Computational Genomics

Week 8 tutorial
Viterbi algorithm

HMMs

- What's the complexity of the brute force algorithm, given a sequence of length *n*?

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- Answer: $O(n2^n)$

HMMs

- If only interested in the best path...
- ...Viterbi algorithm

Viterbi Algorithm

- Probability of being in state L after observing x_{i+1} is:

- $v_L(i+1)=e_L(x_{i+1})*\max(v_K(i)*a_{KL})$

- What's the complexity of Viterbi algorithm, with sequence length of n and number of states m?

Viterbi Algorithm

- Probability of being in state L after observing x_{i+1} is:
- $v_L(i+1)=e_L(x_{i+1})*\max(v_K(i)*a_{KL})$
- What's the complexity of Viterbi algorithm, with sequence length of n and number of states m?
- Answer: $O(nm^2)$

Viterbi Algorithm

- Implement the Viterbi algorithm. Verify your result with the brute force program from week7, and compare the runtime.