TDT4171 Artificial Intelligence Methods

Part A

X_t is used to denote the set of state variables at time t. In the Umbrella domain X_t refers to whether it is raining or not at time t. E_t is used to denote the set of observable evidence variables. In the Umbrella domain it refers to whether or not the director is carrying an umbrella or not.

The Dynamic model looks like this
$$P(X_t|X_{t-i}) = \begin{pmatrix} 0.7 & 0.3 \\ 0.3 & 0.7 \end{pmatrix}$$

The observational model looks like this

$$P(E_t|X_t) = \begin{pmatrix} 0.9 & 0 \\ 0 & 0.2 \end{pmatrix}$$

First order Markov process

In first order Markov process the current state depends only on the previous state and not on any earlier states. For weather this is not the best solution. seasons and location should be considered as it can be argued that they have a larger influence on the weather than the previous day.

Stationary process

If the changes in the world state are caused by process of change governed by laws that do not themselves change over time it is a stationary process. The weather can be argued to be a stationary process as it is governed by the rules of nature.

Sensor model

The evidence variables E_t could depend on previous variables as well as the current state variables. We base our sensory model on values observed at time slice t, we can assume this to be reasonable.