

CS 678 HMM Baum-Welch Homework

Assume the following 2 state HMM with alphabet $\{C, R\}$. A) Use the forward algorithm (show work) to get the probability of the observed sequence (R, C) (one Rib followed by one Chicken). Note that one state does not necessarily correlate directly with C and R as it was with the discrete Markov Process. B) Use the Viterbi algorithm (show work) to show the most likely state sequence given the observation (R, C) and give its probability. C) If the full training set were just the sequence (R, C), show what the new values of π , A, and B would be after one iteration of the Baum Welch learning algorithm. Round all computations to 3 significant digits. Initial settings:

$$\pi_1 = .2, \pi_2 = .8$$

$$a_{1,1} = .7, a_{1,2} = .3, a_{2,1} = .9, a_{2,2} = .1$$

$$b_{1,C} = .4, b_{1,R} = .6, b_{2,C} = .2, b_{2,R} = .8$$