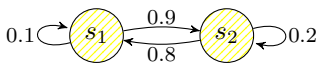
Markov Chain



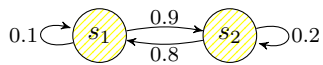

Transition Probability Matrix

$$P = \begin{array}{c} \\ s_1 \\ s_2 \end{array} \begin{array}{c} \begin{array}{cc} s_1 & s_2 \end{array} \\ \begin{bmatrix} 0.1 & 0.9 \\ 0.8 & 0.2 \end{bmatrix} \end{array}$$

Next state is determined only by the current state

States are completely observable
i.e. $p(o_1|s_1) = 1$, $p(o_2|s_2) = 1$

Hidden Markov Model



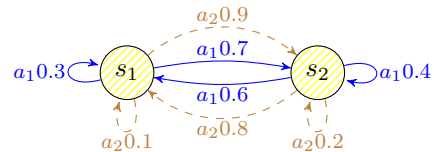

Transition Probability Matrix

$$P = \begin{array}{c} \\ s_1 \\ s_2 \end{array} \begin{array}{c} \begin{array}{cc} s_1 & s_2 \end{array} \\ \begin{bmatrix} 0.1 & 0.9 \\ 0.8 & 0.2 \end{bmatrix} \end{array}$$

Next state is determined only by the current state

We are unsure which state we are in
e.g. $p(o_1|s_1) = 0.75$, $p(o_2|s_2) = 0.75$

Markov Decision Process



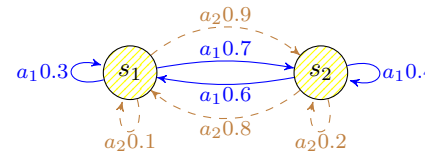

Transition Probability Matrix

$$P = \begin{array}{ccc} & & \\ s_1 & a_1 & \\ & a_2 & \\ s_2 & a_1 & \\ & a_2 & \end{array} \begin{array}{c} \begin{array}{cc} s_1 & s_2 \end{array} \\ \begin{bmatrix} 0.3 & 0.7 \\ 0.1 & 0.9 \\ 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix} \end{array}$$

Next state is determined by the current state and current action

States are completely observable
i.e. $p(o_1|s_1) = 1$, $p(o_2|s_2) = 1$

Partially Observable Markov Decision Process




Transition Probability Matrix

$$P = \begin{array}{ccc} & & \\ s_1 & a_1 & \\ & a_2 & \\ s_2 & a_1 & \\ & a_2 & \end{array} \begin{array}{c} \begin{array}{cc} s_1 & s_2 \end{array} \\ \begin{bmatrix} 0.3 & 0.7 \\ 0.1 & 0.9 \\ 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix} \end{array}$$

Next state is determined by the current state and current action

We are unsure which state we are in
e.g. $p(o_1|s_1) = 0.75$, $p(o_2|s_2) = 0.75$