TempAMLSI: Temporal Action Model Learning Based on STRIPS Translation

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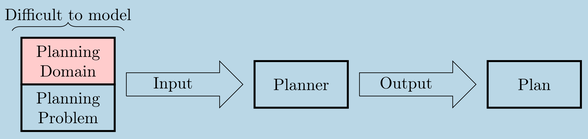
Temporal Planning



Classical STRIPS planning [1]: Some algorithms have been proposed to learn classical action model, e.g. ARMS [2], AMLSI [3, 4], LSONIO [5] etc

Temporal planning [6]: Only the algorithm proposed by [7] learns Temporal domains. There exist differnt form of required action concurrency [8]

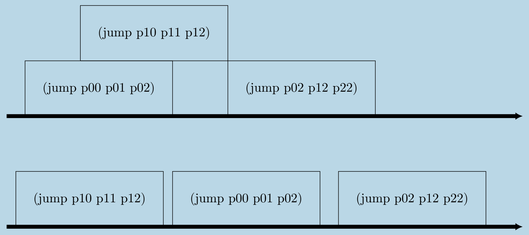


Figure 1: An example of Sequential domain

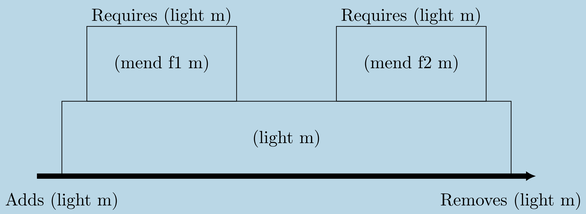


Figure 2: An example of domain with Single Hard Enveloppe [9] (SHE Domain)

There are no learning algorithm able to learn SHE domains
Some planners resolves temporal problem using classical planner [9–13]

- Translate Temporal domains to Classical domains
- Solve Classical problems
- Generate Temporal Plan using the Classical Plan and scheduling techniques

TempAMLSI reuses this idea for the learning problem

The TempAMLSI Approach

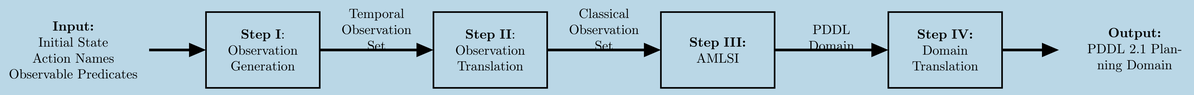
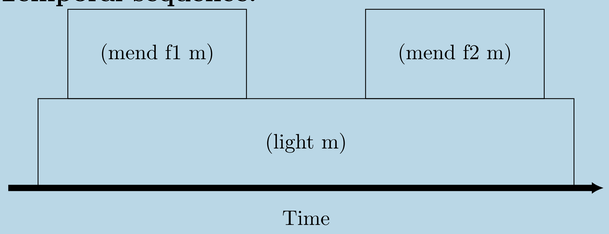


Figure 3: TempAMLSI Overview

Temporal sequence:



Classical sequence:

$\omega =$ {start(light m), start(mend f1 m), end(mend f1 m),start(mend f2 m), end(me,d f2 m), end(light m)}

Figure 4: Observation Translation

```
(:action mend-start
 :parameters (?f - fuse ?m - match)
 :precondition (and (handfree) (light ?m))
 :effect (and (not (handfree))))
 (:action mend-end
 :parameters (?f - f ?m - m)
 :precondition (and (light ?m))
 :effect (and  (mended ?f) (handfree)))
```

```
(:durative-action mend
 :parameters (?f - fuse ?m - match)
 :duration (= ?duration 2)
 :condition (and (at start (handfree))
      (over all (light ?m)))
 :effect (and (at start (not (handfree)))
    (at end (mended ?f))
    (at end (handfree))))
```

Figure 5: Domain Translation

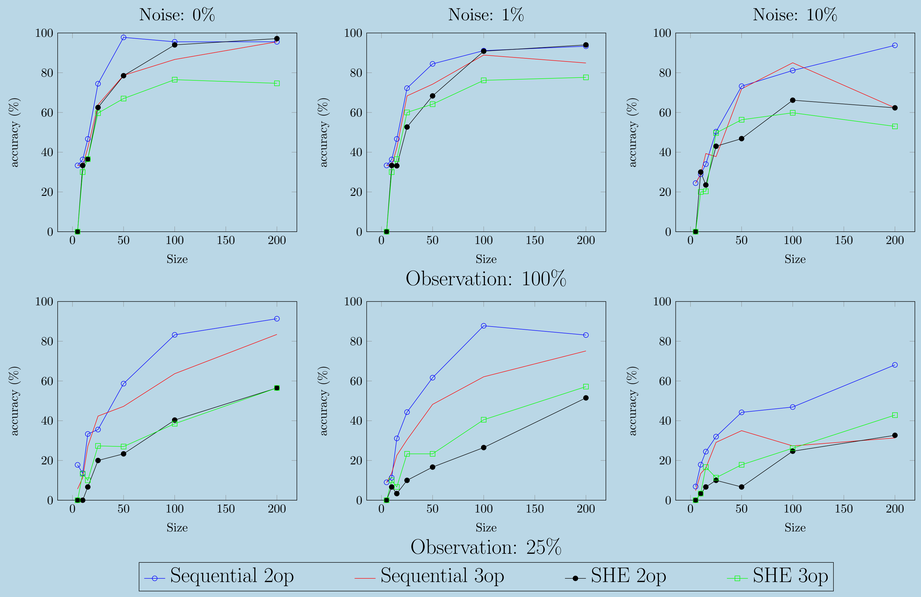


Figure 6: Average Performance in terms of Accuray on 5 IPC Domains of 2-Operators and 3-Operators translation variants when the training data set size increases in number of actions

References

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Acknowledgements

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