

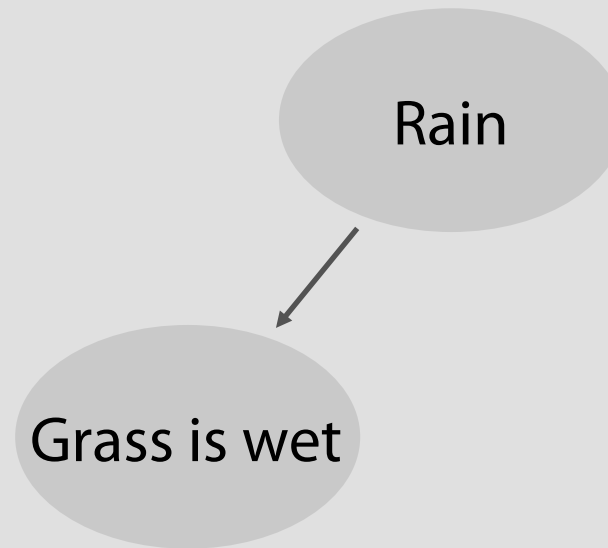
How to define a model



Bayesian network*

Nodes: random variables

Edges: direct impact



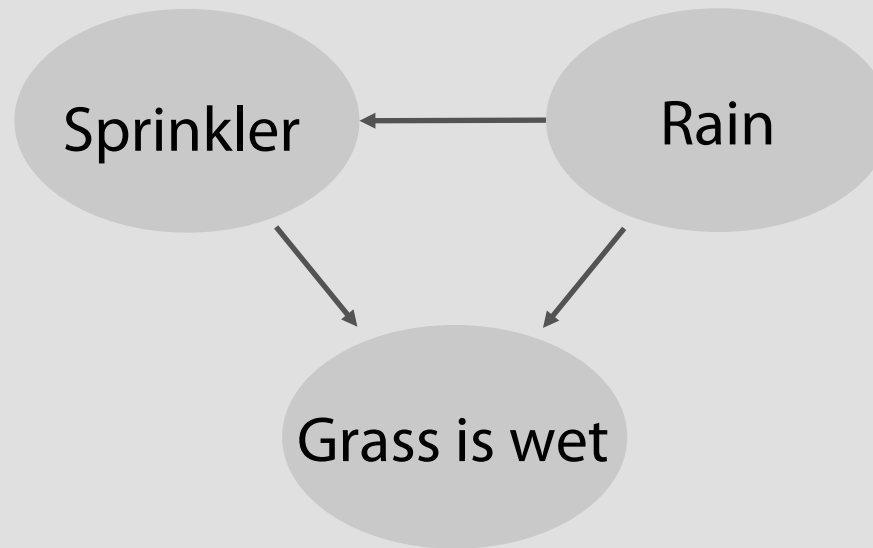
* Don't mix up with Bayesian neural network



Bayesian network*

Nodes: random variables

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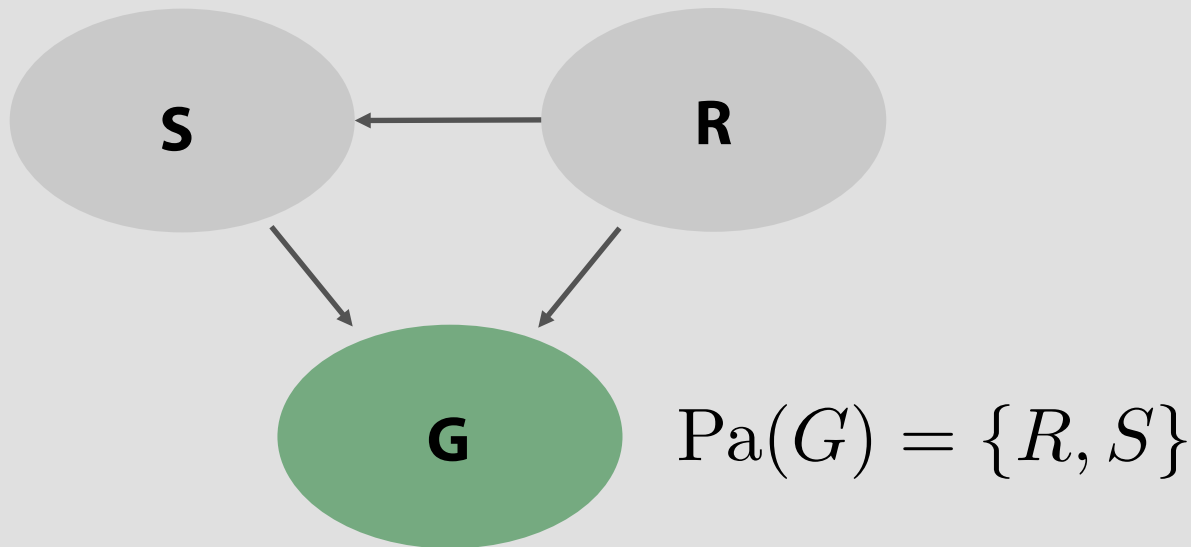


Probabilistic model from BN

Model: joint probability over all variables

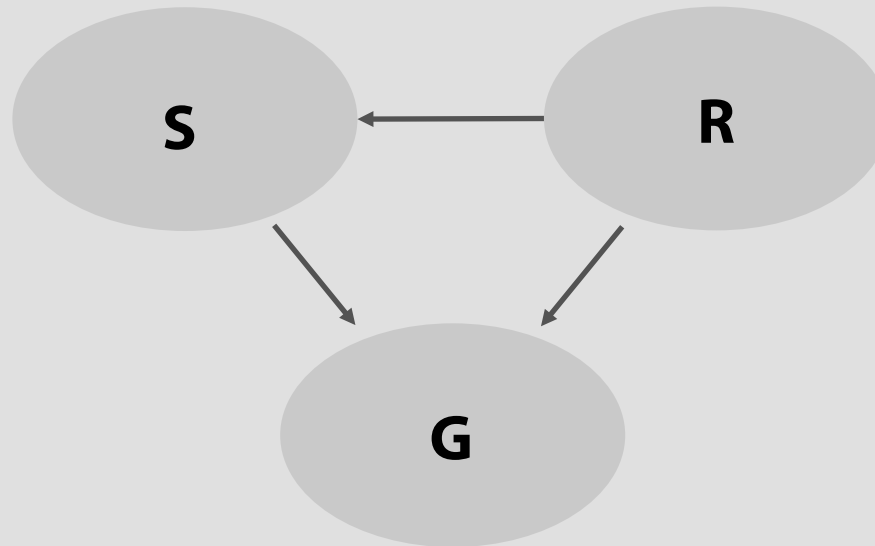
$$P(X_1, \dots, X_n) = \prod_{k=1}^n P(X_k | \text{Pa}(X_k))$$

Parents



Probabilistic model from BN

Model: joint probability over all variables

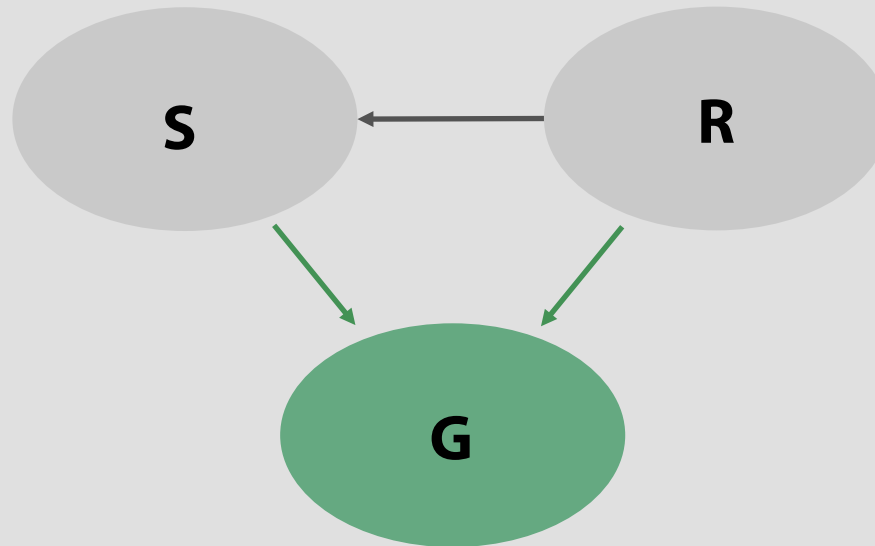


$$P(S, R, G) =$$



Probabilistic model from BN

Model: joint probability over all variables

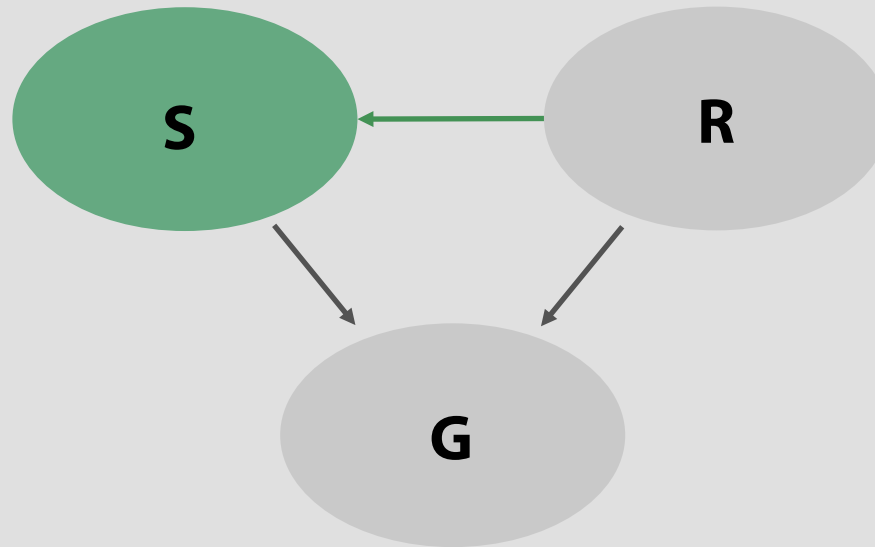


$$P(S, R, G) = P(G|S, R) \cdot$$



Probabilistic model from BN

Model: joint probability over all variables

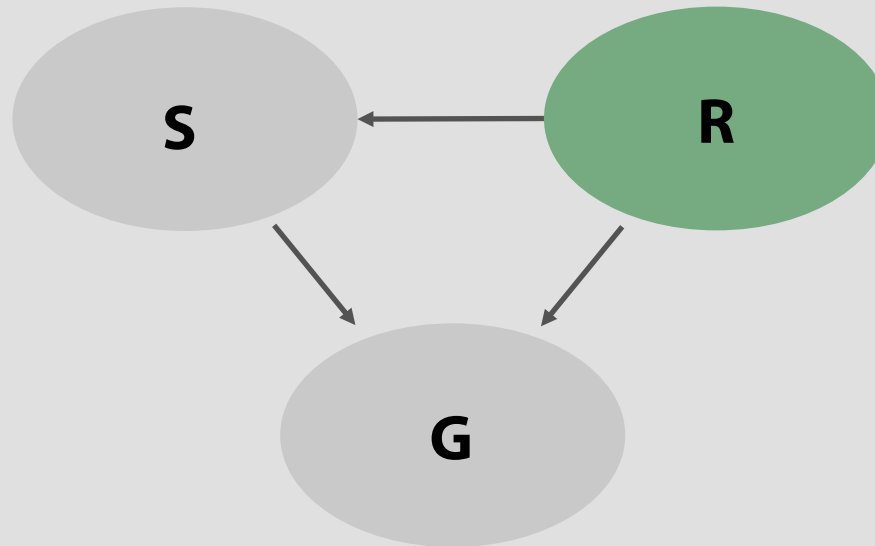


$$P(S, R, G) = P(G|S, R) \cdot P(S|R) .$$



Probabilistic model from BN

Model: joint probability over all variables

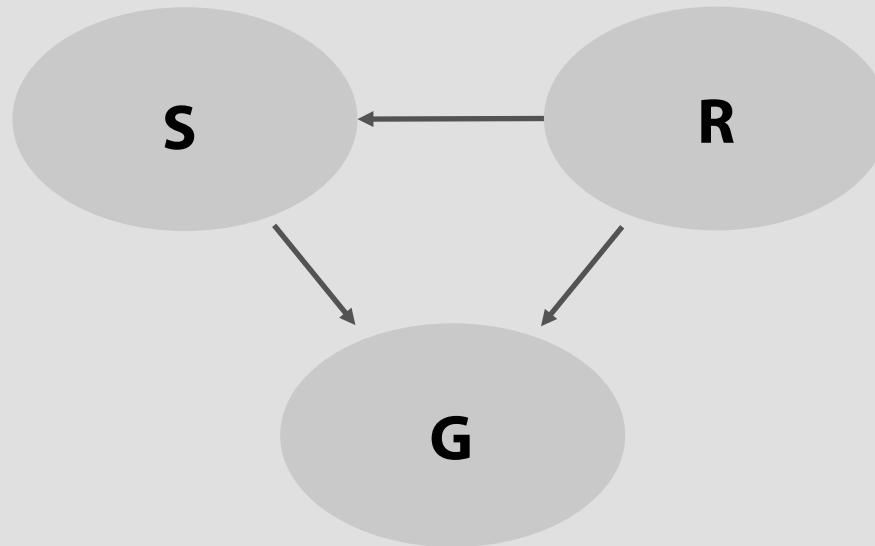


$$P(S, R, G) = P(G|S, R) \cdot P(S|R) \cdot P(R)$$



Probabilistic model from BN

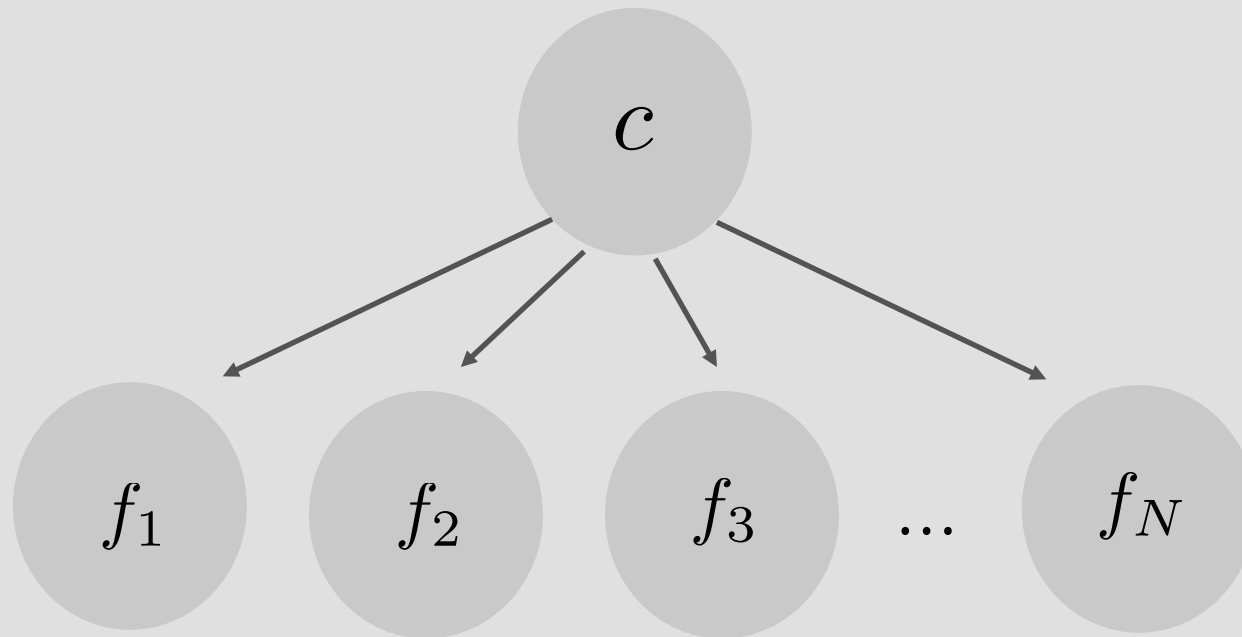
Model: joint probability over all variables



$$P(S, R, G) = P(G|S, R) \cdot P(S|R) \cdot P(R)$$



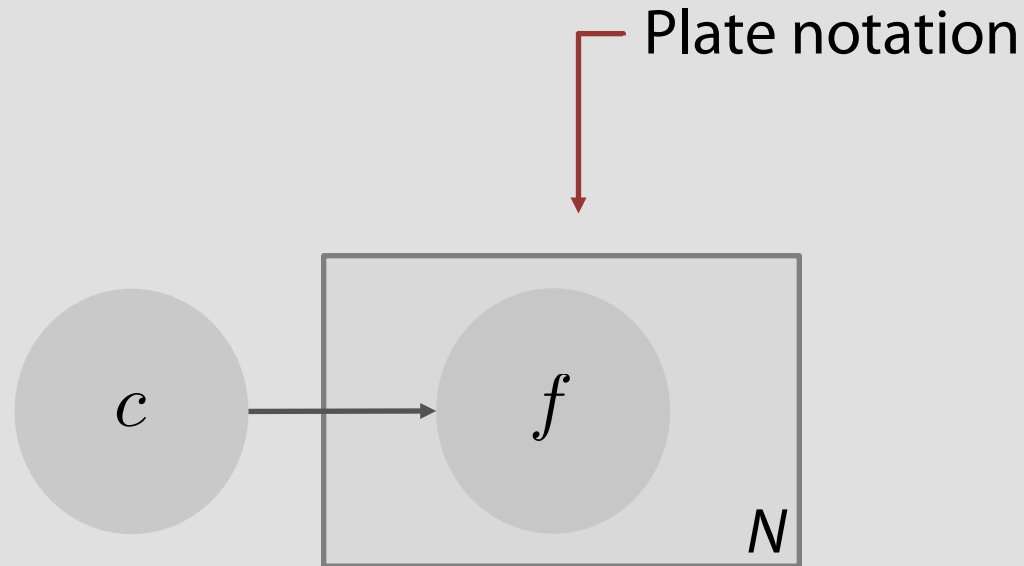
Naïve Bayes classifier



$$P(c, f_1, \dots, f_N) = P(c) \prod_{i=1}^N P(f_i|c)$$



Naïve Bayes classifier



$$P(c, f_1, \dots, f_N) = P(c) \prod_{i=1}^N P(f_i | c)$$

