

CECS 451 Assignment 10
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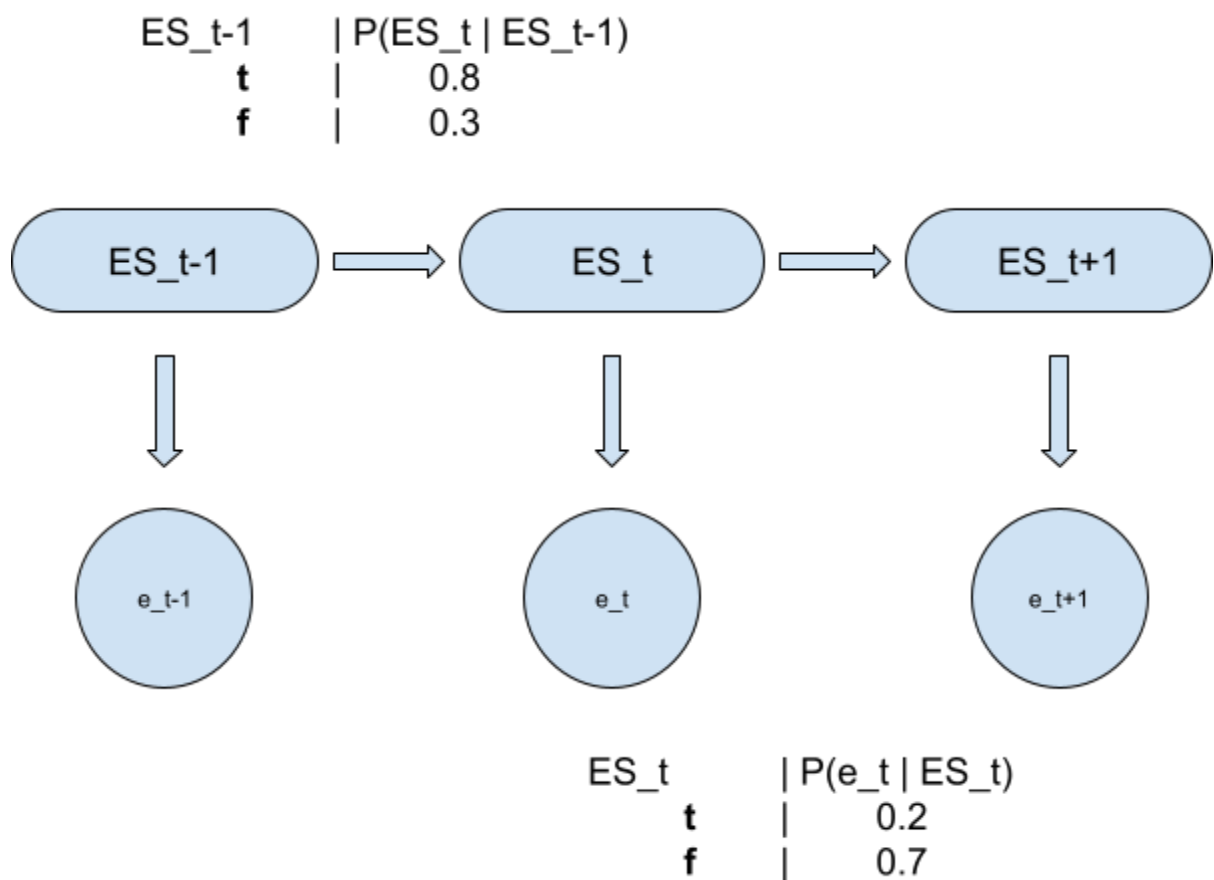
1.

- a. 0.2304
- b. $\langle 0.73, 0.27 \rangle$
- c. $\langle 0.1, 0.9 \rangle$

2. $p = 0.9304$

3.

a.



b.

$P(ES_2 | e_{1:2})$

$$\begin{aligned}
 &= a * P(\sim e_2 | ES_2) * \text{Sum}_{(es_1)} [P(ES_2 | es_1) * P(es_1 | e_1)] \\
 &\rightarrow P(\sim e_2 | ES_2) = \langle 1 - .2, 1 - .7 \rangle = \langle 0.8, 0.3 \rangle \\
 &= a * \langle 0.8, 0.3 \rangle * [\langle 0.8, 0.2 \rangle * x + \langle 0.3, 0.7 \rangle * y] \\
 &\rightarrow x = P(es_1 | e_1)
 \end{aligned}$$

$$\rightarrow y = P(\sim es_1 | e_1)$$

$$P(ES_1 | e_1)$$

$$= a * P(e_1 | ES_1) * \text{Sum}_{(es_0)} [P(ES_1 | es_0) * P(es_0)$$

$$\rightarrow P(es_0) = \langle 0.7, 0.3 \rangle$$

$$= a * \langle 0.2, 0.7 \rangle * [\langle 0.8, 0.2 \rangle * 0.7 + \langle 0.3, 0.7 \rangle * 0.3]$$

$$= a * \langle 0.2, 0.7 \rangle * [\langle 0.65, 0.35 \rangle] = a * \langle 0.13, 0.245 \rangle$$

$$= \langle 0.3467, 0.6533 \rangle$$

Therefore,

$$\rightarrow a * \langle 0.8, 0.3 \rangle * [\langle 0.8, 0.2 \rangle * x + \langle 0.3, 0.7 \rangle * y]$$

$$= a * \langle 0.8, 0.3 \rangle * [\langle 0.8, 0.2 \rangle * 0.3467 + \langle 0.3, 0.7 \rangle * 0.6533]$$

$$= a * \langle 0.8, 0.3 \rangle * [\langle 0.2774, 0.0683 \rangle + \langle 0.1960, 0.4573 \rangle]$$

$$= a * \langle 0.8, 0.3 \rangle * [\langle 0.4734, 0.5267 \rangle]$$

$$= a * \langle 0.3787, 0.1580 \rangle$$

$$P(ES_2 | e_{1:2}) = \langle \mathbf{0.7056}, \mathbf{0.2944} \rangle$$