

COSC 387 Homework #2 (Optional)

Fall 1998

1. Of 100 patients in a hospital with a certain disease, 10 are chosen to undergo a drug treatment that increases the percentage cured rate from 50% in the untreated case to 75%. If a doctor later encounters a cured patient, what is the probability that the patient received the drug treatment?
2. For the same problem as above, draw a Bayesian inference network that shows the causal interaction(s) between the variables. Use the algorithm for propagating probabilities in trees to compute the posterior probability (i.e., the probability that a patient participated in the drug study given that the patient has been cured).
3. In your local nuclear power station, there is an alarm that senses when a temperature gauge exceeds a given threshold. The gauge measures the core temperature. Consider the Boolean variables A (alarm sounds), F_A (alarm is faulty), and F_G (gauge is faulty), and the multivalued nodes G (gauge reading) and T (actual core temperature).
 - (a) Draw a belief network for this domain, given that the gauge is more likely to fail when the core temperature gets too high.
 - (b) Suppose we add a second temperature gauge H , connected so that the alarm goes off when either gauge reads High. Where do H and F_H (the event of H failing) go in the network?