Probabilistic graphical models

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January 21, 2022

Outline

Markov random fields

$$P(\mathbf{x}) = \frac{\exp\left(-H(\mathbf{x})\right)}{\sum_i \exp\left(-H(\mathbf{x}_i)\right)}$$

Suppose the energy function can be written as a sum over cliques:

$$H(\mathbf{x}) = \sum_n \tilde{\psi}_n(c_n)$$

Let $\psi_n = \log \tilde{\psi}_n$, which means $P(\mathbf{x})$ factors according to

$$P(\mathbf{x}) = \frac{\prod_n \psi_n(c_n)}{\sum_i \prod_n \psi_n(c_n)}$$

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