WEEK 9

Apriori and Association Rules

1. A database has 5 transactions. Let's say min_sup = 60% and min_conf = 80%
    a) Find all frequent itemsets using Apriori
    b) List all of the strong association rules (with support s and confidence and lift)

Answer => support calculation:

Total transaction (T) =5

Minimum support = 60%

Step 1: Apply apriori

Counting the frequency of each item :

Items	Frequency(f)	Support count(f/t)*100%
Key-chain	5	100%
Eggs	4	80%
Onion	3	60%
Mango	3	60%
Yo-yo	3	60%
Nintendo	2	40%
Corn	2	40%
Doll	1	20%
Apple	1	20%
Umbrella	1	20%
Icecream	1	20%

Support count>=60%:

Key-chain, eggs, onions, mango, yo-yo

Step 2: candidate 2-itemsets (C2):

2-itemsets	frequency	Support count(f/t)*100%
Key-chain, Eggs	4	80%
Key-chain, Onion	3	60%
Key-chain, mango	3	60%
Key-chain, Yo-yo	3	60%
Eggs, onions	3	60%
Eggs, mangoes	2	40%
Eggs, yo-yo	2	40%
Onions, mango	1	20%
Onion, yo-yo	2	40%
Mango, yo-yo	2	40%

Frequent pairs = suppoet count>=60% Frequent candidate 2-itemsets :

Key-chain, Eggs = 4

Key-chain, Onion = 3

Key-chain, Mango = 3

Key-chain, Yo-yo = 3

Eggs, Onion = 3

Step 3 : candidate 3-itemsets (C3)

items	frequency	Support count(f/t)*100%
Key-chain, Eggs, Onion	3	60%
Key-chain, Eggs, Mango	2	40%
Key-chain, Eggs, Yo-yo	2	40%
Key-chain, Mango, Yo-yo	2	40%

Frequent 3-itemsets (C3)>=60% :

Key-chain, Eggs, Onion =3

Calculations and Rules

Rules	Support	confidence	Lift(confidence/support B)
{key-chain, eggs} ⟶ {onions}	60%	¾ = 75%	75/60 = 1.25
{key-chain, onion} ⟶ {eggs}	60%	3/3 = 100%	100/80 = 1.25
{onion, eggs} ⟶ {key-chain}	60%	3/3 = 100%	100/100 = 1.0
{key-chain} ⟶ {eggs, onion}	60%	3/5 = 60%	60/60 = 1.0
{onion} ⟶ {key-chain, eggs}	60%	3/3 = 100%	100/80 =1.25
{eggs} ⟶ {onion, keychain}	60%	¾ = 75%	75/60 = 1.25

Strong Rules :

Strong rules are those with Confidence ≥ 80%:

1. {Onion, Key-chain} → {Eggs}

Support = 60%, Confidence = 100%, Lift = 1.25

2. {Onion, Eggs} → {Key-chain}

Support = 60%, Confidence = 100%, Lift = 1.00

3. {Onion} → {Key-chain, Eggs} Support = 60%, Confidence = 100%, Lift =1.25