

Apriori Algorithm

Minimum support = 1

Min confidence = 60%

Transaction ID	Transactions
1	1, 3, 4
2	2, 3, 5
3	1, 2, 3, 5
4	2, 5

* For $K=1$ $C_1 \rightarrow$

Itemset	Support count
1	2
2	3
3	3
4	1
5	3

 \therefore min support = 1 $L_1 \rightarrow$

Itemset	Support count
1	2
2	3
3	3
4	1
5	3

* For $K=2$

There should be $K-2$ elements in common. In this case there are 0 common elements. By C_{K-1} and $L_{K-1} \rightarrow$ we get \rightarrow

$C_2 \rightarrow$

Itemset	Support count
1, 2	1
1, 3	2
1, 4	1
1, 5	1
2, 3	2
2, 4	0
2, 5	3
3, 4	1
3, 5	2
4, 5	0

\therefore Min support = 1 ~~and~~ \rightarrow {4, 5} and {2, 4} are removed from the dataset.

$L_2 \rightarrow$

Itemset	Support count
1, 2	1
1, 3	2
1, 4	1
1, 5	1
2, 3	2
2, 5	3
3, 4	1
3, 5	2

* For $K=3$

1 element should be common. By joining L_2 and L_2 .

$C_3 \rightarrow$

1, 2, 3	1
1, 2, 4	0
1, 2, 5	1
1, 3, 4	1
1, 3, 5	1



1, 4, 5 0

2, 3, 5 2

2, 3, 4 0

3, 4, 5 0

$L_3 \rightarrow$

1, 2, 3 1

1, 2, 5 1

1, 3, 4 1

1, 3, 5 1

2, 3, 5 2

* For $K=4$

Atleast 2 elements should be common.

By joining L_3 and L_3

$L_4 \rightarrow$

1, 2, 3, 5 1

1, 2, 3, 4 0

1, 3, 4, 5 0

$L_4 \rightarrow$

1, 2, 3, 5 1

Now,

$$\text{Confidence } (A \rightarrow B) = \frac{\text{Support count } (A \cup B)}{\text{Support count } (A)}$$

\therefore For itemset $\{1, 2, 3, 5\} \Rightarrow$

$$[1] \rightarrow [2, 3, 5] = \frac{\text{sup}(1, 2, 3, 5)}{\text{sup}(1)} = \frac{1}{2} = 50\%$$

$$[2] \rightarrow [1, 3, 5] = \frac{1}{3} = 33.33\%$$

$$[3] \rightarrow [1, 2, 5] = \frac{1}{3} = 33.33\%$$



$$[5] \rightarrow [1, 2, 3] = \frac{1}{3} = 33.33\%$$

$$[1, 2] \rightarrow [3, 5] = \frac{1}{1} = 100\%$$

$$[1, 3] \rightarrow [2, 5] = \frac{1}{3} = 33.33\%$$

$$[1, 5] \rightarrow [2, 3] = \frac{1}{1} = 100\%$$

$$[2, 3] \rightarrow [1, 5] = \frac{1}{2} = 50\%$$

$$[2, 5] \rightarrow [1, 3] = \frac{1}{3} = 33.33\%$$

$$[3, 5] \rightarrow [1, 2] = \frac{1}{2} = 50\%$$

$$[1, 2, 3] \rightarrow [5] = \frac{1}{1} = 100\%$$

$$[1, 2, 5] \rightarrow [3] = \frac{1}{1} = 100\%$$

$$[1, 3, 5] \rightarrow [2] = \frac{1}{1} = 100\%$$

$$[2, 3, 5] \rightarrow [1] = \frac{1}{2} = 50\%$$

\therefore 5 Rules are generated \rightarrow

$$[1, 2] \rightarrow [3, 5]$$

\neq

$$[1, 5] \rightarrow [2, 3]$$

$$[1, 2, 3] \rightarrow [5]$$

$$[1, 2, 5] \rightarrow [3]$$

$$[1, 3, 5] \rightarrow [2]$$