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LAMPIRAN

Lampiran 1

```
from pomegranate import *
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import itertools
from sklearn.preprocessing import LabelEncoder
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import classification_report, confusion_matrix
from sklearn.model_selection import train_test_split
import pygraphviz
import networkx as nx

df = pd.read_csv('mushrooms.csv')

#Eksplorasi data

df.head()

for col in df.columns:
    print(col, ": ", df[col].unique())

df.info()

list_count = []
for column in df.drop(['class'], axis=1):
    list_count += [df.groupby(['class', column]).size()]

# multilevel frequency
pd.concat([pd.concat([pd.DataFrame(list_count[i])], keys=[list_count[i].index.names[1]], names=['variable']) for i in range(len(list_count))])
```

```

fig = plt.figure(figsize=(25,25))
i=1
for col in df:
    ax2 = fig.add_subplot(3,3,i)
    g = sns.countplot(x=col, hue='class', data=df) # pass ax1
    i += 1
    if i==10:
        fig = plt.figure(figsize=(25,25))
        i=1

plt.tight_layout()

#preprocessing

df = df.drop('veil-type', axis=1)

labelencoder=LabelEncoder()
for col in df:
    df[col] = labelencoder.fit_transform(df[col])

for col in df.columns:
    print(col, ":", df[col].unique())

#pembagian data

X = df
y = df.pop('class')

#Data Training 80% data testing 20%
test_size = 0.20
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=t
est_size)
df_train = pd.concat([X_train, y_train],axis=1)

df_train.info()

```

```

#pembuatan tree dengan algoritma Chow-Liu beserta model Bayesian Network
model = BayesianNetwork.from_samples(pd.concat([X_train, y_train],axis=1)
, algorithm='chow-liu')
    node = 0
for t in model.structure:
    if len(t) == 0:
        print("parent of node", node, "-> None")
    else:
        print("parent of node", node, "->", t[0])
    node += 1

#legend dari graf
pd.concat([X_train, y_train], axis=1).info()

#mutual informasi
def P(val, col):
    return len(df_train.loc[df_train[col]==val] ) / len(df_train)
def P_(val1, val2, col1, col2):
    return len(df_train.loc[(df_train[col1]==val1) & (df_train[col2]==val
2)] ) / len(df_train)

mi = {}
    for cols in itertools.combinations_with_replacement(df_train.columns,
2):
        col1 = cols[0]
        col2 = cols[1]
        if(col1 == col2):
            continue
        mii = 0
        for val1 in df_train[col1].unique():
            for val2 in df_train[col2].unique():
                mii+= P_(val1,val2,col1,col2) * np.log((P_(val1,val2,col1
,col2)/ (P(val1,col1)*P(val2,col2))) + np.finfo(float).eps )

```

```

#mutual informasi
mi[col1+'+'col2] = mii
    #P(val1, val2) log (p(val1, val2) / P(val1)P(val2))
    mutual_information = pd.DataFrame([k: v for k, v in sorted(mi.items(
), key=lambda item: item[1], reverse=True))]).T
    mutual_information.columns= ['value']
    mutual_information = np.trunc(1000 * mutual_information) / 1000

mutual_information.to_excel('mutual_information.xlsx')

edges = []
node = 0
for t in model.structure:
    if len(t) != 0:
        edges += [[t[0], node]]
        node += 1

#CPT (disimpan dalam folder)
for pair in edges:
    col1 = df_train.columns[pair[1]]
    col2 = df_train.columns[pair[0]]
    cpt = pd.concat(
        [pd.concat(
            [pd.DataFrame([], index=df_train[col1].unique(), columns=df_t
rain[col2].unique())],
            keys=[col1]
        ).T,
        keys=[col2]
    ).T
l = []
for row in cpt.index:
    ll = []
    for col in cpt.columns:
        ll+= [P_(row[1], col[1], row[0], col[0]) / P(col[1], col[0])]
    l += [ll]
cpt = pd.DataFrame(l, index=cpt.index, columns=cpt.columns)
cpt = np.trunc(1000 * cpt) / 1000
cpt.to_excel('cpt/'+col1+'+'col2+'.xlsx')

```

```

#evaluasi training
pred = model.predict(pd.concat([X_train.reset_index().drop(['index'],axis
=1), pd.Series(np.full(y_train.shape, None))],axis=1).values.tolist())
y_pred = pd.DataFrame(pred)[21]
print(classification_report(y_train, y_pred))
print(confusion_matrix(y_train, y_pred))

#evaluasi testing
pred = model.predict(pd.concat([X_test.reset_index().drop(['index'],axis=
1), pd.Series(np.full(y_test.shape, None))],axis=1).values.tolist())
y_pred = pd.DataFrame(pred)[21]
print(classification_report(y_test, y_pred))
print(confusion_matrix(y_test, y_pred))

#buat Bayesian Network menggunakan 4 variabel yang berpengaruh
new_df = pd.concat([df[['cap-shape', 'stalk-root', 'spore-print-
color', 'odor']], y], axis=1)

new_X = new_df
new_y = new_df.pop('class')

X_train2, X_test2, y_train2, y_test2 = train_test_split(new_X, new_y, tes
t_size=0.20)

pd.concat([X_train2, y_train2], axis=1).info()

model2 = BayesianNetwork.from_samples(pd.concat([X_train2, y_train2], axi
s=1), algorithm='chow-liu')

#evaluasi tranining2

pred = model2.predict(pd.concat([X_train2.reset_index().drop(['index'],ax
is=1), pd.Series(np.full(y_train2.shape, None))],axis=1).values.tolist())
y_pred = pd.DataFrame(pred)[4]
print(classification_report(y_train2, y_pred))

```



```

#evaluasi testing 2
pred = model2.predict(pd.concat([X_test2.reset_index().drop(['index'],axis
=1), pd.Series(np.full(y_test2.shape, None))],axis=1).values.tolist())
y_pred = pd.DataFrame(pred)[4]
print(classification_report(y_test2, y_pred))

```

Lampiran 2

<i>variable</i>	<i>class</i>	<i>value</i>	<i>count</i>
<i>Cap-Shape</i>	e	b	404
		f	1596
		k	228
		s	32
		x	1948
	p	b	48
		c	4
		f	1556
		k	600
		x	1708
<i>Cap-Surface</i>	e	f	1560
		s	1144
		y	1504
	p	f	760
		g	4
		s	1412
		y	1740

<i>variable</i>	<i>class</i>	<i>value</i>	<i>count</i>
<i>Cap-Color</i>	e	b	48
		c	32
		e	624
		g	1032
		n	1264
		p	56
		r	16
		u	16
		w	720
	y	400	
	p	b	120
		c	12
		e	876
		g	808
		n	1020
		p	88
		w	320
		y	672
<i>Bruises</i>	e	f	1456
		t	2752
	p	f	3292
		t	624
<i>Odor</i>	e	a	400
		l	400
		n	3408
	p	c	192
		f	2160
		m	36

<i>variable</i>	<i>class</i>	<i>value</i>	<i>count</i>
		n	120
		p	256
		s	576
		y	576
<i>Gill-Attachment</i>	e	a	192
		f	4016
	p	a	18
		f	3898
<i>Gill-Spacing</i>	e	c	3008
		w	1200
	p	c	3804
		w	112
<i>Gill-Size</i>	e	b	3920
		n	288
	p	b	1692
		n	2224
<i>Gill-Color</i>	e	e	96
		g	248
		h	204
		k	344
		n	936
		o	64
		p	852
		u	444
		w	956
		y	64
	p	b	1728
		g	504

<i>variable</i>	<i>class</i>	<i>value</i>	<i>count</i>
		h	528
		k	64
		n	112
		p	640
		r	24
		u	48
		w	246
		y	22
<i>Stalk-Shape</i>	e	e	1616
		t	2592
	p	e	1900
		t	2016
<i>Stalk-Root</i>	e	?	720
		b	1920
		c	512
		e	864
		r	192
	p	?	1760
		b	1856
		c	44
		e	256
<i>Stalk-Surface-Above-Ring</i>	e	f	408
		k	144
		s	3640
		y	16
	p	f	144
		k	2228
		s	1536

<i>variable</i>	<i>class</i>	<i>value</i>	<i>count</i>
		y	8
<i>Stalk-Surface-Below-Ring</i>	e	f	456
		k	144
		s	3400
		y	208
	p	f	144
		k	2160
		s	1536
		y	76
<i>Stalk-Color-Above-Ring</i>	e	e	96
		g	576
		n	16
		o	192
		p	576
		w	2752
	p	b	432
		c	36
		n	432
		p	1296
		w	1712
		y	8
<i>Stalk-Color-Below-Ring</i>	e	e	96
		g	576
		n	64
		o	192
		p	576
		w	2704
	p	b	432

<i>variable</i>	<i>class</i>	<i>value</i>	<i>count</i>
		c	36
		n	448
		p	1296
		w	1680
		y	24
<i>Veil-Type</i>	e	p	4208
	p	p	3916
<i>Veil-Color</i>	e	n	96
		o	96
		w	4016
	p	w	3908
		y	8
<i>Ring-Number</i>	e	o	3680
		t	528
	p	n	36
		o	3808
		t	72
<i>Ring-Type</i>	e	e	1008
		f	48
		p	3152
	p	e	1768
		l	1296
		n	36
		p	816
<i>Spore-Print-Color</i>	e	b	48
		h	48
		k	1648
		n	1744

<i>variable</i>	<i>class</i>	<i>value</i>	<i>count</i>
		o	48
		u	48
		w	576
		y	48
	p	h	1584
		k	224
		n	224
		r	72
		w	1812
<i>Population</i>	e	a	384
		c	288
		n	400
		s	880
		v	1192
		y	1064
	p	c	52
		s	368
		v	2848
		y	648
<i>Habitat</i>	e	d	1880
		g	1408
		l	240
		m	256
		p	136
		u	96
		w	192
	p	d	1268
		g	740

<i>variable</i>	<i>class</i>	<i>value</i>	<i>count</i>
		l	592
		m	36
		p	1008
		u	272

Lampiran 3

Conditional Probability Table (CPT) dari data asli

$P(\text{node Cap-surface} / \text{node Stalk-root})$

		<i>Stalk-root</i>				
		b	e	c	r	?
<i>Cap-surface</i>	f	0.444	0.43	0	0	0.065
	s	0.132	0.451	0.493	0	0.519
	y	0.421	0.118	0.506	1	0.414
	g	0	0	0	0	0

$P(\text{node Cap-color} / \text{node Odor})$

		<i>Odor</i>								
		n	c	p	l	a	s	f	y	m
<i>Cap-color</i>	e	0.173	0	0	0	0	0.502	0.132	0.507	0.357
	w	0.126	0.341	0.482	0.391	0.395	0	0.047	0	0
	g	0.294	0.323	0	0	0	0	0.344	0	0
	n	0.34	0	0.517	0.105	0.107	0.497	0.127	0.492	0.321
	y	0.007	0	0	0.503	0.496	0	0.301	0	0
	p	0.019	0.335	0	0	0	0	0	0	0
	b	0.018	0	0	0	0	0	0.045	0	0
	u	0.004	0	0	0	0	0	0	0	0
	c	0.009	0	0	0	0	0	0	0	0.321
	r	0.004	0	0	0	0	0	0	0	0

$P(\text{node Bruises} / \text{node Ring-type})$

		<i>Ring-type</i>				
		p	e	l	f	n
<i>Bruises</i>	t	0.798	0.065	0	0	0
	f	0.201	0.934	1	1	1

$P(\text{node Odor} \mid \text{node Spore-print-color})$

		<i>Spore-print-color</i>								
		n	k	u	w	y	h	r	b	o
<i>Odor</i>	n	0.677	0.7	0	0.259	1	0.029	1	1	1
	c	0.049	0.058	0	0	0	0	0	0	0
	p	0.07	0.06	0	0	0	0	0	0	0
	l	0.102	0.088	0.463	0	0	0	0	0	0
	a	0.098	0.091	0.536	0	0	0	0	0	0
	s	0	0	0	0.247	0	0	0	0	0
	f	0	0	0	0.235	0	0.97	0	0	0
	y	0	0	0	0.242	0	0	0	0	0
	m	0	0	0	0.014	0	0	0	0	0

$P(\text{node Gill-attachment} \mid \text{node Stalk-color-above-ring})$

		<i>Stalk-color-above-ring</i>								
		p	w	g	o	n	b	e	c	y
<i>Gill-attachment</i>	f	1	1	0	1	1	1	0.535	1	1
	a	0	0	1	0	0	0	0.464	0	0

$P(\text{node Gill-spacing} \mid \text{node Population})$

		<i>Population</i>					
		v	s	y	a	c	n
<i>Gill-spacing</i>	c	0.949	0.533	1	0	0.953	0.643
	w	0.05	0.466	0	1	0.046	0.356

$P(\text{node 7 (Gill-size)} \mid \text{node 8 (Gill-Color)})$

		<i>Gill-color</i>											
		u	p	g	n	k	w	h	b	o	e	y	r
<i>Gill-size</i>	b	0.863	0.881	0.895	0.835	0.798	0.819	0.985	0	1	1	0.97	1
	n	0.136	0.118	0.104	0.164	0.201	0.18	0.014	1	0	0	0.029	0

P(node Gill-Color / node Spore-Print-Color)

		<i>Spore-print-color</i>								
		n	k	u	w	y	h	r	b	o
<i>Gill-color</i>	u	0.121	0.138	0	0	0	0.008	0	0	0
	p	0.215	0.219	0.365	0.038	0	0.323	0	0	0
	g	0.051	0.051	0	0.039	0	0.266	0.276	0	0
	n	0.259	0.255	0.317	0	0.394	0	0	0.343	0.282
	k	0.109	0.106	0	0	0	0	0	0	0
	w	0.176	0.174	0.317	0.149	0	0.064	0.34	0	0
	h	0.05	0.052	0	0	0	0.337	0	0	0
	b	0	0	0	0.725	0	0	0	0	0
	o	0.007	0	0	0	0.263	0	0	0.406	0.333
	e	0	0	0	0.037	0	0	0	0	0
	y	0.008	0	0	0.009	0.342	0	0	0.25	0.384
r	0	0	0	0	0	0	0.382	0	0	

P(node Stalk-shape / node Gill-color)

		<i>Gill-color</i>											
		u	p	g	n	k	w	h	b	o	e	y	r
<i>Stalk-shape</i>	t	0.863	0.518	0	0.627	0.483	0.45	0.398	1	0	0	0	0
	e	0.136	0.481	1	0.372	0.516	0.549	0.601	0	1	1	1	1

P(node Stalk-root / node Cap-shape)

		<i>Cap-shape</i>					
		f	x	b	k	s	c
<i>Stalk-root</i>	b	0.562	0.53	0.081	0.03	0	0.666
	e	0.178	0.148	0	0	1	0
	c	0.004	0.071	0.587	0.016	0	0.333
	r	0.027	0.025	0	0	0	0
	?	0.226	0.224	0.331	0.952	0	0

$P(\text{node Stalk-surface-above-ring} \mid \text{node Ring-type})$

		<i>Ring-type</i>				
		p	e	l	f	n
<i>Stalk-surface-above-ring</i>	s	0.922	0.528	0	1	0
	f	0.038	0.151	0	0	0
	k	0.034	0.317	1	0	1
	y	0.004	0.002	0	0	0

$P(\text{node Stalk-surface-below-ring} \mid \text{node Ring-type})$

		<i>Ring-type</i>				
		p	e	l	f	n
<i>Stalk-surface-below-ring</i>	s	0.874	0.527	0	0	0
	y	0.049	0.015	0	0	1
	f	0.038	0.146	0	1	0
	k	0.037	0.31	1	0	0

$P(\text{node Stalk-color-above-ring} \mid \text{node Ring-type})$

		<i>ring-type</i>				
		p	e	l	f	n
<i>Stalk-color-above-ring</i>	p	0.145	0.313	0.322	0	0
	w	0.656	0.652	0	1	0
	g	0.147	0	0	0	0
	o	0.046	0	0	0	0
	n	0.004	0	0.327	0	0
	b	0	0	0.349	0	0
	e	0	0.032	0	0	0
	c	0	0	0	0	1
	y	0	0.002	0	0	0

$P(\text{node Stalk-color-below-ring} \mid \text{node Stalk-color-above-ring})$

		<i>Stalk-color-above-ring</i>								
		p	w	g	o	n	b	e	c	y
<i>Stalk-color-below-ring</i>	g	0.108	0.043	0.32	0	0	0	0	0	0
	w	0.336	0.784	0.344	0	0	0	0.486	0	0
	p	0.404	0.142	0.335	0	0.32	0.327	0	0	0
	o	0	0	0	1	0	0	0	0	0
	b	0.073	0	0	0	0.322	0.325	0	0	0
	n	0.076	0.015	0	0	0.356	0.347	0	0	0
	c	0	0	0	0	0	0	0	1	0
	y	0	0.003	0	0	0	0	0	0	1
	e	0	0.01	0	0	0	0	0.513	0	0

$P(\text{node Veil-color} \mid \text{node Stalk-color-above-ring})$

		<i>Stalk-color-above-ring</i>								
		p	w	g	o	n	b	e	c	y
<i>Veil-color</i>	w	1	1	1	0	1	1	1	1	0
	o	0	0	0	0.472	0	0	0	0	0
	n	0	0	0	0.527	0	0	0	0	0
	y	0	0	0	0	0	0	0	0	1

$P(\text{node Ring-number} \mid \text{node Gill-color})$

		<i>Gill-color</i>											
		u	p	g	n	k	w	h	b	o	e	y	r
<i>Ring-number</i>	o	1	0.938	0.85	1	1	0.761	1	1	1	0	0.764	0
	t	0	0.061	0.149	0	0	0.225	0	0	0	1	0	1
	n	0	0	0	0	0	0.012	0	0	0	0	0.235	0

$P(\text{node Ring-Type} / \text{node Spore-Print-Color})$

		<i>Spore-print-color</i>								
		n	k	u	w	y	h	r	b	o
<i>Ring-type</i>	p	0.8	0.789	1	0.144	1	0.179	1	1	1
	e	0.199	0.21	0	0.841	0	0	0	0	0
	l	0	0	0	0	0	0.791	0	0	0
	f	0	0	0	0	0	0.029	0	0	0
	n	0	0	0	0.014	0	0	0	0	0

$P(\text{node Spore-Print-Color} / \text{node Stalk-Root})$

		<i>Stalk-root</i>				
		b	e	c	r	?
<i>Spore-print-color</i>	n	0.259	0.509	0.472	0.482	0.018
	k	0.262	0.49	0.45	0.517	0
	u	0.013	0	0	0	0
	w	0.027	0	0.076	0	0.906
	y	0	0	0	0	0.019
	h	0.42	0	0	0	0.019
	r	0.015	0	0	0	0
	b	0	0	0	0	0.016
	o	0	0	0	0	0.019

$P(\text{node Population} / \text{node Stalk-root})$

		<i>Stalk-root</i>				
		b	e	c	r	?
<i>Population</i>	v	0.523	0.147	0	0	0.761
	s	0.066	0.463	0.457	0.517	0.059
	y	0.408	0.045	0	0.482	0.01
	a	0	0.344	0	0	0
	c	0.001	0	0.076	0	0.11

	n	0	0	0.466	0	0.057
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P(node Habitat) / node Stalk-root)

		<i>Stalk-root</i>				
		b	e	c	r	?
<i>Habitat</i>	d	0.652	0	0.063	0	0.271
	u	0.038	0.188	0	0	0
	m	0.007	0	0.463	0	0
	g	0.161	0.811	0.459	0.51	0.117
	p	0.124	0	0	0.489	0.227
	w	0	0	0	0	0.074
	l	0.015	0	0.013	0	0.309

P(node Class / node Odor)

		<i>Odor</i>								
		n	c	p	l	a	s	f	y	m
<i>Class</i>	e	0.969	0	0	1	1	0	0	0	0
	p	0.03	1	1	0	0	1	1	1	1

Lampiran 4

Tabel Mutual Informasi

No	Pasangan variabel acak	value
1	odor , spore-print-color	0.663
2	gill-color , spore-print-color	0.658
3	odor , class	0.632
4	odor , gill-color	0.607
5	stalk-root , spore-print-color	0.605
6	odor , stalk-root	0.58
7	gill-color , stalk-root	0.562
8	ring-type , spore-print-color	0.561
9	gill-color , ring-type	0.539
10	odor , ring-type	0.524
11	stalk-root , population	0.48
12	stalk-root , habitat	0.47
13	stalk-root , ring-type	0.451
14	population , habitat	0.449
15	stalk-color-above-ring , stalk-color-below-ring	0.445
16	gill-color , habitat	0.442
17	stalk-color-above-ring , ring-type	0.412
18	cap-color , odor	0.401
19	stalk-color-below-ring , ring-type	0.396
20	cap-color , gill-color	0.379
21	stalk-color-above-ring , spore-print-color	0.376
22	stalk-color-below-ring , spore-print-color	0.368
23	odor , stalk-color-above-ring	0.362
24	stalk-surface-below-ring , ring-type	0.359
25	gill-color , population	0.353
26	odor , stalk-color-below-ring	0.35

No	Pasangan variabel acak	value
27	bruises , ring-type	0.349
28	gill-color , stalk-color-above-ring	0.349
29	odor , stalk-surface-below-ring	0.348
30	odor , habitat	0.346
31	gill-color , stalk-color-below-ring	0.344
32	stalk-surface-above-ring , ring-type	0.341
33	stalk-surface-below-ring , spore-print-color	0.34
34	gill-size , gill-color	0.338
35	spore-print-color , class	0.33
36	stalk-surface-above-ring , spore-print-color	0.33
37	cap-color , spore-print-color	0.329
38	odor , gill-size	0.322
39	cap-color , habitat	0.322
40	odor , population	0.319
41	cap-color , stalk-root	0.319
42	stalk-color-below-ring , population	0.309
43	stalk-root , stalk-color-below-ring	0.308
44	stalk-root , stalk-color-above-ring	0.306
45	stalk-color-above-ring , population	0.305
46	stalk-color-below-ring , habitat	0.303
47	stalk-color-above-ring , habitat	0.303
48	spore-print-color , habitat	0.298
49	cap-color , ring-type	0.297
50	odor , stalk-surface-above-ring	0.297
51	stalk-surface-above-ring , stalk-surface-below-ring	0.291
52	gill-color , class	0.287
53	stalk-surface-below-ring , stalk-color-above-ring	0.286
54	bruises , odor	0.275

No	Pasangan variabel acak	value
55	cap-color , stalk-color-below-ring	0.275
56	stalk-surface-below-ring , stalk-color-below-ring	0.274
57	cap-color , stalk-color-above-ring	0.272
58	stalk-surface-above-ring , stalk-color-above-ring	0.269
59	bruises , gill-color	0.257
60	gill-color , stalk-surface-below-ring	0.257
61	stalk-surface-above-ring , stalk-color-below-ring	0.256
62	ring-type , population	0.256
63	gill-color , stalk-shape	0.248
64	stalk-shape , ring-type	0.236
65	cap-color , population	0.236
66	spore-print-color , population	0.234
67	gill-size , spore-print-color	0.228
68	gill-color , stalk-surface-above-ring	0.225
69	stalk-root , stalk-surface-below-ring	0.219
70	ring-type , class	0.217
71	cap-color , stalk-shape	0.213
72	bruises , stalk-surface-above-ring	0.212
73	ring-type , habitat	0.21
74	odor , stalk-shape	0.209
75	cap-shape , stalk-root	0.208
76	bruises , stalk-surface-below-ring	0.207
77	gill-size , stalk-root	0.205
78	bruises , spore-print-color	0.203
79	gill-spacing , population	0.202
80	stalk-surface-above-ring , class	0.197
81	stalk-shape , stalk-color-below-ring	0.195
82	bruises , stalk-root	0.187

No	Pasangan variabel acak	value
83	stalk-shape , stalk-color-above-ring	0.187
84	stalk-surface-below-ring , class	0.186
85	gill-size , ring-type	0.178
86	stalk-color-above-ring , class	0.176
87	cap-surface , stalk-root	0.174
88	bruises , habitat	0.169
89	stalk-color-below-ring , class	0.167
90	bruises , stalk-color-below-ring	0.162
91	gill-size , class	0.159
92	gill-size , population	0.158
93	bruises , stalk-color-above-ring	0.155
94	cap-shape , spore-print-color	0.154
95	cap-color , stalk-surface-below-ring	0.153
96	stalk-surface-below-ring , habitat	0.15
97	stalk-surface-above-ring , habitat	0.148
98	stalk-root , stalk-surface-above-ring	0.143
99	gill-spacing , habitat	0.143
100	population , class	0.139
101	stalk-surface-below-ring , population	0.139
102	gill-size , habitat	0.138
103	cap-surface , population	0.137
104	cap-shape , gill-color	0.134
105	cap-shape , odor	0.133
106	cap-surface , gill-color	0.132
107	bruises , class	0.132
108	stalk-surface-above-ring , population	0.132
109	gill-spacing , stalk-root	0.131
110	stalk-shape , population	0.128

No	Pasangan variabel acak	value
111	cap-color , gill-size	0.128
112	cap-surface , stalk-color-below-ring	0.127
113	cap-shape , population	0.126
114	cap-shape , habitat	0.121
115	odor , gill-spacing	0.121
116	cap-surface , stalk-color-above-ring	0.12
117	cap-surface , odor	0.115
118	stalk-color-above-ring , veil-color	0.114
119	gill-spacing , stalk-color-above-ring	0.113
120	stalk-shape , spore-print-color	0.113
121	stalk-color-below-ring , veil-color	0.112
122	cap-color , stalk-surface-above-ring	0.112
123	gill-attachment , stalk-color-below-ring	0.111
124	gill-attachment , stalk-color-above-ring	0.111
125	gill-color , ring-number	0.111
126	habitat , class	0.11
127	cap-surface , habitat	0.11
128	ring-number , habitat	0.109
129	ring-number , spore-print-color	0.108
130	gill-attachment , veil-color	0.1
131	gill-spacing , stalk-color-below-ring	0.1
132	cap-surface , ring-type	0.1
133	gill-size , stalk-color-above-ring	0.099
134	cap-shape , ring-type	0.097
135	stalk-shape , habitat	0.096
136	stalk-root , class	0.095
137	ring-number , population	0.094
138	stalk-color-below-ring , ring-number	0.092

No	Pasangan variabel acak	value
139	stalk-shape , stalk-root	0.091
140	odor , ring-number	0.09
141	cap-surface , spore-print-color	0.09
142	stalk-color-above-ring , ring-number	0.09
143	cap-color , gill-spacing	0.088
144	gill-size , stalk-color-below-ring	0.084
145	veil-color , spore-print-color	0.081
146	cap-shape , cap-color	0.078
147	gill-attachment , gill-color	0.077
148	stalk-shape , stalk-surface-below-ring	0.076
149	cap-surface , cap-color	0.076
150	gill-attachment , spore-print-color	0.076
151	gill-color , veil-color	0.075
152	cap-surface , gill-spacing	0.074
153	bruises , gill-size	0.074
154	gill-spacing , stalk-surface-above-ring	0.072
155	gill-spacing , class	0.071
156	gill-spacing , gill-color	0.068
157	stalk-shape , ring-number	0.067
158	cap-shape , stalk-color-above-ring	0.065
159	gill-spacing , stalk-surface-below-ring	0.064
160	gill-spacing , spore-print-color	0.061
161	cap-shape , stalk-color-below-ring	0.061
162	cap-shape , gill-size	0.061
163	stalk-root , ring-number	0.06
164	stalk-shape , stalk-surface-above-ring	0.059
165	cap-shape , stalk-shape	0.058
166	veil-color , habitat	0.056

No	Pasangan variabel acak	value
167	bruises , population	0.054
168	bruises , gill-spacing	0.053
169	gill-spacing , ring-type	0.053
170	cap-color , ring-number	0.05
171	gill-attachment , habitat	0.048
172	cap-surface , stalk-surface-below-ring	0.046
173	ring-number , ring-type	0.042
174	cap-surface , gill-size	0.041
175	cap-surface , stalk-surface-above-ring	0.04
176	cap-shape , bruises	0.039
177	gill-attachment , population	0.035
178	cap-shape , cap-surface	0.034
179	cap-shape , class	0.034
180	veil-color , population	0.032
181	cap-color , veil-color	0.031
182	stalk-root , veil-color	0.029
183	gill-size , ring-number	0.029
184	cap-shape , ring-number	0.029
185	ring-number , class	0.028
186	cap-color , gill-attachment	0.028
187	cap-surface , veil-color	0.027
188	cap-color , bruises	0.027
189	cap-color , class	0.026
190	gill-attachment , stalk-root	0.025
191	gill-spacing , ring-number	0.024
192	odor , gill-attachment	0.023
193	gill-size , stalk-shape	0.021
194	cap-shape , stalk-surface-below-ring	0.021

No	Pasangan variabel acak	value
195	stalk-surface-below-ring , ring-number	0.021
196	cap-shape , stalk-surface-above-ring	0.021
197	cap-surface , gill-attachment	0.021
198	gill-attachment , stalk-shape	0.021
199	gill-attachment , ring-type	0.02
200	stalk-shape , veil-color	0.02
201	odor , veil-color	0.019
202	cap-surface , class	0.019
203	gill-size , stalk-surface-above-ring	0.018
204	veil-color , ring-type	0.017
205	stalk-surface-above-ring , veil-color	0.015
206	veil-color , class	0.015
207	stalk-surface-above-ring , ring-number	0.015
208	stalk-surface-below-ring , veil-color	0.014
209	bruises , gill-attachment	0.013
210	gill-size , stalk-surface-below-ring	0.012
211	bruises , veil-color	0.012
212	gill-attachment , stalk-surface-below-ring	0.011
213	cap-surface , ring-number	0.01
214	gill-size , veil-color	0.009
215	gill-attachment , class	0.009
216	gill-attachment , gill-size	0.009
217	cap-shape , veil-color	0.008
218	cap-surface , bruises	0.008
219	cap-shape , gill-attachment	0.007
220	gill-spacing , gill-size	0.006
221	gill-attachment , ring-number	0.006
222	gill-attachment , stalk-surface-above-ring	0.005

No	Pasangan variabel acak	value
223	stalk-shape , class	0.005
224	gill-spacing , veil-color	0.005
225	bruises , stalk-shape	0.005
226	gill-attachment , gill-spacing	0.004
227	gill-spacing , stalk-shape	0.003
228	cap-surface , stalk-shape	0.003
229	cap-shape , gill-spacing	0.002
230	bruises , ring-number	0.002
231	veil-color , ring-number	0.001

Lampiran 5

Conditional Probability Table (CPT) dari data contoh

$P(\text{node A} / \text{node B})$

		B	
		b	a
A	a	0.8	0.333
	b	0.2	0.666

$P(\text{node B} / \text{node A})$

		A	
		a	b
B	b	0.8	0.333
	a	0.2	0.666

$P(\text{node B} / \text{node C})$

		C	
		a	b
B	b	0.25	1
	a	0.75	0

$P(\text{node C} / \text{node B})$

		B	
		b	a
C	a	0.2	1
	b	0.8	0

$P(\text{node C} / \text{node D})$

		D	
		p	e
C	a	0.8	0
	b	0.2	1

$P(\text{node D} / \text{node C})$

		C	
		a	b
D	p	1	0.25
	e	0	0.75

Lampiran 6

Nama variabel	Anggota Variabel dalam Huruf	Anggota Variabel dalam Angka
<i>Class</i>	'p', 'e'	'1', '0'
<i>Cap-shape</i>	'x', 'b', 's', 'f', 'k', 'c'	'5', '0', '4', '2', '3', '1'
<i>Cap-surface</i>	's', 'y', 'f', 'g'	'2', '3', '0', '1'
<i>Cap-color</i>	'n', 'y', 'w', 'g', 'e', 'p', 'b', 'u', 'c', 'r'	'4', '9', '8', '3', '2', '5', '0', '7', '1', '6'
<i>Bruises</i>	't', 'f'	'1', '0'
<i>Odor</i>	'p', 'a', 'l', 'n', 'f', 'c', 'y', 's', 'm'	'6', '0', '3', '5', '2', '1', '8', '7', '4'
<i>Gill-attachment</i>	'f', 'a'	'0', '1'
<i>Gill-spacing</i>	'c', 'w'	'0', '1'

Nama variabel	Anggota Variabel dalam Huruf	Anggota Variabel dalam Angka
<i>Gill-size</i>	'n', 'b'	'1', '0'
<i>Gill-color</i>	'k', 'n', 'g', 'p', 'w', 'h', 'u', 'e', 'b', 'r', 'y', 'o'	'4', '5', '2', '7', '10', '3', '9', '1', '0', '8', '11', '6'
<i>Stalk-shape</i>	'e', 't'	'0', '1'
<i>Stalk-root</i>	'e', 'c', 'b', 'r', '?'	'3', '2', '1', '4', '0'
<i>Stalk-surface-above-ring</i>	's', 'f', 'k', 'y'	'2', '0', '1', '3'
<i>Stalk-surface-below-ring</i>	's', 'f', 'y', 'k'	'2', '0', '3', '1'
<i>Stalk-color-above-ring</i>	'w', 'g', 'p', 'n', 'b', 'e', 'o', 'c', 'y'	'7', '3', '6', '4', '0', '2', '5', '1', '8'
<i>Stalk-color-below-ring</i>	'w', 'p', 'g', 'b', 'n', 'e', 'y', 'o', 'c'	'7', '6', '3', '0', '4', '2', '8', '5', '1'
<i>Veil-color</i>	'w', 'n', 'o', 'y'	'2', '0', '1', '3'
<i>Ring-number</i>	'o', 't', 'n'	'1', '2', '0'
<i>Ring-type</i>	'p', 'e', 'l', 'f', 'n'	'4', '0', '2', '1', '3'
<i>Spore-print-color</i>	'k', 'n', 'u', 'h', 'w', 'r', 'o', 'y', 'b'	'2', '3', '6', '1', '7', '5', '4', '8', '0'
<i>population</i>	's', 'n', 'a', 'v', 'y', 'c'	'2', '3', '0', '4', '5', '1'
<i>Habitat</i>	'u', 'g', 'm', 'd', 'p', 'w', 'l'	'5', '1', '3', '0', '4', '6', '2'