

Tutorial 11

Solutions should be given till 21th January 2008, 16:00

Exercise 1 Inference using generated data (15 points)

Suppose, we are given the following sample instances (we have generated them via acceptance-rejection sampling). Suppose, we are also given the evidence

$$E = \{C=1, A=0\}$$

- [5 pts] Which of the instances will be rejected?
- [10 pts] What is the marginal distribution of B under the given evidence?
[I.e. we want to infer the $P(B|C=1, A=0)$]

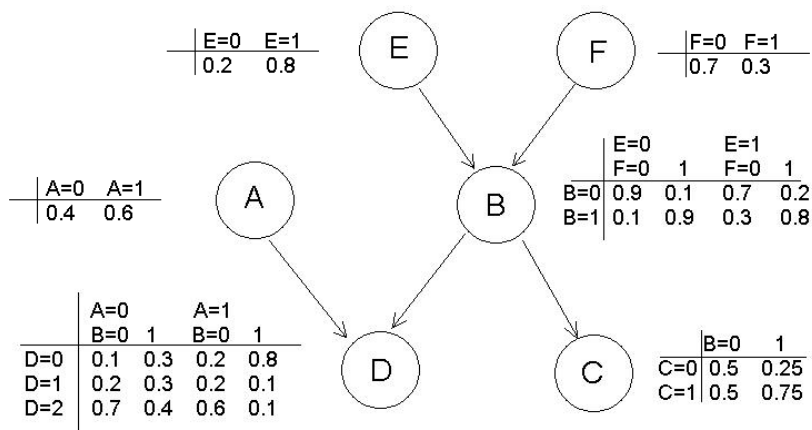
A	B	C	D
0	1	1	1
1	1	0	0
0	1	0	0
0	1	1	1
1	0	0	0
0	0	1	0
0	0	0	0
0	0	1	1
1	1	0	1
0	0	1	0
1	0	0	1
0	1	0	0
0	1	1	1

Exercise 2 Importance sampling (25 points)

Suppose we have generated the following sample instances via importance sampling conditioned by the evidence $E_V = \{D=2, B=1\}$

The Bayesian network shown in the figure above was sampled.

A	B	C	D	E	F
1	1	1	2	1	0
0	1	1	2	1	0
1	1	0	2	1	1
1	1	0	2	0	0
1	1	1	2	1	0
0	1	1	2	1	0
0	1	1	2	1	1
1	1	0	2	1	0
0	1	1	2	0	0
1	1	1	2	1	1



- [10 pts] What are the weights of each instance?
- [5 pts] Infer the the marginal distribution of A under the given evidence!
($P(A|E_V) = ?$)
- [5 pts] Infer the the common probability distribution of A and E under the given evidence! ($P(A,E|E_V) = ?$)
- [5 pts] Infer the conditioned probability distribution of A conditioned by E under the given evidence! ($P(A|E|E_V) = ?$)