The original repo: https://github.com/IBM/forbiditerative

The papers related: , Reshaping Diverse Planning

Top K planner

Return a number of k, best quality (with lowest cost) plans

We used this in the AAMAS paper

Top quality

Set a quality boundary (e.g. 1.1)

Return all the plans which costs are less than 1.1*the_lowest_cost_plan

Equals to the 10% sub-optimality dataset in the AAMAS paper

Diverse planner

There are 3 available planners:

1. diverse_agl

   Similar to top-k planner, from the lowest cost plan to higher cost plans

   Set of actions must be different (if a plan reorder its action sequence, that's only counted as 1 plan)

   ```
   # ./plan_diverse_agl.sh <domain> <problem> <number-of-plans>
   ./plan_diverse_agl.sh examples/logistics00/domain.pddl
   examples/logistics00/probLOGISTICS-4-0.pddl 10
   ```

2. diverse_sat

   Post-processed the founded plans from diverse_agl according to a metric (stability, uniqueness, state).

   Using a greedy algorithm, add a plan to the set if that plan can maximize the metric.

   ```
   ## See the dependencies below (1 and 2)
   # ./plan_diverse_sat.sh <domain> <problem> <number-of-plans> <diversity-
   metric> <larger-number-of-plans>
   ./plan_diverse_sat.sh examples/logistics00/domain.pddl
   examples/logistics00/probLOGISTICS-4-0.pddl 10 stability 20
   ```

   Using the diverse_agl to generate 20 plans. Then from these 20 plans, select 10 plans can maximizing the metric (greedy)

3. diverse_bD

Post-processed the founded plans from diverse_agl according to a metric (stability, uniqueness, state).

Set a boundary of metric, if a plan can satisfy the boundary requirement, then it will be add into the output set.

```
## See the dependencies below (1, 2, and 3)
# ./plan_diverse_bounded.sh <domain> <problem> <number-of-plans> <diversity-
metric> <bound> <larger-number-of-plans>
./plan_diverse_bounded.sh examples/logistics00/domain.pddl
examples/logistics00/probLOGISTICS-4-0.pddl 10 stability 0.25 20
```

Metrics:

stability:

measures the ratio of the number of actions that appear on both plans to the total number of actions on these plans.

A(π) is the set of actions in π.

$$sim_{stability} = \frac{|A(\pi) \cap A(\pi')|}{|A(\pi) \cup A(\pi')|}$$

Uniqueness:

It is another measure that considers plans as action sets. It measures whether two plans are permutations of each other, or one plan is a partial plan (subset) of the other plan.

Roberts, M.; Howe, A. E.; and Ray, I. 2014. Evaluating diversity
in classical planning. In Chien, S.; Fern, A.; Ruml,
W.; and Do, M., eds., Proceedings of the Twenty-Fourth International
Conference on Automated Planning and Scheduling
(ICAPS 2014), 253–261. AAAI Press.