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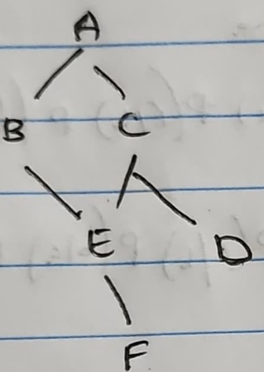
4b) Given Possibilities -
(a)
$P(A)$, $P(B|A)$, $P(C|B)$, $P(D|A, C)$, $P(E|B)$, $P(F|E)$

The N/w Structure is:



We Can Construct Bayesian N/w.

1) A influences B $(P(B|A))$
2) B " C $(P(C|B))$
3) A & C " D $(P(D|A, C))$
4) B " E $(P(E|B))$
5) E " F $(P(F|E))$

b) $P(d)$

we only need Variables that influence D.

According to Bayesian N/w
'D' → depends on 'A' & 'C'
'C' → depends on 'B', which in turn depends on 'A'

∴ We Cannot Prune 'A', 'B', 'C', as 'E, F' are non-relevant, we can prune them

(c) Given $P(a) = 0.8$
in Colve C:
Pr Conditional $P(c|b) = 0.9$, $P(c|\neg b) = 0.3$.

Conditional probability involving B:
$P(e|b) = 0.9$, $P(e|\neg b) = 0.4$

Conditional probability involving E:
$P(f|e) = 0.3$

Conditional Probability involving P:

$P(d|a,c) = P(d|a \wedge c) = 0.5$

1^{st} three enteries:

for b = true, c = true

$$\text{Factor} = \sum_a P(d|a,c)\, P(c|b)\, P(b|a)\, P(a)$$

$$= P(d|a \wedge c)\, P(c|b)\, P(b|a)\, P(a) + P(d|-a \wedge c)\, P(c|b)\, P(b|-a)\, P(-a)$$

$$= 0.3618$$

2. for b = true, c = false

$$\text{factor} = \sum_a P(d|a,-c) \cdot P(-c|b)\, P(b|a)\, P(a)$$

$$= P(d|a \wedge -c)\, P(-c|b)\, P(b|a)\, P(a) + P(d|-a \wedge -c)\, P(-c|b)\, P(b|-a)\, P(-a)$$

$$= 0.0444$$

3. for b = false, c = true

$$\text{Factor} = \sum_a P(d|a,c)\, P(c|-b)\, P(-b|a)\, P(a)$$

$$= P(d|a \wedge c)\, P(c|-b)\, P(-b|a)\, P(a) + P(d|-a \wedge c)\, P(c|-b)\, P(-b|-a)\, P(-a)$$

$$= 0.0414$$