16 approximate inference in BN

Sampling : ① generating events from a distribution

② $\hat{P} = \frac{\#\text{Observed}}{\#\text{total}}$

consistant estimate : becomes exact in the large-scale limit

从父到子，遵循(conditional) prob distributions

Rejection Sampling :
① generate events from prior distribution
② reject those do not agree with evidence
③ use remaining to do estimate

pros: simple
cons: 合法的 sample 数 drop exponentially with #evidence variables (reject too much)

Likelihood weighing :
① generate events 从父到子
对 evidence node :
值已给定，update weights
else :
值由分布定
② Compute weighted sum of samples for estimate

e.g. $P(R|+c,+w)$

算0.45个正例 ←

生成某一个 sample :
$w = 1.0$
(1) C evidence value = +c $w := w \times 0.5$
(2) S non-evi value = +s
(3) R non-evi value = +R
(4) W evidence value = +w $w := w \times 0.9$
结果：, R = +R

$w = 0.45$

pro : use every sample

cons : { more evidence → lower weight (weights too small)
affect by the order of evidence

Gibbs sampling

原理MCMC，过程 similar to local search

start : evidence variables固定，其它随机
loop : sample a non-evidence variable

conditioned on the others

Markov Blanket : parents + children + children's parents