

Use ^{Notes} Apriori Algorithm in the ^{Date} following dataset to find all the strong multidimensional Association Rules which matches the meta rule for all transaction

$$\text{Age}(x, a) \wedge \text{Income}(x, b) \Rightarrow \text{Credit}(x, c)$$

Let min-support = 20%, and confidence = 70%

Rid	Age	Income	CreditRating
1.	≤ 30	High	Fair
2.	≤ 30	High	Excellent
3.	31...40	High	Fair
4.	> 40	High	Fair
5.	> 40	Medium	Fair
6.	31...40	Low	Excellent
7.	≤ 30	Low	Excellent
8.	≤ 30	Medium	Fair
9.	≤ 30	Low	Excellent
10.	≤ 30	High	Fair
11.	31...40	High	Excellent
12.	> 40	Low	Fair

Solution:

Relative Support = 20%

Absolute Support = $\frac{20}{100} \times \text{no of Trans}$

$$= \frac{20 \times 12}{100} = \frac{240}{100}$$

$$= 2.4$$

Support ≈ 2 C₁

$$\leq 30 = 6$$

$$31 \dots 40 = 3$$

$$> 40 = 3$$

$$\text{Low} = 4$$

$$\text{High} = 6$$

$$\text{Medium} = 2$$

$$\text{Fair} = 7$$

$$\text{Excellent} = 5$$

min_support = 2

L₁

$$\leq 30 = 6$$

$$31 \dots 40 = 3$$

$$> 40 = 3$$

$$\text{Low} = 4$$

$$\text{High} = 6$$

$$\text{Medium} = 2$$

$$\text{Fair} = 7$$

$$\text{Excellent} = 5$$

Age

Income

Rating

Notes

Date _____

C2

$C \leq 30$, Low = 2
 $C \leq 30$, High = 3
 $C \leq 30$, Medium = 1
 $C \leq 30$, Fair = 3
 $C \leq 30$, Excellent = 3

31...40, Low = 1
31...40, High = 2
31...40, Medium = 0
31...40, Fair = 1
31...40, Excellent = 2

$C > 40$, Low = 1
 $C > 40$, High = 1
 $C > 40$, Medium = 1
 $C > 40$, Fair = 3
 $C > 40$, Excellent = 0

Low, Fair = 1
Low, Excellent = 3
High, Fair = 4
High, Excellent = 2
Medium, Fair = 2
Medium, Excellent = 0

L2

$C \leq 30$, Low = 2
 $C \leq 30$, High = 3
 $C \leq 30$, Fair = 3
 $C \leq 30$, Excel = 3

31...40, High = 2
31...40, Excel = 2

$C > 40$, Fair = 3

Low, Excel = 3
High, Fair = 4
High, Excel = 2
Medium, Fair = 2

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C3

≤ 30 , Low, Excell = 2
 ≤ 30 , High, Fair = 2
 ≤ 30 , High, Excell = 1
 ≤ 30 , Medium, Fair = 1

31...40, High, Fair = 1
31...40, High, Excell = 1
31...40, Low, Excell = 1

> 40 , High, Fair = 1
 > 40 , Medium, Fair = 1

L3

≤ 30 , Low, Excell = 2
 ≤ 30 , High, Fair = 2

Frequent itemsets are:

$L_1 \Rightarrow \{ \leq 30 \}, \{ 31 \dots 40 \}, \{ > 40 \}, \{ Low \},$
 $\{ medium \}, \{ High \}, \{ Fair \}, \{ Excellency \}$

$L_2 \Rightarrow \{ \leq 30, Low \}, \{ \leq 30, Fair \}, \{ \leq 30, High \},$
 $\{ \leq 30, Excell \}, \{ 31 \dots 40, High \},$

$\{31..40, \text{Excellent}\}$, $\{>40, \text{Fair}\}$,
 $\{\text{Low}, \text{Excellent}\}$, $\{\text{High}, \text{Fair}\}$,
 $\{\text{High}, \text{Excellent}\}$, $\{\text{Medium}, \text{Fair}\}$

$L_3 \Rightarrow \{ \leq 30, \text{Low}, \text{Excellent} \}$
 $\{ \leq 30, \text{High}, \text{Fair} \}$

Association Rule Generation.

According to the given metarule, it is enough to take frequent item sets from L_3 .

~~$\{ \leq 30, \text{Low} \}$~~

① $(\leq 30) \wedge (\text{Low}) \Rightarrow \text{Excellent}$

confidence = $2/2 = 100\%$

② $(\leq 30) \wedge (\text{High}) \Rightarrow \text{Fair}$

confidence = $2/3 = 66.67\%$

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Strong

Association

Rule is:

$(x_1 <= 30)^1$

$(x_1, low) \Rightarrow (x_1, Fullen)$