

Intro to AI Assignment 3 - Probabilistic Reasoning

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§1 Problem 1

§2 Problem 2

§3 Problem 3

§4 Problem 4

We can model the system as a hidden Markov model. We can model X_t as a Markov chain with the states $\{A, B, C, D, E, F\}$ and transition matrix:

$$\begin{pmatrix} 0.2 & 0.8 & 0 & 0 & 0 & 0 \\ 0 & 0.2 & 0.8 & 0 & 0 & 0 \\ 0 & 0 & 0.2 & 0.8 & 0 & 0 \\ 0 & 0 & 0 & 0.2 & 0.8 & 0 \\ 0 & 0 & 0 & 0 & 0.2 & 0.8 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

In addition, we have the observation matrices for hot and cold:

§4.1 Part 1

We know that the rover starts at state A with probability 1, so $P(X_1 = A) = 1$. The initial state vector is therefore $[1, 0, 0, 0, 0, 0]^T$.

§5 Problem 5