Association Rules

or market basket analysis

or affinity analysis

Q what is

=> its study of what goes with what.

for example

* if A costumer visit supermaket and purchase beer then he is most likely to buy diaper (studies found)

Association rules simply tell you interesting relations between variable in dataset.

one more example

study found if costumer buys milk he will most likely to buy cereal

it is basically if person buys something what is likely he will buy other product.

it related to likelyhood, chance.

$A \Longrightarrow B$

if Then,

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★ Association Rule mining

Rules:

Antecedent → consequent [support, confidence] and lift

where

$$\text{Support} = \frac{\text{frequency}(A, B)}{N}$$

(A → Antecedent, B → consequent, N → no. transactions)

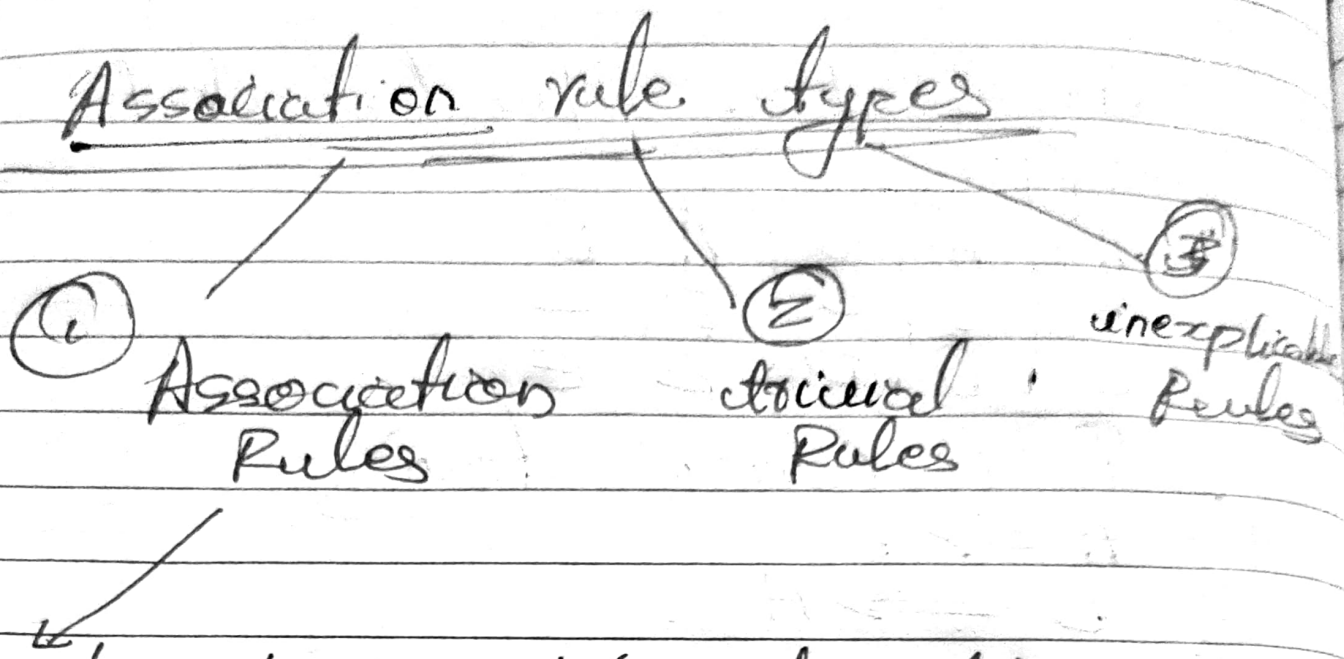
$$\text{Confidence} = \frac{\text{frequency}(A, B)}{\text{Frequency}(A)}$$

$$\text{lift} = \frac{\text{Support}}{\text{support}(A) \times \text{support}(B)}$$

Antecendent :- the product in which we are running associat Rules

Consequent → the product in which we are trying to find association.

Association rule types



1. contain high quality actionable information (example if beer is purchase then those costumer also bought diapers with them)

2. Information already well known by those familiar with the business - (example milk and bread)

3. Inexplicable Rules
No explanation and do not suggest action
(For example Beer and diaper)
it strange and no explain Rules

let understand with example.

transaction	faceplates	colours	purchase
1	red	white	green
2	white	Orange	
3	white	blue	
4	red	white	orange
5	red	blue	
6	white	blue	
7	white	Orange	
8	red	white	blue
9	red	white	blue
10	yellow		

* what is confidence for if white then blue

to find confidence first need find out total no. of transaction of white & blue both at once

= ~~5th~~ 3rd + 6th + 8th + 9th = 4

next to find out frequency of white
= so total is 8

= confidence will be = $\frac{4}{8} = 0.5$

* No find support blue => white

$= \frac{~~84~~}{~~105~~} = ~~.08~~ = \frac{42}{105} = .4$

<u>performace measures : Lift ratio.</u>

= confidence / (benchmark confidence

benchmark confidence = # transaction with consequent items / # transaction in database

if lift ratio is < 1 and 1 > then it is Actional rule. it good performance.