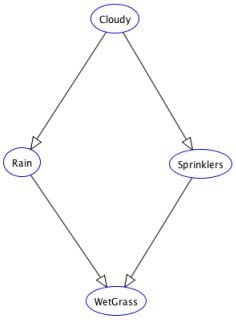
Homework 6 Machine Learning

Marco Treglia

1 Bayesian Network

Bayes network: a directed acyclic graph defining a joint probability distribution over a set of variables Each node denotes a random variable.Each node is conditionally independent of its non-descendents, given its immediate parents.A conditional probability distribution (CPD) is associated with each node N, defining P(N — Parents(N))

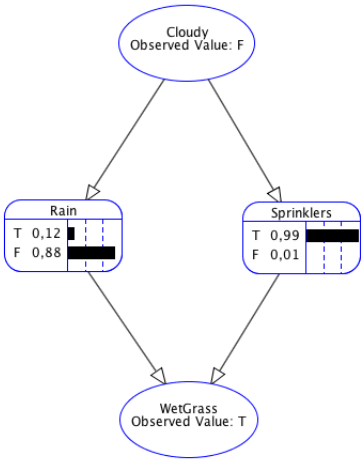
2 Assignment 1



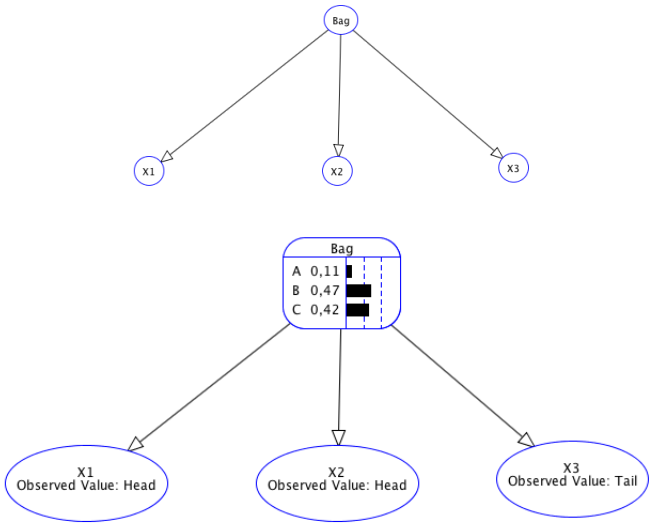
2.1 Joint probability function

$$P(c, r, s, w) = P(c) \cdot P(r|c) \cdot P(s|c) \cdot P(w|r, s)$$

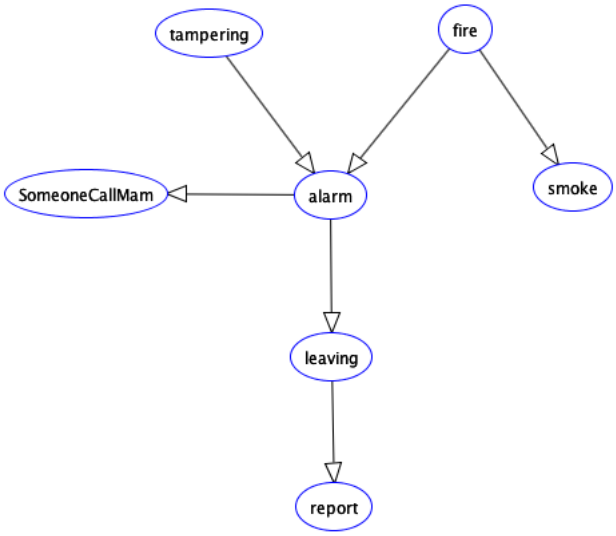
2.2 Joint probability function



3 Assignment 2



4 Assignment 3



4.1 Joint probability function

$$P(t, f, a, s, l, r) = P(t) \cdot P(f) \cdot P(a|t, f) \cdot P(s|f) \cdot P(l|a) \cdot P(r|l)$$

4.2 Node Call