Homework 2: Viterbi and CKY

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2.1 HMM Decoding (Viterbi)

end	0	0	0	0
H	0	0.32	0.0448	0.01254
C	0	0.02	0.048	0.00288
start	1	0	0	0
t =	0	1	2	3

Calculations for V3(1):

Products of Probabilities.

$V2(2) * P(C|H) * P(3|C) = 0.0448 * 0.3 * 0.1 = 0.00134$

$V2(1) * P(C|C) * P(3|C) = 0.048 * 0.6 * 0.1 = 0.00288$

$V3(1) = Max(0.00134, 0.00288) = 0.00288$

Calculations for V3(2):

$V2(2) * P(H|H) * P(3|H) = 0.0448 * 0.7 * 0.4 = 0.01254$

$V2(1) * P(H|C) * P(3|H) = 0.048 * 0.4 * 0.4 = 0.00768$

$V3(2) = Max(0.01254, 0.00768) = 0.01254$

Sum of logs:

Calculations for ln(V3(1)):

$\ln(V2(2)) + \ln(P(H|H)) + \ln(P(3|H)) = -3.11 - 1.20 - 2.30 = -6.61$

$\ln(V2(1)) + \ln(P(C|C)) + \ln(P(3|C)) = -3.04 - 0.51 - 2.30 = -5.85$

$V3(1) = Max(-6.61, -5.85) = -5.85$

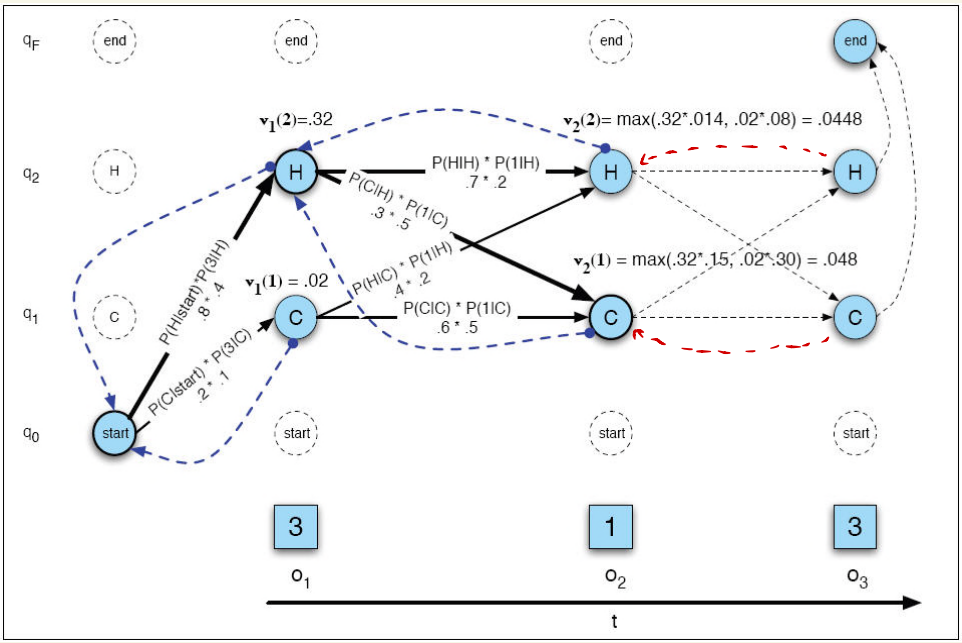
Calculations for ln(V3(2)):

$\ln(V2(2)) + \ln(P(H|H)) + \ln(P(3|H)) = -3.11 - 0.36 - 0.92 = -4.39$

$\ln(V2(1)) + \ln(P(H|C)) + \ln(P(3|H)) = -3.04 - 0.92 - 0.92 = -4.88$

$V3(2) = Max(-4.39, -4.88) = -4.39$

Best Path: start H H H end



Add a backtrace link to the backtrace figure from state H at time t = 3 to state H at time t = 2.

Add a backtrace link to the backtrace figure from state C at time t = 3 to state C at time t = 2.