Research Review

Partially Observable Markov Decision Process

Partially Observable Markov Decision Process(POMDP) is a generalization of Markov Decision Process(MDP). MDP are useful in situation where states are fully observable in contrast to POMDP which assume that states are only partially observable. Instead agent contains a probability of its belief of being in a certain state. By acting in the environment the agent gains more knowledge about the state that it is in. The POMDP gives us the optimal action for every belief state. It does this by evaluating the reward or penalty of an action in a particular belief state. The interesting thing about a POMDP, if it deterministic, is that the first part of the process might be the agent determining what state it is in turning the problem into a Partially Observable Markov Decision Process

Partial Order Planing

Partial Order Planing(POP) is an approach automated planning. It differs from total order planning(TOP) in that it does not include order except when necessary. This is the Principle of Least Commitment. The inputs in POP are a problem, a set of all action, a initial state, and a goal state. The output in POP is a partial plan(pp). A pp is a collection of action that need to be taken to achieve the goal but does not specify an order when order does not matter.We can apply linearization to a partial order plan to achieve a total order plan. For example, a pp for doing laundry maybe as follows:

1. go to store
2. get detergent; get bleach; get fabric softener;
3. pay for goods
4. go to laundry

This pp can be linearized in to 6 different total plans. POP is better than TOP at finding the quickest path making it he more efficient of the two.

Version Space learning

Version space learning(VSL), is a logical approach to binary classification. The process starts with a a disjunction of finite hypothesis or subsets of hypothesis 1 through n. The hypothesis space of this algorithm goes through a process of iterative refinement called, candidate elimination. The genius part of this algorithm is it creates two boundaries, the most specific boundary and the most general boundary.

The most specific boundary(SB) is the smallest boundary that covers all observed positive training points. This means if this boundary were reduced it would exclude some observed positive training point. This is a pessimistic approach where if data isn't ruled in its ruled out.

The most general boundary(GB) is the largest boundary that excludes all observed negative training points. This means if this boundary were enlarged it would include some observed negative training point. This is a optimistic approach where if data isn't ruled out, then its ruled in.

After training we can classify unseen examples, as positive or negative. unseen points that fall inside he GB and outside the SB, the majority vote rule can be applied.

REFERENCES

1. http://en.wikipedia.org/wiki/Partially_observable_Markov_decision_process
2. https://en.wikipedia.org/wiki/Partial-order-planning
3. http://en.wikipedia.org/wiki/Version_space_learning