

Exercise 1 - Association Rules

The following contains a list of transactions in a shop.

	Barley	Corn	Gram	Millet	Rice	Wheat
1	1	1	1	1	1	1
2		1		1	1	1
3	1		1		1	1
4		1	1		1	1
5	1		1	1	1	
6			1		1	1
7	1			1	1	1
8				1	1	1
9	1	1	1	1		
10	1	1	1		1	1
11		1		1	1	1
12	1	1		1	1	1

- Find the three-item association rules (with one item in the consequent) for the data in the table that meet the requirement of a minimum of 33% support and 66% confidence.
- Calculate the lift for each of the rules and comment on the calculated values.

Exercise 2 - Association Rules

An association rule has been extracted from the data table below:

If Exhaustion = None AND
Stuffy nose = Severe
THEN Diagnosis = cold

Patient ID	Fever	Headaches	General Aches	Weakness	Exhaustion	Stuffy Nose	Sneezing	Sore Throat	Chest Discomfort	Diagnosis
1326	None	Mild	None	None	None	Mild	Severe	Severe	Mild	Cold
398	Severe	Severe	Severe	Severe	Severe	None	None	Severe	Severe	Flu
6377	Severe	Severe	Mild	Severe	Severe	Severe	None	Severe	Severe	Flu
1234	None	None	None	Mild	None	Severe	None	Mild	Mild	Cold
2662	Severe	Severe	Mild	Severe	Severe	Severe	None	Severe	Severe	Flu
9477	None	None	None	Mild	None	Severe	Severe	Severe	None	Cold
7286	Severe	Severe	Severe	Severe	Severe	None	None	None	Severe	Flu
1732	None	None	None	None	None	Severe	Severe	None	Mild	Cold
1082	None	Mild	Mild	None	None	Severe	Severe	Severe	Severe	Cold
1429	Severe	Severe	Severe	Mild	Mild	None	Severe	None	Severe	Flu
14455	None	None	None	Mild	None	Severe	Mild	Severe	None	Cold
524	Severe	Mild	Severe	Mild	Severe	None	Severe	None	Mild	Flu
1542	None	None	Mild	Mild	None	Severe	Severe	Severe	None	Cold
8775	Severe	Severe	Severe	Severe	Mild	None	Severe	Severe	Severe	Flu
1615	Mild	None	None	Mild	None	Severe	None	Severe	Mild	Cold
1132	None	None	None	None	None	Severe	Severe	Severe	Severe	Cold
4522	Severe	Mild	Severe	Mild	Mild	None	None	None	Severe	Flu

Calculate the support, confidence, and lift for this rule.

Exercise 3 - A Priori Method for Association Rules

The table below lists twelve supermarket transactions, each consisting of 2 to 4 grocery items.

	Transactions List			
1	Milk	Egg	Bread	Butter
2	Milk	Butter	Egg	Ketchup
3	Bread	Butter	Ketchup	
4	Milk	Bread	Butter	
5	Bread	Butter	Cookies	
6	Milk	Bread	Butter	Cookies
7	Milk	Cookies		
8	Milk	Bread	Butter	
9	Bread	Butter	Egg	Cookies
10	Milk	Butter	Bread	
11	Milk	Bread	Butter	
12	Milk	Bread	Cookies	Ketchup

Source: “Data Analytics Made Accessible” by Anil Maheshwari, KDP eBook, 2016)

- If the minimal required support level is 33% and the minimal required confidence level 50% for a rule to be considered 'interesting', use the Apriori algorithm to find three-item interesting rules.
- Calculate the lift for the valid three-item association rules and comment on the results.