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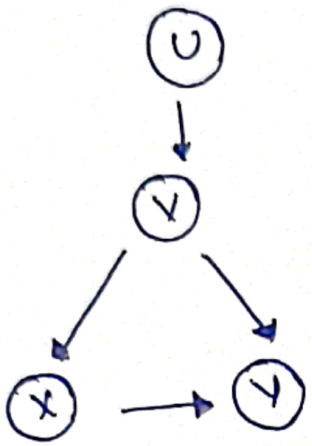
AI61005
Assignment-2

(i) Given



$P(U/Y=+y) = P(U/y)$

initial factors

$P(U), P(V/U), P(X/V), P(Y/X,V)$

we have,

$$P(U/y) = \frac{P(U,y)}{P(y)} = \alpha P(U,y)$$

$$P(U,y) = \sum_{V,X} P(U,V,X,y)$$

$$= \sum_{V,X} P(U)\cdot P(V/U)\cdot P(X/V)\cdot P(y/X,V)$$

given the elimination order: V, X

$$= P(U)\cdot \sum_{X} \sum_{V} P(V/U)\cdot P(X/V)\cdot P(y/X,V)$$

$$= P(U) \sum_{X} f_1(U,X,y)$$

($f_1(U,X,y)$: factor after eliminating V)

$$P(U,y) = P(U)\cdot f_2(U,y)$$

($f_2(U,y)$: factor after eliminating X)

$$\Rightarrow P(U/y) = \alpha P(U,y) = \frac{P(U)\cdot f_2(U,y)}{\sum_{U} f(U)\cdot f_2(U,y)}$$

(normalize over U)

$\Rightarrow$ factors generation after eliminating corresponding variable from left to right are

V	X
$f_1(U,X,+y)$	$P(U)\cdot f_2(U,+y)$

Answer =

②

(a) * $P(+c) = \frac{\text{no. of samples with } +c}{\#\text{ total samples}}$

$s_2, s_3, s_4, s_6, s_8 \rightarrow$ 5 samples

$\Rightarrow P(+c) = \boxed{5/8}$

(b) $P(+c/+a,-d) = \frac{P(+c,+a,-d)}{P(+a,-d)}$

conditional probability

negative rejection

s_1, s_2, s_6

↓ reject ~~#~~

* $\Rightarrow P(+c/+a,-d) = \boxed{2/3}$