

19MIS1018_LAB-6_Implementing Decision trees on Breast cancer dataset

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REG NO: 19MIS1018

SLOT: L13+L14

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```
[1]: from sklearn import tree
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
```

```
[2]: df = pd.read_csv("data.csv")
df
```

```
[2]:
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	\
0	6	148	72	35	0	33.6	
1	1	85	66	29	0	26.6	
2	8	183	64	0	0	23.3	
3	1	89	66	23	94	28.1	
4	0	137	40	35	168	43.1	
..	
414	0	138	60	35	167	34.6	
415	3	173	84	33	474	35.7	
416	1	97	68	21	0	27.2	
417	4	144	82	32	0	38.5	
418	1	83	68	0	0	18.2	

	DiabetesPedigreeFunction	Age	Outcome
0	0.627	50	1
1	0.351	31	0
2	0.672	32	1
3	0.167	21	0
4	2.288	33	1
..
414	0.534	21	1

415	0.258	22	1
416	1.095	22	0
417	0.554	37	1
418	0.624	27	0

[419 rows x 9 columns]

```
[3]: df.corr()
```

```
[3]:
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	\
Pregnancies	1.000000	0.178101	0.112138	-0.063002	
Glucose	0.178101	1.000000	0.098324	-0.004927	
BloodPressure	0.112138	0.098324	1.000000	0.145717	
SkinThickness	-0.063002	-0.004927	0.145717	1.000000	
Insulin	-0.046544	0.358391	0.068093	0.450488	
BMI	0.075060	0.219059	0.228255	0.346303	
DiabetesPedigreeFunction	-0.051257	0.164605	-0.027316	0.165381	
Age	0.560441	0.290969	0.239697	-0.149293	
Outcome	0.234670	0.446388	0.061990	0.044857	

	Insulin	BMI	DiabetesPedigreeFunction	\
Pregnancies	-0.046544	0.075060	-0.051257	
Glucose	0.358391	0.219059	0.164605	
BloodPressure	0.068093	0.228255	-0.027316	
SkinThickness	0.450488	0.346303	0.165381	
Insulin	1.000000	0.186905	0.223547	
BMI	0.186905	1.000000	0.085182	
DiabetesPedigreeFunction	0.223547	0.085182	1.000000	
Age	0.006686	0.085962	0.023614	
Outcome	0.121201	0.312791	0.179681	

	Age	Outcome
Pregnancies	0.560441	0.234670
Glucose	0.290969	0.446388
BloodPressure	0.239697	0.061990
SkinThickness	-0.149293	0.044857
Insulin	0.006686	0.121201
BMI	0.085962	0.312791
DiabetesPedigreeFunction	0.023614	0.179681
Age	1.000000	0.246022
Outcome	0.246022	1.000000

```
[4]: df1 = df.drop(["Glucose", "BloodPressure"], axis = 1)
df1.corr()
```

```
[4]:
```

	Pregnancies	SkinThickness	Insulin	BMI	\
Pregnancies	1.000000	-0.063002	-0.046544	0.075060	

SkinThickness	-0.063002	1.000000	0.450488	0.346303
Insulin	-0.046544	0.450488	1.000000	0.186905
BMI	0.075060	0.346303	0.186905	1.000000
DiabetesPedigreeFunction	-0.051257	0.165381	0.223547	0.085182
Age	0.560441	-0.149293	0.006686	0.085962
Outcome	0.234670	0.044857	0.121201	0.312791

	DiabetesPedigreeFunction	Age	Outcome
Pregnancies	-0.051257	0.560441	0.234670
SkinThickness	0.165381	-0.149293	0.044857
Insulin	0.223547	0.006686	0.121201
BMI	0.085182	0.085962	0.312791
DiabetesPedigreeFunction	1.000000	0.023614	0.179681
Age	0.023614	1.000000	0.246022
Outcome	0.179681	0.246022	1.000000

```
[5]: df2 = df.drop(['Glucose'], axis = 1)
df2.corr()
```

```
[5]:
```

	Pregnancies	BloodPressure	SkinThickness	Insulin \
Pregnancies	1.000000	0.112138	-0.063002	-0.046544
BloodPressure	0.112138	1.000000	0.145717	0.068093
SkinThickness	-0.063002	0.145717	1.000000	0.450488
Insulin	-0.046544	0.068093	0.450488	1.000000
BMI	0.075060	0.228255	0.346303	0.186905
DiabetesPedigreeFunction	-0.051257	-0.027316	0.165381	0.223547
Age	0.560441	0.239697	-0.149293	0.006686
Outcome	0.234670	0.061990	0.044857	0.121201

	BMI	DiabetesPedigreeFunction	Age \
Pregnancies	0.075060	-0.051257	0.560441
BloodPressure	0.228255	-0.027316	0.239697
SkinThickness	0.346303	0.165381	-0.149293
Insulin	0.186905	0.223547	0.006686
BMI	1.000000	0.085182	0.085962
DiabetesPedigreeFunction	0.085182	1.000000	0.023614
Age	0.085962	0.023614	1.000000
Outcome	0.312791	0.179681	0.246022

	Outcome
Pregnancies	0.234670
BloodPressure	0.061990
SkinThickness	0.044857
Insulin	0.121201
BMI	0.312791
DiabetesPedigreeFunction	0.179681
Age	0.246022

Outcome 1.000000

```
[6]: X = df1.iloc[:, :-1]
      y = df1.iloc[:, -1]
```

```
[7]: X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.3,
      ↪random_state = 30)
      print(X_train.shape, y_train.shape, X_test.shape, y_test.shape)

(293, 6) (293,) (126, 6) (126,)
```

```
[8]: clf = tree.DecisionTreeClassifier().fit(X_train, y_train)
      clf
```

```
[8]: DecisionTreeClassifier()
```

```
[9]: fig, axe = plt.subplots(figsize = (60, 30))
      tree.plot_tree(clf, ax = axe, fontsize = 30)
```

```
[9]: [Text(0.4310064935064935, 0.9615384615384616, 'X[5] <= 27.5\ngini =
      0.472\nsamples = 293\nvalue = [181, 112]'),
      Text(0.1461038961038961, 0.8846153846153846, 'X[3] <= 35.4\ngini =
      0.29\nsamples = 125\nvalue = [103, 22]'),
      Text(0.07792207792207792, 0.8076923076923077, 'X[1] <= 31.5\ngini =
      0.141\nsamples = 92\nvalue = [85, 7]'),
      Text(0.03896103896103896, 0.7307692307692307, 'X[0] <= 2.5\ngini =
      0.072\nsamples = 80\nvalue = [77, 3]'),
      Text(0.025974025974025976, 0.6538461538461539, 'gini = 0.0\nsamples = 59\nvalue
      = [59, 0]'),
      Text(0.05194805194805195, 0.6538461538461539, 'X[4] <= 0.693\ngini =
      0.245\nsamples = 21\nvalue = [18, 3]'),
      Text(0.03896103896103896, 0.5769230769230769, 'X[2] <= 9.0\ngini =
      0.18\nsamples = 20\nvalue = [18, 2]'),
      Text(0.025974025974025976, 0.5, 'X[3] <= 24.75\ngini = 0.375\nsamples =
      8\nvalue = [6, 2]'),
      Text(0.012987012987012988, 0.4230769230769231, 'gini = 0.0\nsamples = 5\nvalue
      = [5, 0]'),
      Text(0.03896103896103896, 0.4230769230769231, 'X[3] <= 32.8\ngini =
      0.444\nsamples = 3\nvalue = [1, 2]'),
      Text(0.025974025974025976, 0.34615384615384615, 'gini = 0.0\nsamples = 2\nvalue
      = [0, 2]'),
      Text(0.05194805194805195, 0.34615384615384615, 'gini = 0.0\nsamples = 1\nvalue
      = [1, 0]'),
      Text(0.05194805194805195, 0.5, 'gini = 0.0\nsamples = 12\nvalue = [12, 0]'),
      Text(0.06493506493506493, 0.5769230769230769, 'gini = 0.0\nsamples = 1\nvalue =
      [0, 1]'),
      Text(0.11688311688311688, 0.7307692307692307, 'X[2] <= 150.0\ngini =
      0.444\nsamples = 12\nvalue = [8, 4]'),
```

```

Text(0.1038961038961039, 0.6538461538461539, 'X[1] <= 33.5\ngini =
0.32\nsamples = 10\nvalue = [8, 2]'),
Text(0.09090909090909091, 0.5769230769230769, 'X[2] <= 72.0\ngini =
0.5\nsamples = 4\nvalue = [2, 2]'),
Text(0.07792207792207792, 0.5, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
Text(0.1038961038961039, 0.5, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
Text(0.11688311688311688, 0.5769230769230769, 'gini = 0.0\nsamples = 6\nvalue =
[6, 0]'),
Text(0.12987012987012986, 0.6538461538461539, 'gini = 0.0\nsamples = 2\nvalue =
[0, 2]'),
Text(0.21428571428571427, 0.8076923076923077, 'X[3] <= 52.75\ngini =
0.496\nsamples = 33\nvalue = [18, 15]'),
Text(0.2012987012987013, 0.7307692307692307, 'X[0] <= 2.5\ngini = 0.48\nsamples
= 30\nvalue = [18, 12]'),
Text(0.16883116883116883, 0.6538461538461539, 'X[4] <= 0.609\ngini =
0.408\nsamples = 21\nvalue = [15, 6]'),
Text(0.14285714285714285, 0.5769230769230769, 'X[1] <= 27.0\ngini =
0.165\nsamples = 11\nvalue = [10, 1]'),
Text(0.12987012987012986, 0.5, 'X[2] <= 18.0\ngini = 0.5\nsamples = 2\nvalue =
[1, 1]'),
Text(0.11688311688311688, 0.4230769230769231, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.14285714285714285, 0.4230769230769231, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.15584415584415584, 0.5, 'gini = 0.0\nsamples = 9\nvalue = [9, 0]'),
Text(0.19480519480519481, 0.5769230769230769, 'X[0] <= 0.5\ngini = 0.5\nsamples
= 10\nvalue = [5, 5]'),
Text(0.18181818181818182, 0.5, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
Text(0.2077922077922078, 0.5, 'X[4] <= 0.645\ngini = 0.278\nsamples = 6\nvalue
= [5, 1]'),
Text(0.19480519480519481, 0.4230769230769231, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.22077922077922077, 0.4230769230769231, 'gini = 0.0\nsamples = 5\nvalue =
[5, 0]'),
Text(0.23376623376623376, 0.6538461538461539, 'X[5] <= 21.5\ngini =
0.444\nsamples = 9\nvalue = [3, 6]'),
Text(0.22077922077922077, 0.5769230769230769, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.24675324675324675, 0.5769230769230769, 'X[5] <= 26.0\ngini =
0.375\nsamples = 8\nvalue = [2, 6]'),
Text(0.23376623376623376, 0.5, 'gini = 0.0\nsamples = 5\nvalue = [0, 5]'),
Text(0.2597402597402597, 0.5, 'X[3] <= 42.5\ngini = 0.444\nsamples = 3\nvalue =
[2, 1]'),
Text(0.24675324675324675, 0.4230769230769231, 'gini = 0.0\nsamples = 2\nvalue =
[2, 0]'),
Text(0.2727272727272727, 0.4230769230769231, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),

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Text(0.22727272727272727, 0.7307692307692307, 'gini = 0.0\nsamples = 3\nvalue =
[0, 3]'),
Text(0.7159090909090909, 0.8846153846153846, 'X[2] <= 143.0\ngini =
0.497\nsamples = 168\nvalue = [78, 90]'),
Text(0.4837662337662338, 0.8076923076923077, 'X[3] <= 29.9\ngini =
0.497\nsamples = 124\nvalue = [67, 57]'),
Text(0.36363636363636365, 0.7307692307692307, 'X[4] <= 1.015\ngini =
0.414\nsamples = 41\nvalue = [29, 12]'),
Text(0.35064935064935066, 0.6538461538461539, 'X[0] <= 5.5\ngini =
0.381\nsamples = 39\nvalue = [29, 10]'),
Text(0.2987012987012987, 0.5769230769230769, 'X[5] <= 28.5\ngini =
0.227\nsamples = 23\nvalue = [20, 3]'),
Text(0.2857142857142857, 0.5, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
Text(0.3116883116883117, 0.5, 'X[4] <= 0.264\ngini = 0.165\nsamples = 22\nvalue
= [20, 2]'),
Text(0.2987012987012987, 0.4230769230769231, 'X[4] <= 0.249\ngini =
0.375\nsamples = 8\nvalue = [6, 2]'),
Text(0.2857142857142857, 0.34615384615384615, 'gini = 0.0\nsamples = 5\nvalue =
[5, 0]'),
Text(0.3116883116883117, 0.34615384615384615, 'X[3] <= 24.45\ngini =
0.444\nsamples = 3\nvalue = [1, 2]'),
Text(0.2987012987012987, 0.2692307692307692, 'gini = 0.0\nsamples = 1\nvalue =
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Text(0.3246753246753247, 0.4230769230769231, 'gini = 0.0\nsamples = 14\nvalue =
[14, 0]'),
Text(0.4025974025974026, 0.5769230769230769, 'X[1] <= 32.0\ngini =
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Text(0.38961038961038963, 0.5, 'X[3] <= 26.95\ngini = 0.459\nsamples =
14\nvalue = [9, 5]'),
Text(0.37662337662337664, 0.4230769230769231, 'X[0] <= 11.0\ngini =
0.496\nsamples = 11\nvalue = [6, 5]'),
Text(0.36363636363636365, 0.34615384615384615, 'X[5] <= 28.5\ngini =
0.494\nsamples = 9\nvalue = [4, 5]'),
Text(0.35064935064935066, 0.2692307692307692, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.37662337662337664, 0.2692307692307692, 'X[3] <= 23.55\ngini =
0.469\nsamples = 8\nvalue = [3, 5]'),
Text(0.36363636363636365, 0.19230769230769232, 'gini = 0.0\nsamples = 3\nvalue
= [0, 3]'),
Text(0.38961038961038963, 0.19230769230769232, 'X[1] <= 21.5\ngini =
0.48\nsamples = 5\nvalue = [3, 2]'),
Text(0.37662337662337664, 0.11538461538461539, 'gini = 0.0\nsamples = 2\nvalue
= [2, 0]'),
Text(0.4025974025974026, 0.11538461538461539, 'X[2] <= 133.5\ngini =
0.444\nsamples = 3\nvalue = [1, 2]'),

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Text(0.38961038961038963, 0.038461538461538464, 'gini = 0.0\nsamples = 2\nvalue
= [0, 2]'),
Text(0.4155844155844156, 0.038461538461538464, 'gini = 0.0\nsamples = 1\nvalue
= [1, 0]'),
Text(0.38961038961038963, 0.34615384615384615, 'gini = 0.0\nsamples = 2\nvalue
= [2, 0]'),
Text(0.4025974025974026, 0.4230769230769231, 'gini = 0.0\nsamples = 3\nvalue =
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Text(0.4155844155844156, 0.5, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
Text(0.37662337662337664, 0.6538461538461539, 'gini = 0.0\nsamples = 2\nvalue =
[0, 2]'),
Text(0.6038961038961039, 0.7307692307692307, 'X[5] <= 30.5\ngini =
0.496\nsamples = 83\nvalue = [38, 45]'),
Text(0.4805194805194805, 0.6538461538461539, 'X[0] <= 1.0\ngini =
0.391\nsamples = 15\nvalue = [11, 4]'),
Text(0.45454545454545453, 0.5769230769230769, 'X[3] <= 31.75\ngini =
0.444\nsamples = 3\nvalue = [1, 2]'),
Text(0.44155844155844154, 0.5, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
Text(0.4675324675324675, 0.5, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
Text(0.5064935064935064, 0.5769230769230769, 'X[3] <= 47.55\ngini =
0.278\nsamples = 12\nvalue = [10, 2]'),
Text(0.4935064935064935, 0.5, 'X[3] <= 30.85\ngini = 0.165\nsamples = 11\nvalue
= [10, 1]'),
Text(0.4805194805194805, 0.4230769230769231, 'X[1] <= 19.5\ngini = 0.5\nsamples
= 2\nvalue = [1, 1]'),
Text(0.4675324675324675, 0.34615384615384615, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.4935064935064935, 0.34615384615384615, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.5064935064935064, 0.4230769230769231, 'gini = 0.0\nsamples = 9\nvalue =
[9, 0]'),
Text(0.5194805194805194, 0.5, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
Text(0.7272727272727273, 0.6538461538461539, 'X[1] <= 36.5\ngini =
0.479\nsamples = 68\nvalue = [27, 41]'),
Text(0.6493506493506493, 0.5769230769230769, 'X[3] <= 36.55\ngini =
0.449\nsamples = 53\nvalue = [18, 35]'),
Text(0.5844155844155844, 0.5, 'X[3] <= 33.05\ngini = 0.49\nsamples = 35\nvalue
= [15, 20]'),
Text(0.5324675324675324, 0.4230769230769231, 'X[4] <= 0.433\ngini =
0.408\nsamples = 21\nvalue = [6, 15]'),
Text(0.5194805194805194, 0.34615384615384615, 'X[4] <= 0.361\ngini =
0.48\nsamples = 15\nvalue = [6, 9]'),
Text(0.5064935064935064, 0.2692307692307692, 'X[1] <= 7.5\ngini =
0.426\nsamples = 13\nvalue = [4, 9]'),
Text(0.4805194805194805, 0.19230769230769232, 'X[0] <= 9.5\ngini =
0.219\nsamples = 8\nvalue = [1, 7]'),
Text(0.4675324675324675, 0.11538461538461539, 'gini = 0.0\nsamples = 6\nvalue =

```

```

[0, 6]'),
Text(0.4935064935064935, 0.11538461538461539, 'X[4] <= 0.265\ngini =
0.5\nsamples = 2\nvalue = [1, 1]'),
Text(0.4805194805194805, 0.038461538461538464, 'gini = 0.0\nsamples = 1\nvalue
= [1, 0]'),
Text(0.5064935064935064, 0.038461538461538464, 'gini = 0.0\nsamples = 1\nvalue
= [0, 1]'),
Text(0.5324675324675324, 0.19230769230769232, 'X[1] <= 25.5\ngini =
0.48\nsamples = 5\nvalue = [3, 2]'),
Text(0.5194805194805194, 0.11538461538461539, 'gini = 0.0\nsamples = 3\nvalue =
[3, 0]'),
Text(0.5454545454545454, 0.11538461538461539, 'gini = 0.0\nsamples = 2\nvalue =
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Text(0.5324675324675324, 0.2692307692307692, 'gini = 0.0\nsamples = 2\nvalue =
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Text(0.5454545454545454, 0.34615384615384615, 'gini = 0.0\nsamples = 6\nvalue =
[0, 6]'),
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0.459\nsamples = 14\nvalue = [9, 5]'),
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0.375\nsamples = 12\nvalue = [9, 3]'),
Text(0.6103896103896104, 0.2692307692307692, 'X[1] <= 27.0\ngini =
0.298\nsamples = 11\nvalue = [9, 2]'),
Text(0.5844155844155844, 0.19230769230769232, 'X[4] <= 0.255\ngini =
0.198\nsamples = 9\nvalue = [8, 1]'),
Text(0.5714285714285714, 0.11538461538461539, 'X[4] <= 0.21\ngini =
0.444\nsamples = 3\nvalue = [2, 1]'),
Text(0.5584415584415584, 0.038461538461538464, 'gini = 0.0\nsamples = 2\nvalue
= [2, 0]'),
Text(0.5844155844155844, 0.038461538461538464, 'gini = 0.0\nsamples = 1\nvalue
= [0, 1]'),
Text(0.5974025974025974, 0.11538461538461539, 'gini = 0.0\nsamples = 6\nvalue =
[6, 0]'),
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0.5\nsamples = 2\nvalue = [1, 1]'),
Text(0.6233766233766234, 0.11538461538461539, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.6493506493506493, 0.11538461538461539, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.6363636363636364, 0.2692307692307692, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.6493506493506493, 0.34615384615384615, 'gini = 0.0\nsamples = 2\nvalue =
[0, 2]'),
Text(0.7142857142857143, 0.5, 'X[4] <= 0.639\ngini = 0.278\nsamples = 18\nvalue
= [3, 15]'),
Text(0.6883116883116883, 0.4230769230769231, 'X[3] <= 38.4\ngini =
0.124\nsamples = 15\nvalue = [1, 14]'),

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Text(0.6753246753246753, 0.34615384615384615, 'X[3] <= 38.15\ngini =
0.32\nsamples = 5\nvalue = [1, 4]'),
Text(0.6623376623376623, 0.2692307692307692, 'gini = 0.0\nsamples = 4\nvalue =
[0, 4]'),
Text(0.6883116883116883, 0.2692307692307692, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.7012987012987013, 0.34615384615384615, 'gini = 0.0\nsamples = 10\nvalue
= [0, 10]'),
Text(0.7402597402597403, 0.4230769230769231, 'X[3] <= 39.65\ngini =
0.444\nsamples = 3\nvalue = [2, 1]'),
Text(0.7272727272727273, 0.34615384615384615, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.7532467532467533, 0.34615384615384615, 'gini = 0.0\nsamples = 2\nvalue =
[2, 0]'),
Text(0.8051948051948052, 0.5769230769230769, 'X[3] <= 35.15\ngini =
0.48\nsamples = 15\nvalue = [9, 6]'),
Text(0.7792207792207793, 0.5, 'X[4] <= 0.191\ngini = 0.32\nsamples = 5\nvalue =
[1, 4]'),
Text(0.7662337662337663, 0.4230769230769231, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.7922077922077922, 0.4230769230769231, 'gini = 0.0\nsamples = 4\nvalue =
[0, 4]'),
Text(0.8311688311688312, 0.5, 'X[3] <= 48.4\ngini = 0.32\nsamples = 10\nvalue =
[8, 2]'),
Text(0.8181818181818182, 0.4230769230769231, 'X[2] <= 112.0\ngini =
0.198\nsamples = 9\nvalue = [8, 1]'),
Text(0.8051948051948052, 0.34615384615384615, 'gini = 0.0\nsamples = 8\nvalue =
[8, 0]'),
Text(0.8311688311688312, 0.34615384615384615, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.8441558441558441, 0.4230769230769231, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.948051948051948, 0.8076923076923077, 'X[4] <= 0.528\ngini =
0.375\nsamples = 44\nvalue = [11, 33]'),
Text(0.922077922077922, 0.7307692307692307, 'X[1] <= 36.5\ngini =
0.498\nsamples = 17\nvalue = [8, 9]'),
Text(0.9090909090909091, 0.6538461538461539, 'X[0] <= 9.0\ngini =
0.473\nsamples = 13\nvalue = [8, 5]'),
Text(0.8961038961038961, 0.5769230769230769, 'X[3] <= 32.2\ngini =
0.397\nsamples = 11\nvalue = [8, 3]'),
Text(0.8831168831168831, 0.5, 'X[4] <= 0.402\ngini = 0.5\nsamples = 6\nvalue =
[3, 3]'),
Text(0.8701298701298701, 0.4230769230769231, 'gini = 0.0\nsamples = 2\nvalue =
[0, 2]'),
Text(0.8961038961038961, 0.4230769230769231, 'X[0] <= 4.5\ngini =
0.375\nsamples = 4\nvalue = [3, 1]'),
Text(0.8831168831168831, 0.34615384615384615, 'gini = 0.0\nsamples = 3\nvalue =

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[3, 0]'),
Text(0.9090909090909091, 0.34615384615384615, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
Text(0.9090909090909091, 0.5, 'gini = 0.0\nsamples = 5\nvalue = [5, 0]'),
Text(0.922077922077922, 0.5769230769230769, 'gini = 0.0\nsamples = 2\nvalue =
[0, 2]'),
Text(0.935064935064935, 0.6538461538461539, 'gini = 0.0\nsamples = 4\nvalue =
[0, 4]'),
Text(0.974025974025974, 0.7307692307692307, 'X[4] <= 2.309\ngini =
0.198\nsamples = 27\nvalue = [3, 24]'),
Text(0.961038961038961, 0.6538461538461539, 'X[5] <= 60.5\ngini =
0.142\nsamples = 26\nvalue = [2, 24]'),
Text(0.948051948051948, 0.5769230769230769, 'X[2] <= 333.5\ngini =
0.077\nsamples = 25\nvalue = [1, 24]'),
Text(0.935064935064935, 0.5, 'gini = 0.0\nsamples = 21\nvalue = [0, 21]'),
Text(0.961038961038961, 0.5, 'X[4] <= 0.71\ngini = 0.375\nsamples = 4\nvalue =
[1, 3]'),
Text(0.948051948051948, 0.4230769230769231, 'gini = 0.0\nsamples = 3\nvalue =
[0, 3]'),
Text(0.974025974025974, 0.4230769230769231, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.974025974025974, 0.5769230769230769, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
Text(0.987012987012987, 0.6538461538461539, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]')]

```

