



计算频繁项集的过程: $\min_{sup} = 0.4$, $\min_{conf} = 0.8$

令 a_1 = 方便面, a_2 = 面包, a_3 = 饮料, a_4 = 银耳羹, a_5 = 水, a_6 = 蛋糕, a_7 = 蔬菜水果
 a_8 = 巧克力, a_9 = 肉制品, a_{10} = 辣条, a_{11} = 牛奶

	出现次数	支持度		出现次数	支持度		出现次数	支持度	
$\{a_1\}$	5	1		$\{a_1, a_2\}$	4	0.8	$\{a_1, a_2, a_5\}$	4	0.8
$\{a_2\}$	4	0.8		$\{a_1, a_5\}$	5	1	$\{a_1, a_2, a_8\}$	2	0.4
(X) $\{a_3\}$	1	0.2		$\{a_1, a_8\}$	2	0.4	$\{a_1, a_5, a_8\}$	2	0.4
(X) $\{a_4\}$	1	0.2	\Rightarrow	$\{a_2, a_5\}$	4	0.8	$\{a_2, a_5, a_8\}$	2	0.4
$\{a_5\}$	5	1		$\{a_2, a_8\}$	2	0.4			
(X) $\{a_6\}$	1	0.2		$\{a_5, a_8\}$	2	0.4			
(X) $\{a_7\}$	1	0.2							
$\{a_8\}$	2	0.4							
(X) $\{a_9\}$	1	0.2							
X $\{a_{10}\}$	1	0.2							
X $\{a_{11}\}$	1	0.2							

$\Rightarrow \{a_1, a_2, a_5, a_8\}$ 出现次数 2 支持度 0.4

所以频繁项集有: $\{a_1, a_2\}$, $\{a_1, a_5\}$, $\{a_1, a_8\}$, $\{a_2, a_5\}$, $\{a_2, a_8\}$, $\{a_5, a_8\}$
 $\{a_1, a_2, a_5\}$, $\{a_1, a_2, a_8\}$, $\{a_1, a_5, a_8\}$, $\{a_2, a_5, a_8\}$, $\{a_1, a_2, a_5, a_8\}$

1. 对于 $\{a_1, a_2\}$, 可产生 $a_1 \Rightarrow a_2$, $a_2 \Rightarrow a_1$, 两条规则

① 对于 $a_1 \Rightarrow a_2$, $conf(a_1 \Rightarrow a_2) = 0.8$, $lift = \frac{conf(a_1 \Rightarrow a_2)}{sup(a_2)} = 1$

② 对于 $a_2 \Rightarrow a_1$, $conf(a_2 \Rightarrow a_1) = 1$, $lift = \frac{conf(a_2 \Rightarrow a_1)}{sup(a_1)} = 1$

2. 对于 $\{a_1, a_5\}$, 可产生 $a_1 \Rightarrow a_5$, $a_5 \Rightarrow a_1$, 两条规则

① 对于 $a_1 \Rightarrow a_5$, $conf(a_1 \Rightarrow a_5) = 1$, $lift = \frac{conf(a_1 \Rightarrow a_5)}{sup(a_5)} = 1$

② 对于 $a_5 \Rightarrow a_1$, $conf(a_5 \Rightarrow a_1) = 1$, $lift = \frac{conf(a_5 \Rightarrow a_1)}{sup(a_1)} = 1$

3. 对于 $\{a_1, a_8\}$, 可产生 $a_1 \Rightarrow a_8$, $a_8 \Rightarrow a_1$, 两条规则

(X) ① 对于 $a_1 \Rightarrow a_8$, $conf(a_1 \Rightarrow a_8) = 0.4$, $lift = 1$

② 对于 $a_8 \Rightarrow a_1$, $conf(a_8 \Rightarrow a_1) = 1$, $lift = 1$

4. 对于 $\{a_2, a_5\}$, 可产生 $a_2 \Rightarrow a_5, a_5 \Rightarrow a_2$ 两条规则

① 对于 $a_2 \Rightarrow a_5, \text{conf}(a_2 \Rightarrow a_5) = 1, \text{lift} = 1$

② 对于 $a_5 \Rightarrow a_2, \text{conf}(a_5 \Rightarrow a_2) = 0.8, \text{lift} = 1$

5. 对于 $\{a_2, a_8\}$, 可产生 $a_2 \Rightarrow a_8, a_8 \Rightarrow a_2$ 两条规则

(X) ① 对于 $a_2 \Rightarrow a_8, \text{conf}(a_2 \Rightarrow a_8) = 0.5, \text{lift} = 1.25$

② 对于 $a_8 \Rightarrow a_2, \text{conf}(a_8 \Rightarrow a_2) = 1, \text{lift} = 1.25$

6. 对于 $\{a_5, a_8\}$, 可产生 $a_5 \Rightarrow a_8, a_8 \Rightarrow a_5$ 两条规则

(X) ① 对于 $a_5 \Rightarrow a_8, \text{conf}(a_5 \Rightarrow a_8) = 0.4, \text{lift} = 1$

② 对于 $a_8 \Rightarrow a_5, \text{conf}(a_8 \Rightarrow a_5) = 1, \text{lift} = 1$

7. 对于 $\{a_1, a_2, a_5\}$, 可产生 $a_1 \Rightarrow a_2, a_5, a_2 \Rightarrow a_1, a_5, a_5 \Rightarrow a_1, a_2, a_1, a_2 \Rightarrow a_5, a_1, a_5 \Rightarrow a_2, a_2, a_5 \Rightarrow a_1$, 六条规则

① 对于 $a_1, a_2 \Rightarrow a_5, \text{conf}(a_1, a_2 \Rightarrow a_5) = 1, \text{lift} = 1$

② 对于 $a_1, a_5 \Rightarrow a_2, \text{conf}(a_1, a_5 \Rightarrow a_2) = 0.8, \text{lift} = 1$

③ 对于 $a_2, a_5 \Rightarrow a_1, \text{conf}(a_2, a_5 \Rightarrow a_1) = 1, \text{lift} = 1$

④ 对于 $a_1 \Rightarrow a_2, a_5, \text{conf}(a_1 \Rightarrow a_2, a_5) = 0.8, \text{lift} = 1$

⑤ 对于 $a_2 \Rightarrow a_1, a_5, \text{conf}(a_2 \Rightarrow a_1, a_5) = 1, \text{lift} = 1$

⑥ 对于 $a_5 \Rightarrow a_1, a_2, \text{conf}(a_5 \Rightarrow a_1, a_2) = 0.8, \text{lift} = 1$

8. 对于 $\{a_1, a_2, a_8\}$, 可产生 $a_1 \Rightarrow a_2, a_8, a_2 \Rightarrow a_1, a_8, a_8 \Rightarrow a_1, a_2, a_1, a_2 \Rightarrow a_8, a_1, a_8 \Rightarrow a_2, a_2, a_8 \Rightarrow a_1$, 六条规则

(X) ① 对于 $a_1, a_2 \Rightarrow a_8, \text{conf}(a_1, a_2 \Rightarrow a_8) = 0.5, \text{lift} = 1.25$

② 对于 $a_1, a_8 \Rightarrow a_2, \text{conf}(a_1, a_8 \Rightarrow a_2) = 1, \text{lift} = 1.25$

③ 对于 $a_2, a_8 \Rightarrow a_1, \text{conf}(a_2, a_8 \Rightarrow a_1) = 1, \text{lift} = 1$

~~④ 对于 $a_1 \Rightarrow a_2, a_8, \text{conf}(a_1 \Rightarrow a_2, a_8) = 0.8, \text{lift} = 1$~~

(X) ④ 对于 $a_1 \Rightarrow a_2, a_8, \text{conf}(a_1 \Rightarrow a_2, a_8) = 0.4, \text{lift} = 1$

(X) ⑤ 对于 $a_2 \Rightarrow a_1, a_8, \text{conf}(a_2 \Rightarrow a_1, a_8) = 0.5, \text{lift} = 1.25$

⑥ 对于 $a_8 \Rightarrow a_1, a_2, \text{conf}(a_8 \Rightarrow a_1, a_2) = 1, \text{lift} = 1.25$

9. 对于 $\{a_1, a_5, a_8\}$, 可产生 $a_1 \Rightarrow a_5, a_8, a_5 \Rightarrow a_1, a_8, a_8 \Rightarrow a_1, a_5, a_1, a_5 \Rightarrow a_8, a_1, a_8 \Rightarrow a_5, a_5, a_8 \Rightarrow a_1$, 六条规则

(X) ① 对于 $a_1, a_5 \Rightarrow a_8, \text{conf}(a_1, a_5 \Rightarrow a_8) = 0.4, \text{lift} = 1$

② 对于 $a_1, a_8 \Rightarrow a_5, \text{conf}(a_1, a_8 \Rightarrow a_5) = 1, \text{lift} = 1$

③ 对于 $a_5, a_8 \Rightarrow a_1, \text{conf}(a_5, a_8 \Rightarrow a_1) = 1, \text{lift} = 1$

(X) ④ 对于 $a_1 \Rightarrow a_5, a_8, \text{conf}(a_1 \Rightarrow a_5, a_8) = 0.4, \text{lift} = 1$

(X) ⑤ 对于 $a_5 \Rightarrow a_1, a_8, \text{conf}(a_5 \Rightarrow a_1, a_8) = 0.4, \text{lift} = 1$

⑥ 对于 $a_8 \Rightarrow a_1, a_5, \text{conf}(a_8 \Rightarrow a_1, a_5) = 1, \text{lift} = 1$



10. 对于 $\{a_2, a_5, a_8\}$, 可产生 $a_2 \Rightarrow a_5 a_8, a_5 \Rightarrow a_2 a_8, a_8 \Rightarrow a_2 a_5, a_2 a_5 \Rightarrow a_8, a_2 a_8 \Rightarrow a_5, a_5 a_8 \Rightarrow a_2$ 六条规则]

(X) ① 对于 $a_2 a_5 \Rightarrow a_8, \text{conf}(a_2 a_5 \Rightarrow a_8) = 0.5, \text{lift} = 1.25$

② 对于 $a_2 a_8 \Rightarrow a_5, \text{conf}(a_2 a_8 \Rightarrow a_5) = 1, \text{lift} = 1$

③ 对于 $a_5 a_8 \Rightarrow a_2, \text{conf}(a_5 a_8 \Rightarrow a_2) = 1, \text{lift} = 1.25$

(X) ④ 对于 $a_2 \Rightarrow a_5 a_8, \text{conf}(a_2 \Rightarrow a_5 a_8) = 0.5, \text{lift} = 1.25$

(X) ⑤ 对于 $a_5 \Rightarrow a_2 a_8, \text{conf}(a_5 \Rightarrow a_2 a_8) = 0.4, \text{lift} = 1$

⑥ 对于 $a_8 \Rightarrow a_2 a_5, \text{conf}(a_8 \Rightarrow a_2 a_5) = 1, \text{lift} = 1.25$

11. 对于 $\{a_1, a_2, a_5, a_8\}$, 可产生 $a_1 \Rightarrow a_2 a_5 a_8, a_2 \Rightarrow a_1 a_5 a_8, a_5 \Rightarrow a_1 a_2 a_8, a_8 \Rightarrow a_1 a_2 a_5, a_1 a_2 \Rightarrow a_5 a_8, a_1 a_5 \Rightarrow a_2 a_8, a_2 a_5 \Rightarrow a_1 a_8, a_2 a_8 \Rightarrow a_1 a_5, a_5 a_8 \Rightarrow a_1 a_2, a_1 a_2 a_5 \Rightarrow a_8, a_1 a_2 a_8 \Rightarrow a_5, a_1 a_5 a_8 \Rightarrow a_2, a_2 a_5 a_8 \Rightarrow a_1$ 十四条规则。

(X) ① 对于 $a_1 a_2 a_5 \Rightarrow a_8, \text{conf}(a_1 a_2 a_5 \Rightarrow a_8) = 0.5, \text{lift} = 1.25$

② 对于 $a_1 a_2 a_8 \Rightarrow a_5, \text{conf}(a_1 a_2 a_8 \Rightarrow a_5) = 1, \text{lift} = 1$

③ 对于 $a_1 a_5 a_8 \Rightarrow a_2, \text{conf}(a_1 a_5 a_8 \Rightarrow a_2) = 1, \text{lift} = 1.25$

④ 对于 $a_2 a_5 a_8 \Rightarrow a_1, \text{conf}(a_2 a_5 a_8 \Rightarrow a_1) = 1, \text{lift} = 1$

(X) ⑤ 对于 $a_1 a_2 \Rightarrow a_5 a_8, \text{conf}(a_1 a_2 \Rightarrow a_5 a_8) = 0.5, \text{lift} = 1.25$

⑥ 对于 $a_1 a_5 \Rightarrow a_2 a_8, \text{conf}(a_1 a_5 \Rightarrow a_2 a_8) = 0.4, \text{lift} = 1$

⑦ 对于 $a_1 a_8 \Rightarrow a_2 a_5, \text{conf}(a_1 a_8 \Rightarrow a_2 a_5) = 1, \text{lift} = 1.25$

(X) ⑧ 对于 $a_2 a_5 \Rightarrow a_1 a_8, \text{conf}(a_2 a_5 \Rightarrow a_1 a_8) = 0.5, \text{lift} = 1.25$

⑨ 对于 $a_2 a_8 \Rightarrow a_1 a_5, \text{conf}(a_2 a_8 \Rightarrow a_1 a_5) = 1, \text{lift} = 1$

⑩ 对于 $a_5 a_8 \Rightarrow a_1 a_2, \text{conf}(a_5 a_8 \Rightarrow a_1 a_2) = 1, \text{lift} = 1.25$

(X) ⑪ 对于 $a_1 \Rightarrow a_2 a_5 a_8, \text{conf}(a_1 \Rightarrow a_2 a_5 a_8) = 0.4, \text{lift} = 1$

(X) ⑫ 对于 $a_2 \Rightarrow a_1 a_5 a_8, \text{conf}(a_2 \Rightarrow a_1 a_5 a_8) = 0.5, \text{lift} = 1.25$

(X) ⑬ 对于 $a_5 \Rightarrow a_1 a_2 a_8, \text{conf}(a_5 \Rightarrow a_1 a_2 a_8) = 0.4, \text{lift} = 1$

⑭ 对于 $a_8 \Rightarrow a_1 a_2 a_5, \text{conf}(a_8 \Rightarrow a_1 a_2 a_5) = 1, \text{lift} = 1.25$