

POMDPs

POMDPs

- We've been living a lie:

```
s = observe(env)
```

Types of Uncertainty

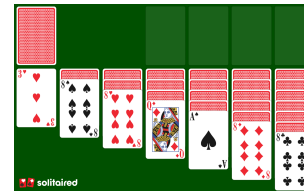
Alleatory



Epistemic (Static)



Epistemic (Dynamic)

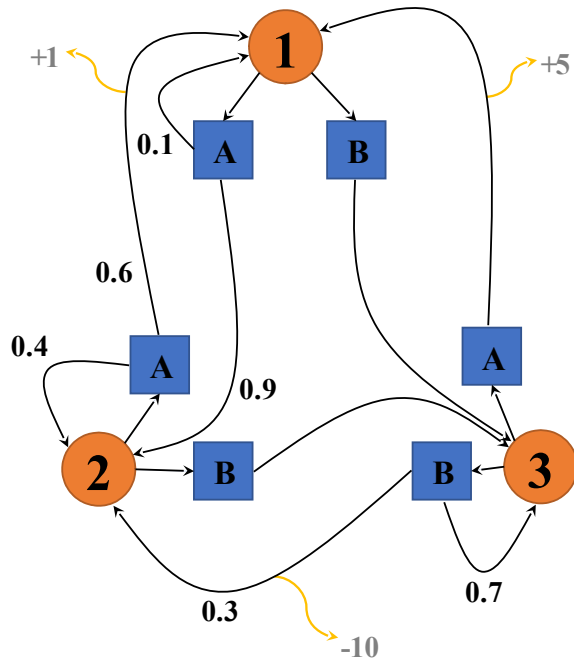


Interaction



Markov Decision Process (MDP)

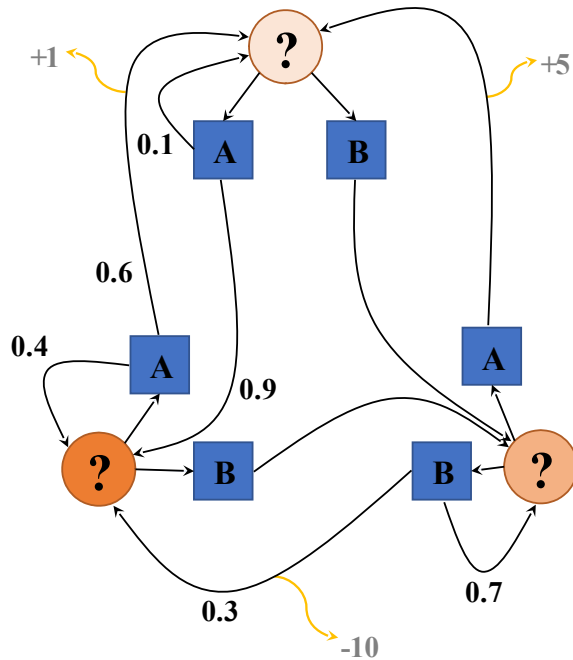
- \mathcal{S} - State space
- $T(s' | s, a)$ - Transition probability distribution
- \mathcal{A} - Action space
- $R(s, a)$ - Reward



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Partially Observable Markov Decision Process (POMDP)

- \mathcal{S} - State space
- $T(s' | s, a)$ - Transition probability distribution
- \mathcal{A} - Action space
- $R(s, a)$ - Reward
- \mathcal{O} - Observation space
- $Z(o | a, s')$ - Observation probability distribution



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Epistemic (Static)

Epistemic (Dynamic)

Tiger POMDP Definition

Hidden Markov Models and Beliefs

Bayesian Belief Updates

Filtering Loop

Tiger Example

Recap