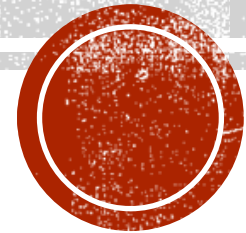


M15-ASSOCIATION RULE KNOWLEDGE DISCOVERY

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TUGAS 1

Assignment

1. **dataset** \leftarrow transaction.csv, and show it
2. **data** \leftarrow get data from **dataset** for country="Portugal"
3. **transaksi** \leftarrow get StockCode from **data** for each transaction (1 code on InvoiceNo = 1 transaction), and show it
4. Find association rule on **transaksi** with minimum support=0.2 and minimum confidence=0.7, and show it



PERALATAN

1. Software Jupyter Anaconda (Bahasa Pemrograman Python)
2. Dataset “transaction.csv”
3. PC



LANGKAH PROGRAM



MENAMPILKAN DATASET “TRANSACTION”

```
import pandas as pd
import csv

contacts = []

with open('D:/KULIAH/MASTER/S2 PENS/KULIAH/SEMESTER 2/Sistem Temu Pengetahuan -
P Ali Ridho/P15_Asosiatif Rule/transaction.csv') as csv_file:
    csv_reader = csv.reader(csv_file, delimiter=",")
    for row in csv_reader:
        contacts.append(row)

labels = contacts.pop(0)

print(f'{labels[0]} \t {labels[1]} \t\t {labels[2]} \t {labels[3]} \t\t {labels[4]} \t {labels[5]}')
print("-"*34)
for data in contacts:
    print(f'{data[0]} \t {data[1]} \t {data[2]} \t {data[3]} \t {data[4]} \t {data[5]}')
```



MENAMPILKAN DATASET “TRANSACTION”

InvoiceNo		StockCode		Qty	InvoiceDate		CustomerID		Country	

537626	22725	830	12/7/2010	14:57	12347	Iceland				
537626	22729	948	12/7/2010	14:57	12347	Iceland				
537626	22195	695	12/7/2010	14:57	12347	Iceland				
542237	22725	636	1/26/2011	14:30	12347	Iceland				
542237	22729	536	1/26/2011	14:30	12347	Iceland				
542237	47559	919	1/26/2011	14:30	12347	Iceland				
542237	21154	803	1/26/2011	14:30	12347	Iceland				
542237	21035	532	1/26/2011	14:30	12347	Iceland				
549222	23076	383	4/7/2011	10:43	12347	Iceland	573511	47559	922	10/31/2011 12:25 12347 Iceland
549222	21791	389	4/7/2011	10:43	12347	Iceland	573511	21791	296	10/31/2011 12:25 12347 Iceland
549222	22550	500	4/7/2011	10:43	12347	Iceland	573511	22992	412	10/31/2011 12:25 12347 Iceland
549222	22432	875	4/7/2011	10:43	12347	Iceland	573511	22561	715	10/31/2011 12:25 12347 Iceland
549222	22195	434	4/7/2011	10:43	12347	Iceland	573511	22621	566	10/31/2011 12:25 12347 Iceland
549222	21975	735	4/7/2011	10:43	12347	Iceland	573511	22725	850	10/31/2011 12:25 12347 Iceland
556201	23171	135	6/9/2011	13:01	12347	Iceland	573511	23308	492	10/31/2011 12:25 12347 Iceland
556201	23172	974	6/9/2011	13:01	12347	Iceland	573511	22195	377	10/31/2011 12:25 12347 Iceland
556201	23175	82	6/9/2011	13:01	12347	Iceland	539318	21981	957	12/16/2010 19:09 12348 Finland
							539318	84988	802	12/16/2010 19:09 12348 Finland
							539318	22952	732	12/16/2010 19:09 12348 Finland
							539318	22952	112	12/16/2010 19:09 12348 Finland
							541998	21980	737	1/25/2011 10:42 12348 Finland
							548955	23077	779	4/5/2011 10:47 12348 Finland
							548955	23076	922	4/5/2011 10:47 12348 Finland
							548955	22437	513	4/5/2011 10:47 12348 Finland



MENDAPATKAN DATA DARI COUNTRY = PORTUGAL

```
import pandas as pd
import csv

contacts = []

with open('D:/KULIAH/MASTER/S2 PENS/KULIAH/SEMESTER 2/Sistem Temu Pengetahuan - P Ali
Ridho/P15_Asosiatif Rule/transaction.csv') as csv_file:
    csv_reader = csv.reader(csv_file, delimiter=",")
    for row in csv_reader:
        contacts.append(row)
labels = contacts.pop(0)
print(f'{labels[0]} \t {labels[1]} \t\t {labels[2]} \t {labels[3]} \t\t {labels[4]} \t {labels[5]}')
print("-"*34)
for data in contacts:
    data5=f'{data[5]}'
    #print(f'{data[0]} \t {data[1]} \t {data[2]} \t {data[3]} \t {data[4]} \t {data[5]}')
    if (data5 == "Portugal"):
        print(f'{data[0]} \t {data[1]} \t {data[2]} \t {data[3]} \t {data[4]} \t {data[5]}')
```


MENDAPATKAN DATA DARI COUNTRY = PORTUGAL

InvoiceNo	StockCode		Qty	InvoiceDate	CustomerID	Country
541430	22195	649	1/18/2011 9:50	12356	Portugal	
541430	22435	460	1/18/2011 9:50	12356	Portugal	
541430	84378	304	1/18/2011 9:50	12356	Portugal	
541430	22646	896	1/18/2011 9:50	12356	Portugal	
541430	84987	157	1/18/2011 9:50	12356	Portugal	
541430	84380	208	1/18/2011 9:50	12356	Portugal	
549435	21124	444	4/8/2011 12:33	12356	Portugal	574099 22487 919 11/3/2011 10:05 12808 Portugal
549435	22957	615	4/8/2011 12:33	12356	Portugal	574099 22619 586 11/3/2011 10:05 12808 Portugal
549435	84378	744	4/8/2011 12:33	12356	Portugal	556829 22667 424 6/15/2011 10:51 12809 Portugal
567929	20723	707	9/22/2011 17:31	12425	Portugal	556829 23306 252 6/15/2011 10:51 12809 Portugal
567929	21154	546	9/22/2011 17:31	12425	Portugal	556829 23308 445 6/15/2011 10:51 12809 Portugal
567929	22215	119	9/22/2011 17:31	12425	Portugal	556829 21218 544 6/15/2011 10:51 12809 Portugal
567929	22329	946	9/22/2011 17:31	12425	Portugal	545191 22859 513 2/28/2011 15:39 12811 Portugal
567929	22628	160	9/22/2011 17:31	12425	Portugal	545191 22957 178 2/28/2011 15:39 12811 Portugal
567929	23077	476	9/22/2011 17:31	12425	Portugal	545191 21929 102 2/28/2011 15:39 12811 Portugal
567929	23076	721	9/22/2011 17:31	12425	Portugal	545191 21928 441 2/28/2011 15:39 12811 Portugal
553017	21980	435	5/12/2011 19:01	12757	Portugal	545191 22411 198 2/28/2011 15:39 12811 Portugal
						547444 84279 363 3/23/2011 10:55 12811 Portugal
						547444 84279 785 3/23/2011 10:55 12811 Portugal
						547444 21164 543 3/23/2011 10:55 12811 Portugal
						547444 22745 292 3/23/2011 10:55 12811 Portugal
						547444 22747 133 3/23/2011 10:55 12811 Portugal
						547444 22746 835 3/23/2011 10:55 12811 Portugal
						547444 23176 878 3/23/2011 10:55 12811 Portugal
						547444 22968 637 3/23/2011 10:55 12811 Portugal



MENCARI ASSOCIATION RULE DARI TRANSAKSI

```
import pandas as pd
!pip install mlxtend
from mlxtend.frequent_patterns import apriori
from mlxtend.frequent_patterns import association_rules

dataset = pd.read_csv('D:/KULIAH/MASTER/S2 PENS/KULIAH/SEMESTER 2/Sistem Temu
Pengetahuan - P Ali Ridho/P15_Asosiatif Rule/transaction.csv')
transaksi = dataset.groupby(['InvoiceNo','StockCode'])['Qty'].sum()

transaksi = transaksi.unstack().reset_index().fillna(0).set_index('InvoiceNo')
transaksi[transaksi>0]=1

print("Tabel Transaksi:\n", transaksi)

frequent_itemsets=apriori(transaksi, min_support=0.2, use_colnames=True)
rules=association_rules(frequent_itemsets, metric="confidence", min_threshold=0.7)

print("\nAssociation Rules:\n", rules[['antecedents', 'consequents', 'confidence']])
```



MENCARI ASSOCIATION RULE DARI TRANSAKSI

Tabel Transaksi:

StockCode	16161	20713	20718	20723	20977	20981	21035	21124	21154	\	StockCode	21164	...	47599	48184	82484	84077	84279	84378	84380	84509	\	
InvoiceNo											InvoiceNo		...										
537246	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		537246	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
537818	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		537818	0.0	...	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	
537915	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		537915	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
538311	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		538311	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
539353	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		539353	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
540519	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0		540519	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
540546	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0		540546	0.0	...	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
541430	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		541430	0.0	...	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	
542147	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		542147	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	
544495	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0		544495	0.0	...	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	
545191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		545191	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
545937	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		545937	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
547444	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		547444	1.0	...	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	
547897	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		547897	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
											548470	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Association Rules:

	antecedents	consequents	confidence
0	(21928)	(21929)	0.900000
1	(21929)	(21928)	1.000000
2	(21928)	(22411)	0.900000
3	(22411)	(21928)	0.818182
4	(21929)	(22411)	1.000000
5	(22411)	(21929)	0.818182
6	(21928, 21929)	(22411)	1.000000
7	(21928, 22411)	(21929)	1.000000
8	(21929, 22411)	(21928)	1.000000
9	(21928)	(21929, 22411)	0.900000
10	(21929)	(21928, 22411)	1.000000
11	(22411)	(21928, 21929)	0.818182



TUGAS 2

TUGAS KNOWLEDGE

DISCOVERY

Latihan 2

T1	{ roti, selai, mentega }
T2	{ roti, mentega }
T3	{ roti, susu, mentega }
T4	{ coklat, roti, susu, mentega }
T5	{ coklat, susu }

- Suatu supermarket mempunyai jumlah transaksi seperti dalam tabel
- Carilah association rule dari data tersebut dengan cara menghitung support dan confidence
- Pakailah metode apriori dengan minimum support = 0,3 dan confidence > 0,8

Jawab :

	Itemset	SP
T1	{ roti, selai, mentega }	{ roti } 0,8
T2	{ roti, mentega }	{ selai } 0,2
T3	{ roti, susu, mentega }	{ mentega } 0,8
T4	{ coklat, roti, susu, mentega }	{ susu } 0,6
T5	{ coklat, susu }	{ coklat } 0,4

Itemset	Sp
{roti, mentega, susu}	0,4

Itemset	SP
{roti, mentega}	0,8
{roti, susu}	0,4
<u>{roti, coklat}</u>	<u>0,2</u>
{mentega, susu}	0,4
<u>{mentega, coklat}</u>	<u>0,2</u>
{susu, coklat}	0,4

Druckerei

$$\text{Contraction}(\text{Montegut}) \approx \text{Supply}(\text{Montegut}) + \text{Supply}(\text{Montegut})$$

* 08/10/14 4 11 10/16

Complexitätsgrad der RWST \propto Anzahl der RWST, die RWST

~~Supermarket~~

2. ОПРЕДЕЛЕНИЕ НЕ КОРРЕКТНО

Определены задачи и сроки выполнения работ по проекту.

4. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

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Maka, mencari asosiasi pada semua himpunan bagian:

$\{R\} \rightarrow \{M, S\}$ Keyakinannya adalah $0,4 / 0,8 = 50\%$

$\{M\} \rightarrow \{R, S\}$ Keyakinannya adalah $0,4/0,8 = 50\%$

$$\{S\} \rightarrow \{R, M\} \quad \text{--- " ---} \quad 0,4 / 0,6 = 67\%$$
$$\{M, S\} \rightarrow \{R\} \quad \text{---||---} \quad 0,4/0,4 = 100\%$$
$$\{R, S\} \rightarrow \{M\} \quad \text{---||---} \quad 0,4/0,4 = 100\%$$
$$\{R, M\} \rightarrow \{S\} \quad \text{---||---} \quad 0,4/0,8 = 100\%$$

Association Rulanya adalah $\{M, S\} \rightarrow \{R\}$, $\{R, S\} \rightarrow \{M\}$ &

$$(R, M) \rightarrow \{S\}$$

ANALISA

- Berdasarkan hasil penerapan Association Rule dengan algoritma Apriori pada dataset 'transaction' menggunakan minimum support 0.2 dan minimum confidence 0.7 diperoleh 12 rules hubungan antar indicator. Banyaknya jumlah rules yang dihasilkan mengakibatkan banyaknya pengetahuan mengenai pola hubungan antar indicator. Yang juga pengguna dapat lebih banyak memilih pemilihan rules keterkaitannya.
- Semakin besar nilai minimum support dan minimum confidence, maka semakin banyak pula association rules yang didapat, dan sebaliknya.

