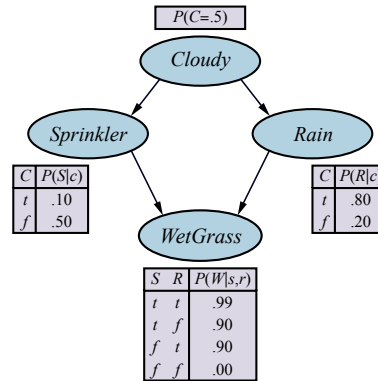


Bayesian Networks Review

Artificial Intelligence



- Given the following Bayes' net:

What is the probability that the grass is wet, the sprinkler didn't run, it rained recently, and it is cloudy?

Solution:

$$P(x_1, \dots, x_n) = \prod_{i=1}^n P(x_i | \text{parents}(X_i)) \quad (13.2)$$

$$\begin{aligned}
 P(w, \neg s, r, c) &= P(w | \neg s, r) P(\neg s | c) P(r | c) P(c) \\
 &= (0.90)(0.90)(0.80)(0.5) \\
 &= 0.324
 \end{aligned}$$

- Elsa is unlikely to chew up slippers, $P(\text{ElsaChews}) = 0.1$, Anna is more likely, $P(\text{AnnaChews}) = 0.3$. If the slippers are chewed, whether she or her sister did it, Elsa is likely to go into her crate and look concerned, $P(\text{ElsaConcerned} | \text{SlippersChewed}) = 0.8$. If you were constructing a Bayesian network, in which topological order would you include the variables *ElsaConcerned*, *SlippersChewed*, *ElsaChews*, *AnnaChews*?



Solution:

ElsaChews, AnnaChews, SlippersChewed, ElsaConcerned

You could reverse the order of *ElsaChews* and *AnnaChews*.