BMI/CS 576 – Day 19

- Today
  - HMMs
    - Forward
    - Backward
    - Posterior probabilities
- Thursday
  - Training HMMs for an application

Mid-semester course survey

- Announced on Canvas
- Please respond by tomorrow so that I can take your feedback into account

Markov chain parameter estimation lecture up

- Please review this lecture prior to Thursday
- Important for notebook 20

Notebook 20

- There were some issues in the original version
- If you have already started it (starting = opened it in Vocareum), please save your work locally and "reset assignment" from the Actions menu to get the new version

Quiz

Given an HMM and a sequence that is L characters long, which of the following statements is always true regarding the relative values of the Forward and Viterbi values for this sequence?
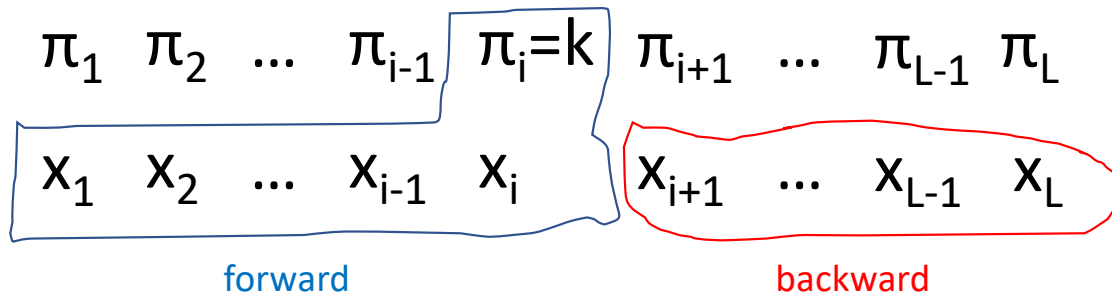
○ $v_N(L) \geq f_N(L)$

○ $v_N(L) \leq f_N(L)$

○ $v_N(L) = f_N(L)$

$$v_N(L) = \max_{\pi} P(x, \pi) \qquad f_N(L) = \sum_{\pi} P(x, \pi)$$

Forward and Backward values

$$\pi_1 \quad \pi_2 \quad \ldots \quad \pi_{i-1} \quad \pi_i=k \quad \pi_{i+1} \quad \ldots \quad \pi_{L-1} \quad \pi_L$$

$$x_1 \quad x_2 \quad \ldots \quad x_{i-1} \quad x_i \qquad x_{i+1} \quad \ldots \quad x_{L-1} \quad x_L$$

$f_k(i)$

forward   backward

$$f_k(i) = P(x_1, \ldots, x_i, \pi_i = k) \qquad b_k(i) = P(x_{i+1}, \ldots, x_L | \pi_i = k)$$