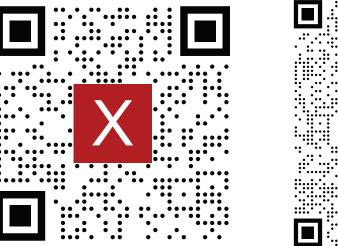


LeDeepChef



Results

2700

Random Pruned

2700

percentage

Method

9300

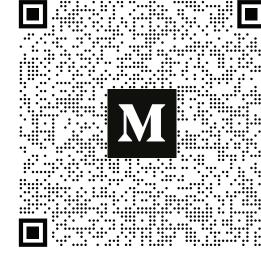
9300

episode

12600

12600

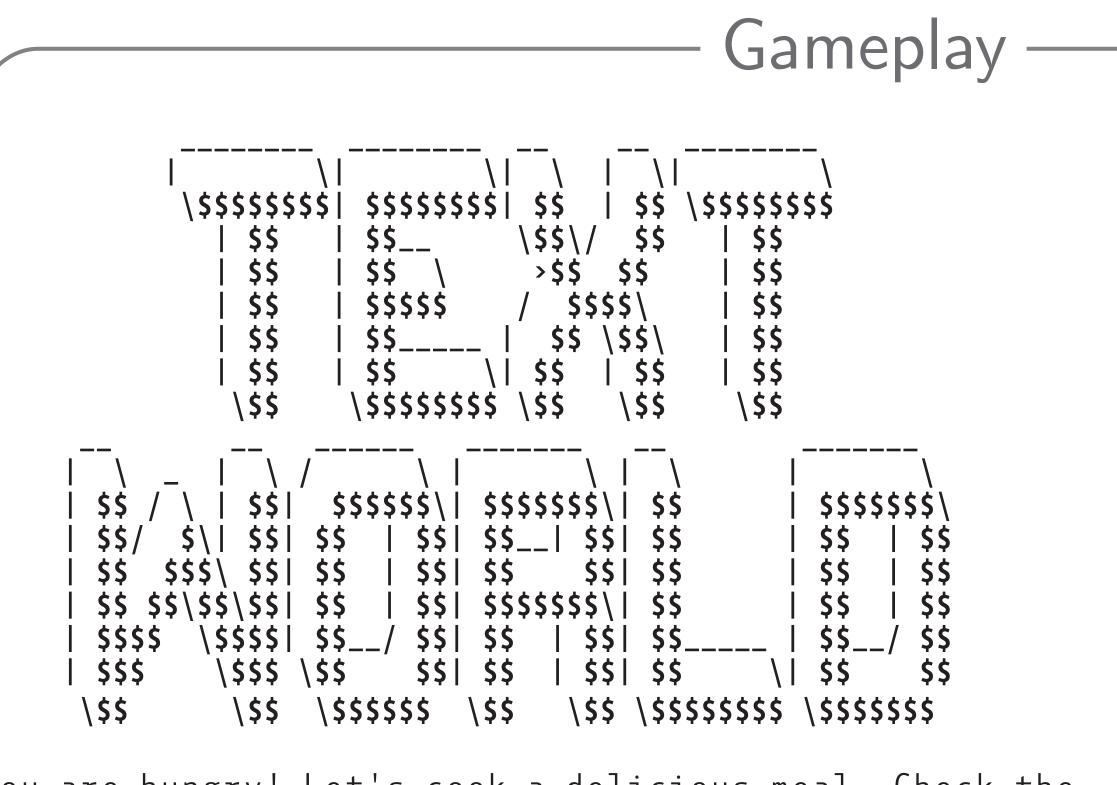
test





Deep Reinforcement Learning Agent for Families of Text-Based Games

Leonard Adolphs & Thomas Hofmann



You are hungry! Let's cook a delicious meal. Check the cookbook in the kitchen for the recipe. Once done, enjoy your meal!

-= Kitchen =-Look at you, bigshot, walking into a kitchen like it isn't some huge deal.

You make out a fridge. I mean, just wow! Isn't TextWorld just the best? You see a closed oven. You can make out a table. On the table you can make out a knife. You can make out a counter. I guess it's true what they say, if you're looking for a counter, go to TextWorld. The counter is vast. On the counter you can see a raw red potato, a raw purple potato, a red hot pepper and a cookbook. You see a stove. Why don't you take a picture of it? It'll last longer. Unfortunately, there isn't a thing on it. It would have been so cool if there was stuff on the stove.

> examine cookbook You open the copy of "Cooking: A Modern Approach

(3rd Ed.) " and start reading:

Recipe #1

Gather all following ingredients and follow the directions to prepare this tasty meal.

Ingredients: yellow bell pepper

yellow potato Directions:

slice the yellow bell pepper fry the yellow potato prepare meal

> take yellow bell pepper

> inventory

You are carrying:

a yellow potato

> open fridge You open the fridge, revealing a yellow bell pepper.

You take the yellow bell pepper from the fridge.

> inventory You are carrying: a yellow potato a yellow bell pepper

> take knife You take the knife from the table.

> slice the yellow bell pepper You slice the yellow bell pepper.

> cook the yellow potato with stove You cooked the yellow potato with stove.

inventory

You are carrying:

a fried yellow potato a sliced yellow bell pepper

> prepare meal

Adding the meal to your inventory.

→ eat meal

You eat the meal. Not bad.

*** The End ***

Why Text-Based Games?

- Good testbed for research at the intersection of RL & NLP (Côté et al. 2018).
- Broad spectrum of challenges, e.g.:
 - Combinatorial state and action spaces
 - Common-sense reasoning
 - Sparse and delayed rewards

TextWorld

- Family of games with different environments and goals.
- Agent needs to learn to generalize.

Identify vital information

disregard needless information identify ingredients & tools identify state of ingredients

Recipe

Recipe Model

Supervised training

Recipe

inventory

Inventory

- Determines the goal of the game.
- Different for every game.

Ingredients:

× yellow bell pepper yellow potato Directions:

X slice the yellow bell pepper X fry the yellow potato

Dataset augmented with new ingredients & adjectives

steps steps Random WL 98.9 $\pm .02$ LSTM-DQN 97.0 1.0 99.3 $\pm .00$ $\pm .00$ $\pm .00$ Random AC 12.8 50.1 $\pm .31$ ± 1.67 $\pm .64$ DRRN 50.2 39.3 13.2 ± 1.65 $\pm .05$ Random Pruned 39.6 95.8 $\pm .36$ **DRRN** Pruned 44.1 34.3 $\pm .31$ ± 2.01 ± 1.80 $\pm .41$

6000

episode

valid

Yin and May (2019) LeDeepChef 🐺 24.1 43.9 $\pm .23$ $\pm .20$ $\pm .19$

First TextWorld Problems Competition by Microsoft Research

Rank Commands

- 1. Prune commands using Recipe Model's output.
- 2. Group commands.
- 3. Use context + derived features for the RL Model.

