

```

import pandas as pd
from sklearn.preprocessing import LabelEncoder
import pyforest

# pip install mixtend

Collecting mixtend
  Downloading mixtend-0.18.0-py2.py3-none-any.whl (1.2 kB)
Requirement already satisfied: pandas>=0.24.2 in c:\users\hpa\anaconda3\lib\site-packages (from mixtend) (0.13.3)
Requirement already satisfied: joblib>=0.12.2 in c:\users\hpa\anaconda3\lib\site-packages (from mixtend) (0.17.0)
Requirement already satisfied: setuptools in c:\users\hpa\anaconda3\lib\site-packages (from mixtend) (58.3.1.post20201017)
Requirement already satisfied: matplotlib>=3.6.0 in c:\users\hpa\anaconda3\lib\site-packages (from mixtend) (3.3.2)
Requirement already satisfied: scipy>=1.2.3 in c:\users\hpa\anaconda3\lib\site-packages (from mixtend) (1.5.2)
Requirement already satisfied: numpy>=1.16.2 in c:\users\hpa\anaconda3\lib\site-packages (from mixtend) (1.19.2)
Requirement already satisfied: sklearn>=0.22.0 in c:\users\hpa\anaconda3\lib\site-packages (from mixtend) (0.23.2)
Requirement already satisfied: pytz>=2017.2 in c:\users\hpa\anaconda3\lib\site-packages (from pandas>=0.24.2->mixtend) (2018.1)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\hpa\anaconda3\lib\site-packages (from matplotlib>=3.6.0->mixtend) (1.3.0)
Requirement already satisfied: cycler>=0.10.0 in c:\users\hpa\anaconda3\lib\site-packages (from matplotlib>=3.6.0->mixtend) (0.10.0)
Requirement already satisfied: python-dateutil>=2.8.0 in c:\users\hpa\anaconda3\lib\site-packages (from matplotlib>=3.6.0->mixtend) (2.8.1)
Requirement already satisfied: pyparsing>=2.4.2 in c:\users\hpa\anaconda3\lib\site-packages (from matplotlib>=3.6.0->mixtend) (2.4.7)
Requirement already satisfied: certifi>=2020.6.20 in c:\users\hpa\anaconda3\lib\site-packages (from matplotlib>=3.6.0->mixtend) (2020.6.20)
Requirement already satisfied: urllib3>=1.25.0 in c:\users\hpa\anaconda3\lib\site-packages (from urllib3>=1.25.0->mixtend) (1.25.8)
Requirement already satisfied: six>=1.10 in c:\users\hpa\anaconda3\lib\site-packages (from python-dateutil>=2.8.0->mixtend) (1.15.0)
Successfully installed mixtend-0.18.0
Note: you may need to restart the kernel to use updated packages.

In [5]: pip install pyforest

Collecting pyforest
  Downloading pyforest-1.1.0.tar.gz (15 kB)
Building wheels for collected packages: pyforest
  Building wheel for pyforest (setup.py): finished with status 'done'
  Created wheel for pyforest: filename=pyforest-1.1.0-py2.py3-none-any.whl size=14609 sha256=4a32a26c50b3ea87e4f8f4431a5967330af739af85113886b0bba7eed5144844b
  Stored in directory: c:\users\hpa\appdata\local\pip\cache\wheels\21\20\19\8054848f0caee089233437456405320487078e0516f163
Successfully built pyforest
Installing collected packages: pyforest
Successfully installed pyforest-1.1.0
Note: you may need to restart the kernel to use updated packages.

In [34]: bkpr.read_csv('book (1).csv')
bk.head()

Out[34]:
  ChildBks  YouthBks  CookBks  DoriYBks  RefBks  ArtBks  GeoGbkB  NatCook  NatAids  NatArt  Florence
0         0         0         1         0         0         0         0         0         0         0
1         0         0         0         0         0         0         0         0         0         0
2         0         0         0         0         0         0         0         0         0         0
3         1         1         1         0         1         0         1         0         0         0
4         0         0         1         0         0         0         1         0         0         0

In [41]: bk_itemsets = apriori(bk, min_support=0.1, use_colnames=True)

Out[41]:
  support  itemsets
0  0.4200  (ChildBks)
1  0.2475  (YouthBks)
2  0.4310  (CookBks)
3  0.2820  (DoriYBks)
4  0.2145  (RefBks)
5  0.2100  (ArtBks)
6  0.2760  (GeoGbkB)
7  0.1335  (NatCook)
8  0.1085  (NatAids)
9  0.1650  (NatArt)
10 0.2560  (CookBks, ChildBks)
11 0.1840  (DoriYBks, ChildBks)
12 0.1515  (RefBks, ChildBks)
13 0.1625  (ArtBks, ChildBks)
14 0.1950  (GeoGbkB, ChildBks)
15 0.1620  (YouthBks, CookBks)
16 0.1100  (DoriYBks, YouthBks)
17 0.1010  (YouthBks, ArtBks)
18 0.1095  (GeoGbkB, CookBks)
19 0.1375  (RefBks, CookBks)
20 0.1575  (ArtBks, CookBks)
21 0.1670  (NatCook, ArtBks)
22 0.1925  (GeoGbkB, CookBks)
23 0.1135  (NatCook, CookBks)
24 0.1055  (RefBks, ArtBks)
25 0.1235  (DoriYBks, ArtBks)
26 0.1325  (GeoGbkB, DoriYBks)
27 0.1105  (RefBks, GeoGbkB)
28 0.1275  (GeoGbkB, ArtBks)
29 0.1290  (CookBks, YouthBks, ChildBks)
30 0.1460  (RefBks, DoriYBks, ChildBks)
31 0.1325  (RefBks, CookBks, ChildBks)
32 0.1265  (CookBks, ArtBks, ChildBks)
33 0.1495  (GeoGbkB, CookBks, ChildBks)
34 0.1045  (GeoGbkB, DoriYBks, ChildBks)
35 0.1020  (GeoGbkB, ArtBks, ChildBks)
36 0.1015  (DoriYBks, ArtBks, ChildBks)
37 0.1085  (GeoGbkB, DoriYBks, CookBks)
38 0.1035  (GeoGbkB, ArtBks, CookBks)

In [45]: confi_rules = association_rules(bk_itemsets, metric="confidence", min_threshold=0.5)

Out[45]:
  antecedents  consequents  antecedent support  consequent support  support  confidence  lift  leverage  conviction
0  (YouthBks)  (ChildBks)  0.2475  0.4200  0.1650  0.66667  1.570044  0.000308  1.731000
1  (ChildBks)  (YouthBks)  0.4200  0.2475  0.1650  0.90001  1.570044  0.000308  1.237500
2  (CookBks)  (ChildBks)  0.4310  0.4200  0.2560  0.93968  1.404179  0.073687  1.421069
3  (DoriYBks)  (ChildBks)  0.2820  0.4200  0.1840  0.652482  1.542511  0.064714  1.660347
4  (RefBks)  (ChildBks)  0.2145  0.4200  0.1515  0.700294  1.697725  0.060767  1.964548
5  (ArtBks)  (ChildBks)  0.2100  0.4200  0.1625  0.674274  1.594028  0.060557  1.774247
6  (GeoGbkB)  (ChildBks)  0.2760  0.4200  0.1950  0.705522  1.708204  0.078252  1.966074
7  (YouthBks)  (CookBks)  0.2475  0.4310  0.1620  0.654545  1.518667  0.055328  1.647105
8  (DoriYBks)  (CookBks)  0.2820  0.4310  0.1875  0.664894  1.542077  0.060559  1.697968
9  (RefBks)  (CookBks)  0.2145  0.4310  0.1525  0.710956  1.649349  0.060050  1.969556
10 (ArtBks)  (CookBks)  0.2100  0.4310  0.1670  0.692946  1.607763  0.063129  1.853095
11 (YouthBks)  (CookBks)  0.2760  0.4310  0.1625  0.697484  1.610245  0.073544  1.880766
12 (YouthBks)  (CookBks)  0.2760  0.4310  0.1875  0.688681  1.617058  0.067264  1.879234
13 (YouthBks)  (DoriYBks)  0.2145  0.2820  0.1235  0.512440  1.211102  0.056530  1.478564
14 (YouthBks)  (RefBks)  0.2145  0.2760  0.1105  0.515152  1.066491  0.051298  1.492250
15 (YouthBks)  (ArtBks)  0.2145  0.2760  0.1275  0.520646  1.018632  0.060964  1.537304
16 (YouthBks, CookBks)  (YouthBks)  0.1650  0.4200  0.1290  0.760396  1.924927  0.060474  1.832545
17 (ChildBks, CookBks)  (YouthBks)  0.2560  0.4200  0.1290  0.503096  0.203965  0.066540  1.516950
18 (YouthBks, ChildBks)  (CookBks)  0.1650  0.4310  0.1290  0.781818  1.813963  0.078850  2.007917
19 (YouthBks)  (ChildBks, CookBks)  0.2475  0.2560  0.1290  0.521212  0.203985  0.066540  1.535924
20 (DoriYBks, CookBks)  (ChildBks)  0.1875  0.4200  0.1460  0.778667  1.864409  0.066540  1.606628
21 (ChildBks, CookBks)  (DoriYBks)  0.2560  0.2820  0.1460  0.570312  2.022285  0.073809  1.670982
22 (DoriYBks, ChildBks)  (CookBks)  0.1840 
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