167.4, 90.6, 'X[0] <= 1.5\ngini = 0.444\nsamples = 3\nvalue = [2, 1]'),
 Text(111.60000000000001, 54.359999999999985, 'X[3] <= 0.5\ngini = 0.5\nsamples = 2\nval
ue = [1, 1]'),
 Text(55.800000000000004, 18.119999999999976, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(167.4, 18.119999999999976, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(223.20000000000002, 54.359999999999985, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(279.0, 90.6, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]')]
```



In [51]:
```
print("Training set score: %f" % clf1.score(X_train, y_train))
print("Test set score: %f" % clf1.score(X_test, y_test))
```

```
Training set score: 1.000000
Test set score: 0.500000
```

In [52]:
```
print("Accuracy score: %f" % sklearn.metrics.accuracy_score(y_test, clf1.predict(X_test
print("F1 Score : %f" % sklearn.metrics.f1_score(y_test, clf1.predict(X_test),average='
```

```
Accuracy score: 0.500000
F1 Score : 0.666667
```

Id3Estimator

In [53]:
```
import six
import sys
sys.modules['sklearn.externals.six'] = six
import mlrose
```

In [54]:
```
import id3
estimator = id3.Id3Estimator()
estimator = estimator.fit(x, y)
tree = id3.export_graphviz(estimator.tree_, 'tree1.dot', df_play_tennis.columns)
# file dot bisa dibuka pake graphviz
```

In [55]:
```
print("Accuracy score: %f" % sklearn.metrics.accuracy_score(y_test, estimator.predict(X
print("F1 Score : %f" % sklearn.metrics.f1_score(y_test, estimator.predict(X_test),aver
```

```
Accuracy score: 1.000000
F1 Score : 1.000000
```

KMeans

In [56]:
```
from sklearn.cluster import KMeans
mapping = {'Sunny': 1, 'Overcast' : 0, 'Rain' : -1,
            'Hot': 1, 'Mild' : 0, 'Cool' : -1,
            'High': 1, 'Normal' : 0,
            'Strong': 1, 'Weak' : 0,
            'Yes': 1, 'No' : 0}
df_play_tennis_kmeans = df_play_tennis.replace({'Outlook':mapping,'Temperature':mapping
x1 = df_play_tennis_kmeans.iloc[:,5:9]
y1 = df_play_tennis_kmeans.iloc[:,9]
X_train1, X_test1, y_train1, y_test1 = sklearn.model_selection.train_test_split(x1, y1,
kmeans = KMeans(n_clusters=2).fit(x1)

centroids = kmeans.cluster_centers_
print(centroids)
```

```
[[1.375      1.75       0.25       0.5       ]
 [0.66666667 0.33333333 0.83333333 0.66666667]]
```

In [57]:
```
print("Accuracy score: %f" % sklearn.metrics.accuracy_score(y_test1, kmeans.predict(X_t
print("F1 Score : %f" % sklearn.metrics.f1_score(y_test1, kmeans.predict(X_test1),avera
```

```
Accuracy score: 0.750000
F1 Score : 0.857143
```

Logistic Regression

In [58]:
```
from sklearn.linear_model import LogisticRegression
clf3 = LogisticRegression(random_state=0).fit(X_train, y_train)
```

In [59]:
```
print("Training set score: %f" % clf3.score(X_train, y_train))
print("Test set score: %f" % clf3.score(X_test, y_test))
```

```
Training set score: 0.900000
Test set score: 0.500000
```

In [60]:
```
print("Accuracy score: %f" % sklearn.metrics.accuracy_score(y_test, clf3.predict(X_test
print("F1 Score : %f" % sklearn.metrics.f1_score(y_test, clf3.predict(X_test),average='
```

```
Accuracy score: 0.500000
F1 Score : 0.666667
```

Neural Network

In [61]:
```
from sklearn.neural_network import MLPClassifier
clf4 = MLPClassifier(random_state=1, max_iter=300).fit(X_train, y_train)
```

In [62]:
```
print("Training set score: %f" % clf4.score(X_train, y_train))
print("Test set score: %f" % clf4.score(X_test, y_test))
```

```
Training set score: 1.000000
Test set score: 0.500000
```

In [63]:
```
print("Accuracy score: %f" % sklearn.metrics.accuracy_score(y_test, clf4.predict(X_test
print("F1 Score : %f" % sklearn.metrics.f1_score(y_test, clf4.predict(X_test),average='
```

```
Accuracy score: 0.500000
F1 Score : 0.666667
```

SVM

In [64]:
```
from sklearn.pipeline import make_pipeline
from sklearn.preprocessing import StandardScaler
from sklearn.svm import SVC
clf5 = make_pipeline(StandardScaler(), SVC(gamma='auto'))
clf5.fit(X_train, y_train)
```

Out[64]:
```
Pipeline(steps=[('standardscaler', StandardScaler()),
                ('svc', SVC(gamma='auto'))])
```

In [65]:
```
print("Training set score: %f" % clf5.score(X_train, y_train))
print("Test set score: %f" % clf5.score(X_test, y_test))
```

```
Training set score: 1.000000
```

```
Test set score: 0.000000
```

In [66]:

```
print("Accuracy score: %f" % sklearn.metrics.accuracy_score(y_test, clf5.predict(X_test
print("F1 Score : %f" % sklearn.metrics.f1_score(y_test, clf5.predict(X_test),average='
```

```
Accuracy score: 0.000000
F1 Score : 0.000000
```