PAC Optimal MDP Planning with Application to Invasive Species Management

1 Main Ideas

- The idea of MDPs are very well-applicable in the realm of environmental managment and in particular, invasive species.
- As discussed before, in case of big MDPs, we have no other choices rather than using samples to solve the MDP.
- In this paper, another approach is studies. Instead of batch of samples, they have a simulator, which is able to produce a random outcome of the process in each state-action pair.
- The paper bases the idea of PAC-RL on Fiechter's work. However, it extends the Hoeffding-bound confidence intervals to a multinomial CI, that was introduced in MBIE.
- In order to find a tighter CI for the transition probability, a method called Good-Turning estimate of the missing mass is used. This is done based on the fact that transition probabilities are usually sparse in real world, meaning that they are limitted (and often a couple of) s' that the MDP can reach out to from the state s.