TOOLS, PLATFORMS, AND APPROACHES FOR SC2 AI

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OUTLINE

- Who we are
- Tools for easier entry into pysc2
- RL methods for mini-games
- Beyond mini-games
- More Resources

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TOOLS FOR EASIER ENTRY INTO PYSC2: OPENAI GYM ENVIRONMENT

sc2gym (https://github.com/islamelnabarawy/sc2gym)

- A standardized action-observation-reward environment
- Simplified action and observation space for mini-games
- Compatible with OpenAI gym environments
- Allows reuse of OpenAI baselines algorithms*

*: not necessarily out-of-the-box…

TOOLS FOR EASIER ENTRY INTO PYSC2: OPENAI GYM ENVIRONMENT

- Take your first action with only 3 lines of code:

```
env = gym.make("SC2MoveToBeacon-v0")
env.reset()
env.step(env.action_space.sample())
```

- Here's an example that will play an entire episode:

```
env = gym.make("SC2MoveToBeacon-v0")
env.reset()
done = False
while not done:
    obs, reward, done, _ = env.step(env.action_space.sample())
```

TOOLS FOR EASIER ENTRY INTO PYSC2: OPENAI GYM ENVIRONMENT

```
import sys
import gym
from absl import flags
import sc2gym.envs

FLAGS = flags.FLAGS

def main():
    FLAGS(sys.argv)
    env = gym.make("SC2MoveToBeacon-v0")
    env.reset()
    done = False
    while not done:
        obs, reward, done, _ = env.step(env.action_space.sample())

if __name__ == "__main__":
    main()
```

TOOLS FOR EASIER ENTRY INTO PYSC2: REINFORCEMENT LEARNING FOR MINI-GAMES

sc2agents (https://github.com/islamelnabarawy/sc2agents)

- Ready-made examples of RL algorithms
- Networks designed and trained for mini-games using sc2gym environments
- Imported from OpenAI baselines implementations
- More implementations and trained weights will be released progressively

BEYOND MINI-GAMES:
FULL GAME SCORING AND AI COMPETITION PLATFORM

sc2ai.net tournament ladder

- Credit: Martin Clarke, aka “Cryptious”
- Currently undergoing overhaul and expansion effort
- Looking for collaborators and volunteers

RL APPROACHES FOR MINI-GAMES:

- D. V Prokhorov and D. C. Wunsch, “Adaptive critic designs,” Neural Networks, IEEE Trans., vol. 8, no. 5, pp. 997–1007, Sep. 1997.
- M. Fairbank and E. Alonso, “Value-gradient learning,” in Neural Networks (IJCNN), The 2012 International Joint Conference on, 2012, pp. 1–8.
- S. Al Dabooni, D. Wunsch, S. Al Dabooni, and D. Wunsch, “Heuristic dynamic programming for mobile robot path planning based on Dyna approach,” in 2016 International Joint Conference on Neural Networks (IJCNN), 2016, pp. 3723–3730.
- S. Al-Dabooni and D. Wunsch, “Mobile robot control based on hybrid neuro-fuzzy value gradient reinforcement learning,” in 2017 International Joint Conference on Neural Networks (IJCNN), 2017, pp. 2820–2827.

MORE REFERENCES…

- X. Cai, G.K. Venayagamoorthy, and D.C. Wunsch, “Evolutionary swarm neural network game engine for Capture Go,” Neural Networks, vol. 23, pp. 295-305, 2010.
- X. Cai and D.C. Wunsch II, “Computer Go: A grand challenge to AI,” in Challenges for Computational Intelligence (Studies in Computational Intelligence, vol. 63), W. Duch and J. Mandziuk, Eds. Springer-Verlag, 2007.
- X. Cai and D.C. Wunsch, “A parallel computer Go player, using HDP method,” in Proc. IEEE International Joint Conference on Neural Networks, vol. 4. Washington, DC, July 2001, pp. 2373-2375.
- M.R. Us-Zaman and D.C. Wunsch, "TD methods applied to mixture of experts for learning 9x9 Go evaluation function," in Proc. IEEE / INNS International Joint Conference on Neural Networks '99, vol. 6. Washington, DC, pp. 3734-3739.
- R. Zaman, D. Prokhorov, and D.C. Wunsch, “Adaptive critic design in learning to play game of Go,” in Proc. IEEE International Conference on Neural Networks, Houston, TX: IEEE, 1997, pp. 1-4.

COMMUNITY RESOURCES…

- Discord Server: https://discord.gg/qTZ65sh
- Subreddit: https://www.reddit.com/r/sc2ai/

- YouTube Channel: https://goo.gl/3C9aAN
- Website: https://islamelnabarawy.github.io/
- Twitter: @IslamElnabarawy

Questions?

Thank you!