

Practice Questions for Quiz 8

CS228 – Winter 2009

1. Which of the following is NOT true about constraint based approaches to learning graph structures?
 - They test for dependencies and independencies
 - They are robust to failures in individual independence tests
 - They try to find an equivalence of networks that best explain found dependencies and independencies
2. Which of the following terms could be penalized in a structure prior that satisfies structure modularity?
 - the number of loops in the graph.
 - the number of independent parameters in the graph.
 - the number of v-structures in the graph.
 - the minimum induced width of the graph.
3. Suppose we are given data generated from the Bayesian network $X \rightarrow Y \rightarrow Z$. Under what circumstances can we perform a Bayesian estimate of the parameters θ_x , $\theta_{y|x}$, and $\theta_{z|y}$ independently?
 - (A) The data is completely observed.
 - (B) The parameter prior factors as $\theta_x \theta_{y|x} \theta_{z|y}$.
 - Both (A) and (B) must hold.
 - Either (A) or (B) must hold.
4. Give a missing data model that is neither MCAR nor MAR. In reader (pp.353) it said "In fact, one can show that we can always extend our model to produce one where the MAR assumption holds." Describe how you will extend your model to meet the MAR assumptions.
5. EM Algorithm: E-step. We use the posterior probability when we compute our expected sufficient statistics rather than the prior because the posterior takes the observed data into account, in addition to the current parameter estimates. True or False?
6. At each iteration of the EM algorithm, the M-step maximizes
 - The expected log likelihood $E_Q[l(\theta^{t+1} : D^+)]$, where $Q=P(H|D, \theta^{t+1})$
 - The expected log likelihood $E_Q[l(\theta^{t+1} : D^+)]$, where $Q=P(H|D, \theta^t)$
 - The expected log likelihood $E_Q[l(\theta^{t+1} : D^+)]$, where Q is an arbitrary distribution
 - The log likelihood $l(\theta^{t+1} : D^+)$