CS 302 AI

Quiz 4

202151188

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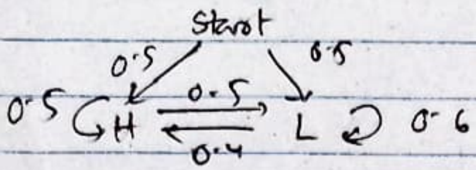
Sol^n

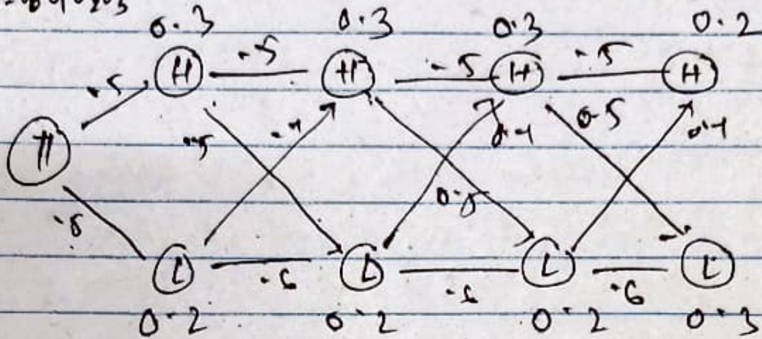
(2)



GGCA

$O = o_0 o_1 o_2 o_3$

(i)



$\alpha_0(L) = 0.5 \times 0.2 = 0.1 \mid \alpha_0(H) = 0.5 \times 0.3 = 0.15$

For T=0 $\{ \alpha_1(H) = .15 \times .5 \times .3 + .1 \times .4 \times .3 = .0345$

$\alpha_1(L) = 0.1 \times .6 \times .2 + .15 \times .5 \times .2 = .027$

For T=2 $\{ \alpha_2(H) = 0.0345 \times .5 \times .3 + .027 \times .4 \times .3 = .008415$

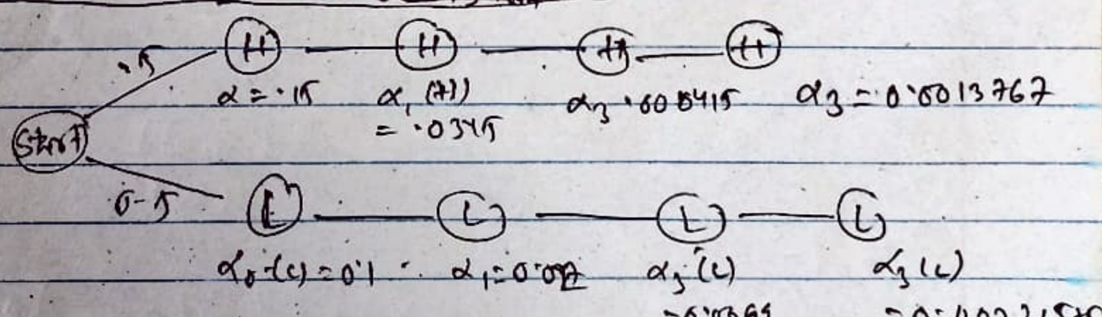
$\alpha_2(L) = .027 \times .6 \times .2 + .0345 \times .5 \times .2 = .00669$

For T=3 $\{ \alpha_3(H) = .008415 \times .5 \times .8 + .00669 \times .4 \times .2 = .0013767.$

$\alpha_3(L) = .0.0669 \times 0.5 \times 0.3 + .008415 \times 0.5 \times 0.3$

$\boxed{P(O/\lambda) = \sum_{t=0}^{w-1} \alpha_{T-1}(i) = 0.0036.}$ $= 0.00026575$

(ii)



For most likely state seq. we backtrack from higher α_i value of every state.

For $T_3 \Rightarrow$ max = L

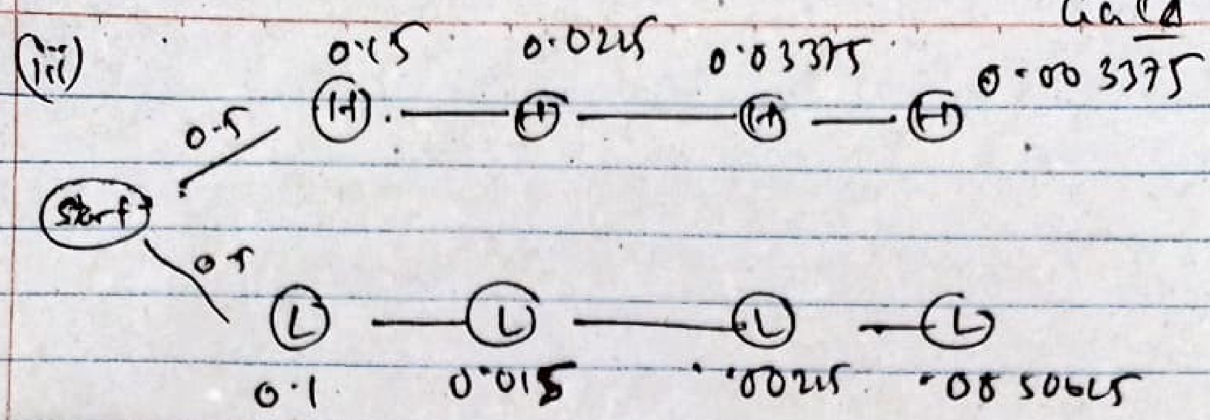
$T_2 \Rightarrow$ max = H

$T_1 \Rightarrow$ max = H

$T_0 \Rightarrow$ max = H

state seq = H H H L

(iii)



$V_0(H) = .5 \times .3$
$= .15$

$V_0(L) = .5 \times .2$
$= 0.1$

for V_1,

H → H $.15 \times .5 \times .3 = .0225$

H → L $.15 \times .05 \times .2 = 0.015$

L → H $0.1 \times .4 \times .3 = 0.012$

L → L $0.1 \times .6 \times .2 = 0.012$

for V_2

H → H $.0225 \times .5 \times .3 = .03375$

H → L $.0225 \times .5 \times .2 = 0.00225$

L → H $0.015 \times .4 \times .3 = 0.0018$

L → L $0.015 \times .6 \times .2 = 0.0018$

for V_3,

H → H $0.03375 \times .5 \times .2 = 0.003375$

H → L $0.0375 \times 0.5 \times 0.3 = 0.0050625$

L → H $0.00225 \times 0.4 \times 0.2 = 0.00018$

L → L $0.00225 \times .6 \times .3 = 0.000405$

optimal path = HHHL