

Intelligent Systems: Reasoning and Recognition

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Exercise 7

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Bayesian Networks

1) Two random variables are Independent if $P(A, B) = P(A) \cdot P(B)$. Demonstrate that

a) $A \perp B \mid C \Leftrightarrow P(A \mid B, C) = P(A \mid C)$

b) $A \perp B \mid C \Leftrightarrow P(A, B \mid C) = P(A \mid C) \cdot P(B \mid C)$

2) The air traffic controllers are protesting new rules and go on strike for an entire day, one out of 10 days. Whenever there is a strike, Low-cost airlines Fleasy Jet cancels one quarter of its flights.

Assume that you purchase a ticket from Lyon to Brussels on Fleasy Jet with return the same day. Construct a Bayesian network with conditional probability tables that allows you to determine:

a) The probability of a strike on the day of your flight to Brussels.

b) The probability that your flight to Brussels will be canceled because of a strike.

c) If you make it to Brussels, what is the probability that your flight back to Lyon will be canceled.