AI METHODS ASSIGNMENT 2

A

The unobserved variables X_t are wether or not it's raining that day: R_t.

The observable variables are wether or not the director brings his umbrella: U_t

$$P(X_t \mid X_{t-1}) = \begin{bmatrix} 0,7 & 0,3 \\ 0,3 & 0,7 \end{bmatrix} X_{t-1}$$

(T)

$$P(E_t \mid X_t) = \begin{bmatrix} 0,9 & 0 \\ 0 & 0,2 \end{bmatrix} X_t$$

(O)

Here we are assuming the weather stays the same with a 70% chance, and that the director brings his umbrella with a 90% chance if rain, else 20%

These assumptions are fairly simplistic and probably doesn't give a very accurate model. Allowing for seasonal changes to the probability and possibly using more than one day of weather data would most likely give more accurate dat.

For a secret facility - guard-thought-experiment it's probably accurate enough

B

$f_{1:6} = \langle 0,5 \quad 0,5 \rangle$

$f_{2:6} = \langle 0,818 \quad 0,182 \rangle$

$f_{3:6} = \langle 0,307 \quad 0,693 \rangle$

$f_{4:6} = \langle 0,767 \quad 0,233 \rangle$

$f_{5:6} = \langle 0,874 \quad 0,126 \rangle$

$f_{6:6} = \langle 0,893 \quad 0,107 \rangle$

C

$b = \langle 0,044 \quad 0,024 \rangle$

$\langle 0,666 \quad 0,046 \rangle$

$\langle 0,091 \quad 0,150 \rangle$

$\langle 0,459 \quad 0,244 \rangle$

$\langle 0,690 \quad 0,410 \rangle$

This is in the source code aswell