CS 228: Probabilistic Graphical Models
Problem Set 1

Dong-Bang Tsai*
Department of Applied Physics, Stanford University, Stanford, California 94305, USA
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Problem 1

(a)

Assuming that $P(S' = s^j | S = s^i) = f_{ij}$ is the transition model in time duration Δt, then the probability of HMM with transition model f form t to d_i such that at step d_i, the state first transitions out of state s^i will be

$$P(S^{(t+d_i)} \neq s^i | S^t = s^i) = f_{ii}^{(\frac{d_i}{\Delta t} - 1)}(1 - f_{ii}) \tag{1}$$

In order to ease the notation, we can define that in $j - th$ step, the probability that the sate is not stayed in s^i is

$$P(d_i = j | S^t = s^i) = f_{ii}^{(j-1)}(1 - f_{ii}) \tag{2}$$

(b)

(c)

(d)

(e)

*Electronic address: dbtsai@stanford.edu