CIS 700 HW4: Convert WikiHow to PDDL

[redacted]

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1 Choice of WikiHow article

We decided to select one of the survival articles. We thought that PDDL would be able to effectively capture a survival mission that would contain several branching paths and fail states. Moreover, during our childhood we both also enjoyed reading survival novels, so we also thought that the challenge could be enjoyable.

2 Portion of article chosen

We decided to translate three problems mentioned in the article to PDDL: solving hunger by eating food, hydrating oneself by collecting water, and escaping the jungle. We chose these sub-problems, because we imagined that food and water are essential for surviving in the wilderness and maintaining health, while the ultimate objective is to escape the jungle itself.

3 Examples of actions, types and predicates

Below we provide descriptions of several actions we implemented:

1. Collecting water from rainfall. Given a player and a location, the precondition is that 1) the player is at the location, 2) the player's inventory contains a bamboo container, and 3) the location has rainfall. As a result, the player's inventory now contains water, and the water in turn is not treated.

2. Creating fire. Given a player and a location, the precondition is that 1) the player is at the location, 2) the player's inventory contains stone, and 3) the player's inventory contains wood. As a result, fire exists at the location, and the inventory contains neither stone or wood.

Meanwhile, we used types of item (e.g. stone, wood), location (e.g. basecamp), condition (e.g. dehydrated, hungry), player and direction.

Finally, we used various predicates including *has rainfall* which takes in a location and returns whether it contains rainfall for collecting water.

4 Goal, Initial State and Solution

First, for the hunger sub-problem, we assigned the goal to be the player not being in a hungry state. Second, for the dehydration sub-problem, we assigned the goal to be the player not being in a dehydrated state. Finally, for the escape sub-problem, we assigned the goal to be the player not being located within the basecamp, bamboo forest, or the jungle.

5 Limitations of PDDL

The temporal aspect was difficult to implement in PDDL. For example, in the eating food section, the wikiHow described asking the individual to rub the potential fruit on the lips and waiting to see if there

would be any side effects. If an hour passed without causing any swelling or rashes, the article stated that the fruit would likely be okay to eat. Since there was no way to capture the essence of time, we had to remove this challenge for our PDDL.

6 PDDL for text-adventure game

We believe that our PDDL could be used as an interesting challenge. It has a fail state (if the player drinks untreated water, the player's condition becomes "ill" that prevents the player from ever escaping) as well as numerous small challenges (hunger and dehydration) that needs to be resolved before the player can achieve the ultimate goal of escaping.

7 GPT-3 for article conversion to PDDL

To utilize GPT-3 to automatically convert wikiHow articles to PDDL, we believe that we would need to prompt GPT-3 using several demonstrations. More specifically, we would provide a paragraph of wikiHow article alongside a gold, natural language description which includes the associated items and locations. By providing GPT-3 with a paragraph from a completely separate article, the program may be able to learn to generate related items and locations. Using the autogenerated text, users can then be incorporated in crowdsourcing setups to create the full-fledged PDDL. We do not think it will be easy to fully automatically convert a new wikiHow article to a PDDL as the syntax for a PDDL seems less intuitive and much longer than languages such as SQL, where GPT-3 would more likely be able to shine.