Markov Models

Wednesday, May 20, 2020 12:05 PM

$$\boxed{p(L_i|T)} > p(L_j|T)$$

$$\ldots t_1 \cdot t_2 \cdot \ldots t_{j-1}\, t_j \ldots t_N$$

ϕ

$0 \to S$

$p(S|\phi)$

$p(S|k)$

$$p(T|L_i) = p(t_1 \ldots t_N | L_i) = p_i(t_1 \ldots t_N)$$

$$\big(p(A,B) = p(B|A)\cdot p(A)$$

$$\boxed{p_i(\overbrace{t_1 \ldots t_{N-1}}^{A}\, \overbrace{t_N}^{B})} =$$

$$= p_i(\overset{B}{t_N} | \overset{A}{\cancel{t_1 \ldots}\, t_{N-1}}) \cdot p_i(\overset{A}{t_1 \ldots t_{N-1}}) =$$

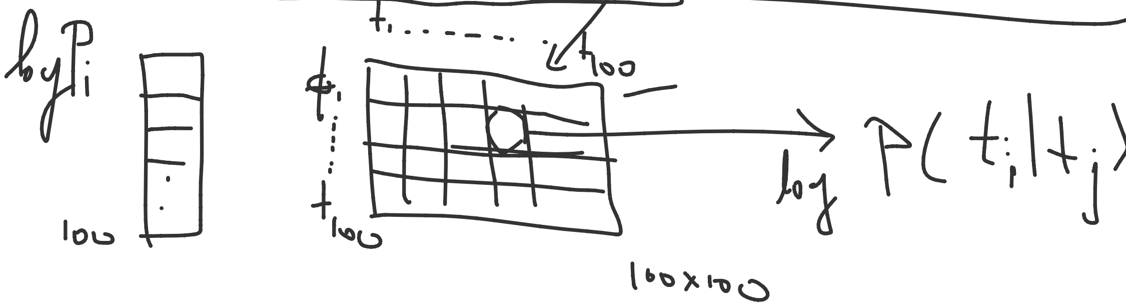
$$= p_i(t_N | t_{N-1}) \cdot p_i(\overset{A}{t_1 \ldots} \overset{B}{t_{N-1}}) = \ldots =$$

$$= \overset{100}{p_i(t_1)} \cdot \prod_{q=2}^{N} p_i(\overset{100}{t_q} | \overset{100}{t_{q-1}}) \quad \Bigg| \quad \prod_{q=1}^{N} p_i(t_q)$$

ΤΑΞ	ΑΡ. ΣΥΜΒ	ΑΡ. ΠΙΘ
1) ΧΑΡ.	~ 100	$100 + 100^2 = 10100$
Γ. Ε.Μ.	$Q \,/\, Q^2$	$Q + Q^2 \,/\, Q^2 + Q^3$
2) ΛΕΞΕΩΝ	~ 10.000	$10^4 + 10^8$
ΧΑΡ	~ 100	$100^2 + 100^3 = 1.010.000$ $10^4 + 10^6$

$$\log\Big(p_i(t_1) \prod_{q=2}^{N} p(t_q | t_{q-1})\Big)$$

$$\boxed{\log \overbrace{P_i(t_1)}^{M} + \sum_{q=2}^{N} \log P_i(t_q \mid t_{q-1}) + \log \underline{P_i}}$$



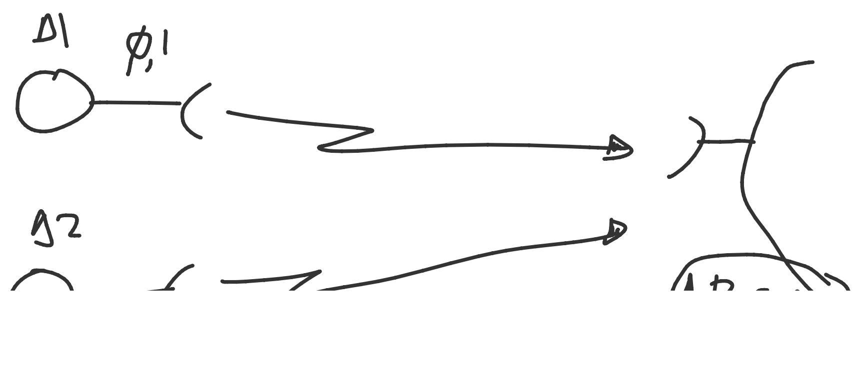
$$P(\overbrace{t_1 \ldots t_{N-2}}^{A}\ \overbrace{t_{N-1}\, t_N}^{B}) = P_i(t_N \mid \cancel{t_1} \ldots \underbrace{t_{N-2}\, t_{N-1}}) \cdot$$

$$\cdot P_i(\overset{A}{t_1 \ldots t_{N-1}}) =$$

$$\underbrace{P_i(t_N \mid t_{N-2}\, t_{N-1})} \cdot P_i(\underbrace{\overset{A}{t_1 \ldots} \overset{B}{t_{N-1}}}) =$$

$$\boxed{P_i(t_1\, t_2) \cdot \prod_{q=3}^{N} P_i(t_q \mid \underbrace{t_{q-2}\, t_{q-1}})}$$

Q^2 $\qquad\qquad$ Q^3



$P(\Delta_1) = \frac{3}{4}$

$P(\Delta\ ) = \frac{1}{}$

92

$\phi 1$

ABCA

$\phi 1 1 \phi$ ...... $\phi \phi$ ...

$P(\Delta_2) = \frac{1}{4}$

$\Delta 1$: 011110 000111 11111

$\Delta 2$: 01110 1110

M.T.1

$P_1(t_1)$ $P_1(t_q \mid t_{q-1})$

$p(\phi \mid \phi) + p(1 \mid \phi) = 1$

$$\Pi_1 = \begin{array}{c} \\ \phi \\ 1 \end{array}\begin{bmatrix} 2/3 \\ 1/3 \end{bmatrix} \qquad A_1 = \begin{array}{cc} \phi & 1 \end{array} \begin{bmatrix} \frac{2}{4} = \frac{1}{2} & \frac{2}{4} = \frac{1}{2} \\ \frac{1}{11} & \frac{10}{11} \end{bmatrix} \begin{array}{c} \phi \\ 1 \end{array} = \begin{bmatrix} \frac{1}{2} & \frac{1}{2} \\ \frac{1}{11} & \frac{10}{11} \end{bmatrix}$$

$$\Pi_2 = \begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix} \qquad A_2 = \begin{bmatrix} \phi/1 & 1/1 \\ 2/6 & 4/6 \end{bmatrix} = \begin{bmatrix} \phi & 1 \\ 1/3 & 2/3 \end{bmatrix}$$

$$P(\Delta 1 \mid \phi 1 1 \phi) > P(\Delta 2 \mid \phi 1 1 \phi) \Longrightarrow \in \Sigma T.\ \Delta 1$$

$\Updownarrow$

$$P(\overset{ABCA}{\phi 1 1 \phi} \mid \Delta 1) \cdot P(\Delta 1) > P(\overset{ABCA}{\phi 1 1 \phi} \mid \Delta 2) \cdot P(\Delta 2)$$

$$\underset{2/3}{\Pi_1(\phi)} \cdot \underset{1/2}{A_1(01)}\, \underset{1/11}{A_1(11)}\, \underset{10/11}{A_1(1\phi)} \cdot \underset{3/4}{P_1(\Delta)} > \underset{1/2}{\Pi_2(\phi)}\, \underset{1}{A_2(01)}\, \underset{1/3}{A_2(11)}\, \underset{2/3}{A_1(10)}\, \underset{1/4}{P(\Delta_2)}$$

$$\frac{2 \cdot 10 \cdot 3}{} > \frac{\cancel{}}{}$$

$$\frac{\cancel{2}\cdot 10\cdot \cancel{3}}{\cancel{3}\cdot \cancel{2}\cdot 11\cdot 11\cdot \cancel{4}} > \frac{\cancel{2}}{\cancel{2}\cdot 3\cdot 3\cdot \cancel{4}} \Leftrightarrow$$

$$\frac{10}{121} > \frac{1}{9} \Rightarrow \underline{\underline{90 > 121}} \longrightarrow \text{ΕΣΤΕΙΛΕ } \underline{\underline{8\Delta 2}}$$

$$\Pi_1 = \begin{array}{c} \begin{bmatrix} 1/3 \\ 1/3 \\ \emptyset \\ 1/3 \end{bmatrix} \end{array} \begin{array}{c} 00 \\ 01 \\ 10 \\ 11 \end{array} = \begin{bmatrix} 0.333\ldots \\ 0.333\ldots \\ \emptyset \\ 0.333\ldots \end{bmatrix}$$

$$A_1 = \begin{array}{c} \begin{array}{cc} \emptyset & 1 \end{array} \\ \begin{bmatrix} 1/2 & 1/2 \\ \vdots & \vdots \\ \boxed{\emptyset 1/2 \quad \emptyset 1/2} & \\ & \end{bmatrix} \end{array} \begin{array}{c} \\ 00 \\ 01 \\ 10 \\ 11 \end{array}$$

$$P_1(1|01) \qquad P_2(\emptyset|11)$$

$$P(011\emptyset|\Delta_1) = \Pi_1(01)\cdot A_1(01|1)\, A_1(1|\emptyset)$$

<u>HMM</u>