

$$\max_{\{S_t\}_{t=1}^T} p(\{S_t\}_{t=1}^T, \{O_t\}_{t=1}^T) = \max_k V_T^k$$

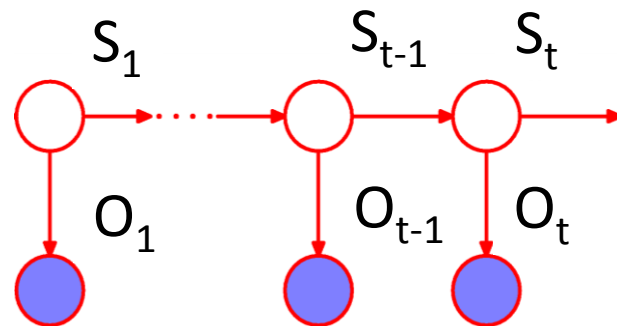
Compute probability V_t^k recursively over t

$$V_t^k := \max_{S_1, \dots, S_{t-1}} p(S_t = k, S_1, \dots, S_{t-1}, O_1, \dots, O_t)$$

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Bayes rule

Markov assumption



$$= p(O_t | S_t = k) \max_i p(S_t = k | S_{t-1} = i) V_{t-1}^i$$