

Vamos experimentar agora o algoritmo Decision Tree?

```
!pip -q install yellowbrick
```

```
[notice] A new release of pip available: 22.3 -> 23.0.1
```

```
[notice] To update, run: python.exe -m pip install --upgrade pip
```

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import plotly.express as px
from sklearn.tree import DecisionTreeClassifier

import pickle
with open('restaurante.pkl', 'rb') as f:
    X_treino, X_teste, y_treino, y_teste = pickle.load(f)

modelo = DecisionTreeClassifier(criterion='entropy')
modelo.fit(X_treino, y_treino)

DecisionTreeClassifier(criterion='entropy')
```

Vamos testar o modelo?

```
previsoes = modelo.predict(X_teste)

previsoes

array(['Nao', 'Nao', 'Nao'], dtype=object)
```

Será se o modelo acertou?

```
y_teste

array(['Nao', 'Sim', 'Nao'], dtype=object)

from sklearn.metrics import accuracy_score, confusion_matrix,
classification_report
accuracy_score(y_teste,previsoes)

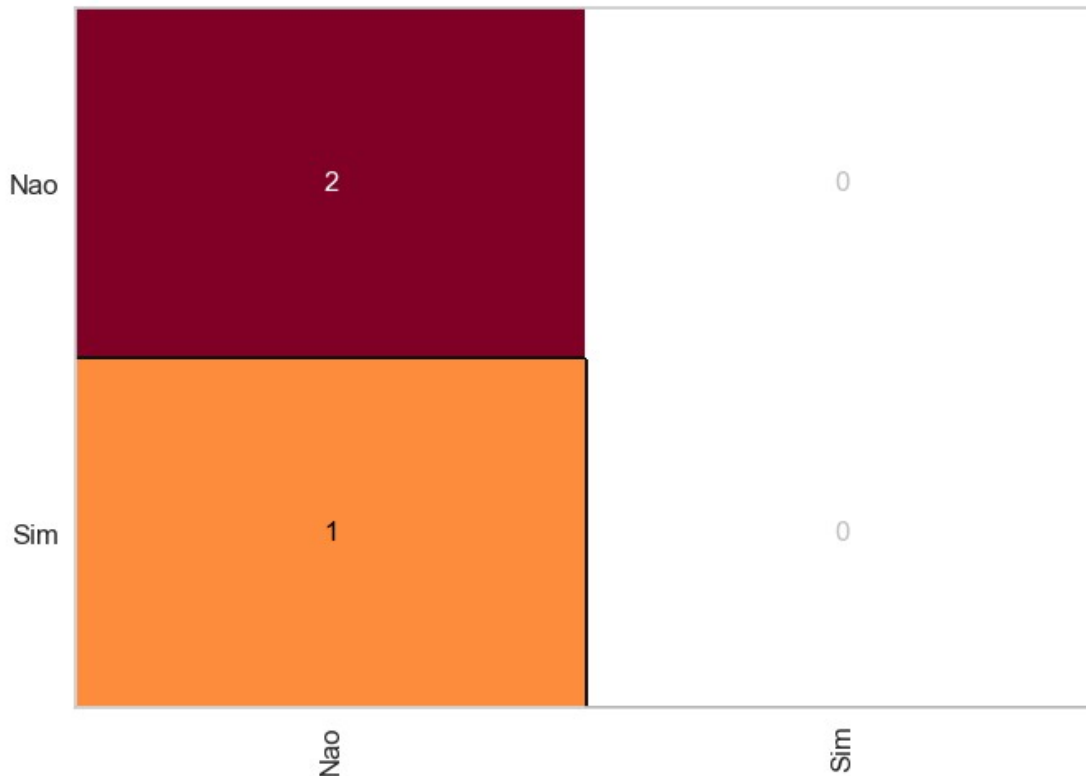
0.6666666666666666

from yellowbrick.classifier import ConfusionMatrix
confusion_matrix(y_teste, previsoes)

array([[2, 0],
       [1, 0]], dtype=int64)

cm = ConfusionMatrix(modelo)
cm.fit(X_treino, y_treino)
cm.score(X_teste, y_teste)
```

0.6666666666666666



```
print(classification_report(y_teste, previsoes))
```

	precision	recall	f1-score	support
Nao	0.67	1.00	0.80	2
Sim	0.00	0.00	0.00	1
accuracy			0.67	3
macro avg	0.33	0.50	0.40	3
weighted avg	0.44	0.67	0.53	3

```
c:\Python311\Lib\site-packages\sklearn\metrics\
_classification.py:1344: UndefinedMetricWarning: Precision and F-score
are ill-defined and being set to 0.0 in labels with no predicted
samples. Use `zero_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
c:\Python311\Lib\site-packages\sklearn\metrics\
_classification.py:1344: UndefinedMetricWarning: Precision and F-score
are ill-defined and being set to 0.0 in labels with no predicted
samples. Use `zero_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
c:\Python311\Lib\site-packages\sklearn\metrics\
_classification.py:1344: UndefinedMetricWarning: Precision and F-score
```

are ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero_division` parameter to control this behavior.

```
_warn_prf(average, modifier, msg_start, len(result))
```

```
from sklearn import tree
previsores = ['Alternativo', 'Bar', 'Sex/Sab', 'Fome', 'Cliente',
              'Preco', 'Chuva', 'Res',
              'TipoFrances', 'TipoTailandes', 'TipoHamburger',
              'TipoItaliano',
              'Tempo']
figura, eixos = plt.subplots(nrows=1, ncols=1, figsize=(10,10))
tree.plot_tree(modelo, feature_names=previsores, class_names =
modelo.classes_, filled=True);
```

