

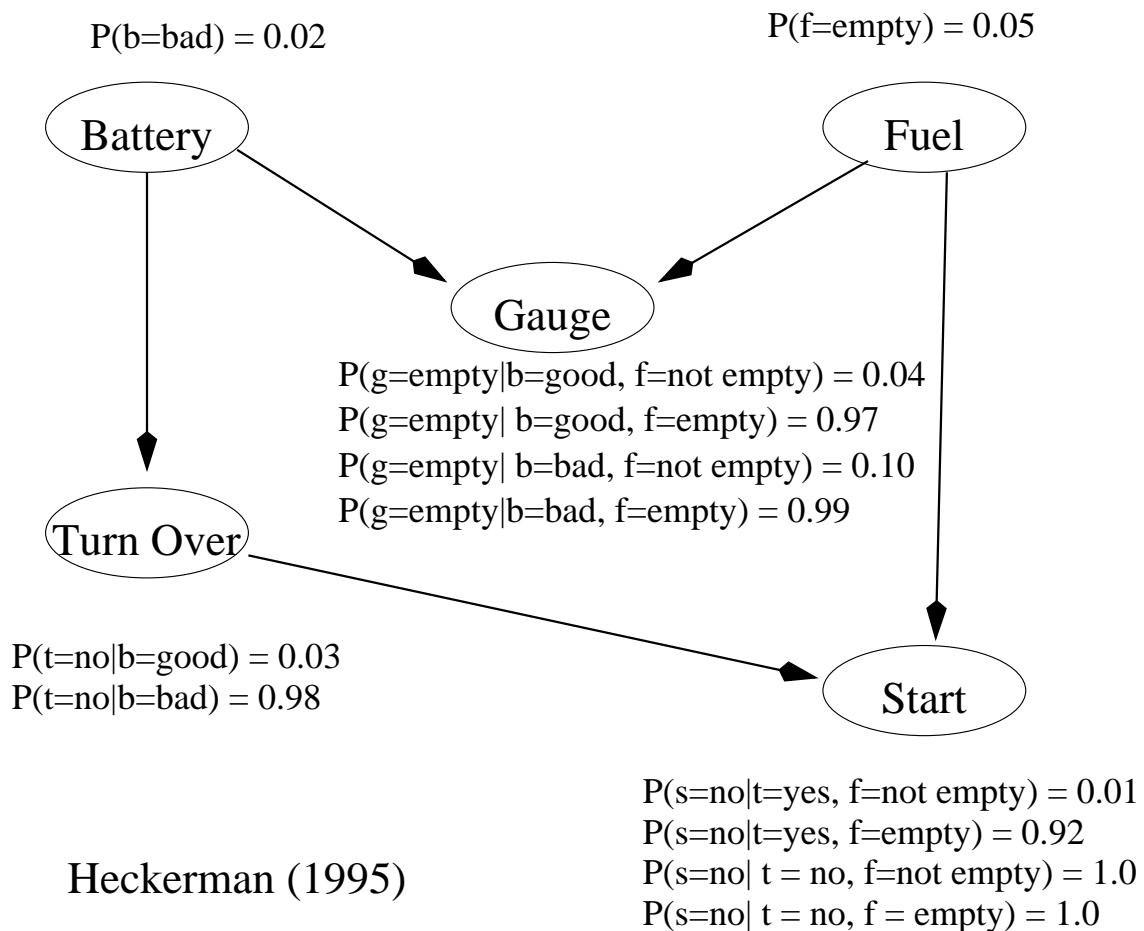
Probabilistic Modelling and Reasoning, Tutorial Sheet for week 4

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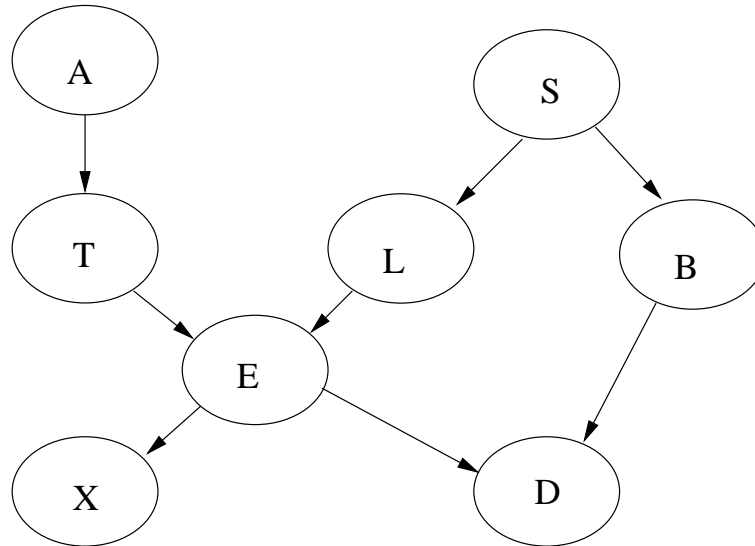
1. Consider the belief network given below, which concerns the probability of a car starting.



Calculate $P(f = empty|s = no)$, the probability of the fuel tank being empty conditioned on the observation that the car does not start. Do this calculation “by hand”, i.e. do not use or create a computer program to do this.

2. Practice the use of the JavaBayes software by setting up a belief network with the given structure and CPTs. Condition on the evidence and verify your calculation from question 1 above. Information on the JavaBayes software can be found by visiting the course homepage.

3. The belief network shown below is the famous “Asia” example of Lauritzen and Spiegelhalter (1988). It concerns the diagnosis of lung disease (T=tuberculosis, L=lung cancer, or both, or neither). In this model a visit to A=Asia is assumed to increase the probability of tuberculosis.



State if the following conditional independence relationships in the “Asia” graph are true or false

$$I(T, S|D),$$

$$I(L, B|S),$$

$$I(A, S|L)$$

$$I(A, S|L, D)$$