Context Free Grammar

Context-free grammar (CFG) describes infinite set of valid trees using a finite set of rules, e.g.:

$$\text{S} \rightarrow \text{NP VP}$$

Probabilistic CFG assign weights to rules, e.g.:

$$\text{VP} \rightarrow \begin{cases} \text{V} & 0.1 \\ \text{V NP} & 0.5 \\ \text{V NP NP} & 0.4 \end{cases} \tag{1}$$

Generative model for probabilitic CFG:

$$p(\text{tree } T|\text{sentence } s) = \prod_{X \rightarrow \alpha \in T} p(\alpha|X) \tag{2}$$