Part -1.

Question -3.

Single - dimensional Association rules

Definition: The association rules in which only one predicate (or dimension) is used, are called Single - dimensional Association rules.

Example :(i) In store application "buys".

$$buys(x, "milk") \rightarrow buys(x, "bread")$$

Multi - dimensional Association rules.

In Multi - dimensional association rules, two or more predicates (or dimensions) are used. These types of rules can be classified further to : Inter - dimensional association rules and Hybrid - dimensional association rules.

Inter - dimensional Association rules.

Definition: The association rules in which two or

more predicates or dimensions are used, and if the predicates donot repeat then these rules are called as Inter - dimensional Association rules.

Example :

(i) occupation(x,"student") $\wedge$ age (x,"22-28") $\rightarrow$ buys (x, "Computer").

(ii) age (x,"young") $\wedge$ income (x,"high") $\rightarrow$ buys (x,"coke")

Hybrid- dimensional Association rules.

Definition : The association rules in which two or more predicates or dimensions are used, and if the predicates repeat then these rules are called as Hybrid - dimensional Association rules.

Example :

(i) buys (x, "milk") $\wedge$ age (x, "old") $\rightarrow$ buys (x, "bread")

(ii) age (x, "30-35") $\wedge$ buys (x, "ipad") $\rightarrow$ buys (x,"apple pencil")

Applications of Association rules

Association rule mining can be used for Cross-marketing, clustering, classification, Basket data analysis, catalog design, loss-leader analysis etc. Below are the fields in which Association rules can be effectively applied:

- <u>Entertainment</u>: Services like Spotify and Netflix can use association rules to fuel their content recommendation engines.

$$age(x, \text{"young"}) \land liked(x, \text{"Science Fiction"})$$
$$\rightarrow recommend(x, \text{"Interstellar"}).$$

- <u>Retail</u>: Retailers can collect data about purchasing patterns. Using these past purchasing patterns a retailer can adjust marketing and sales strategy.

$$age(x, \text{"young"}) \land buys(x, \text{"computer"}) \rightarrow ?$$
(What other products should the store stock up?)

- <u>Medicine</u>: Doctors can use association rules to help

diagnose patients. Many diseases share symptoms. By using association rules, doctors can determine the conditional probability of a given illness by comparing symptom relationships in the data from past cases.