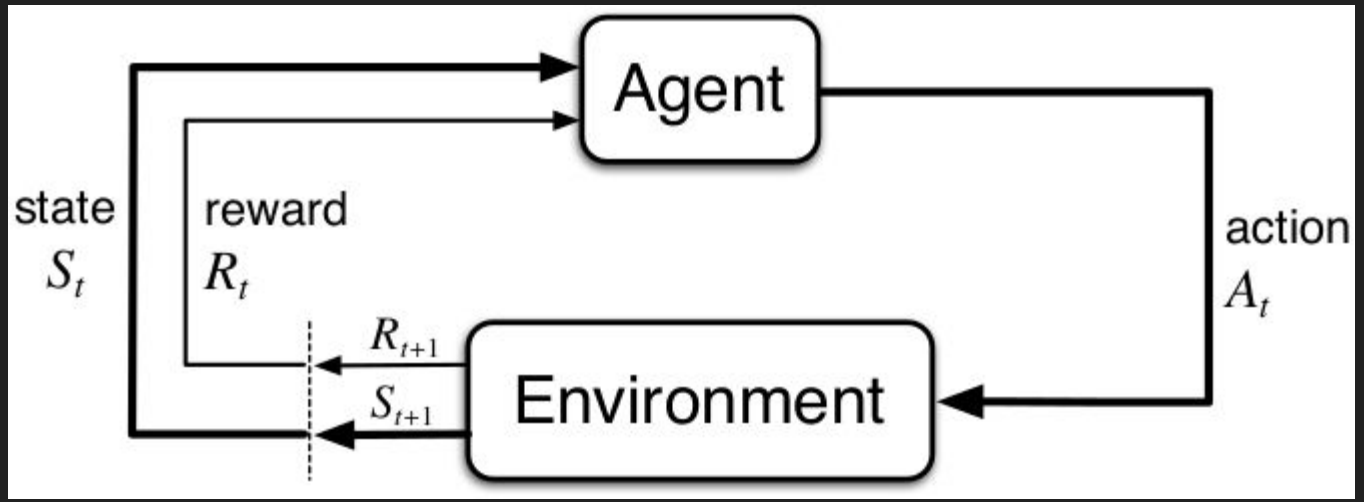
OpenAI Gym

Oier Eguiazabal & David Max

Reinforced Learning



What’s OpenAI Gym?

How to install OpenAI Gym

- Python3, numpy and python3-pip.

```
sudo apt-get install -y python3-numpy python3-dev python3-
pip cmake zlib1g-dev libjpeg-dev xvfb libav-tools xorg-dev
python-opengl libboost-all-dev libsdl2-dev swig
```

- Also install github, and clone repository + install toolkit.

```
cd ~
git clone https://github.com/openai/gym.git
cd gym
sudo pip3 install -e '.[all]'
```

- Start programming.

How to use OpenAI Gym

- Python editor + import gym & numpy.
- Create and initialize environment.

```
env = gym.make("Taxi-v2")
env.reset()
```

- Actions

```
env.action_space.n
env.env.get_action_meanings()
```

```
state, reward, done, info = env.step(1)
```

- Evaluate agents performance → Compare to random.

```
state, reward, done, info = env.step(env.action_space.sample())
```

How to use OpenAI Gym

- Simple loop to solve the environment:

```
state = env.reset()
counter = 0
reward = None
while reward != 20:
    state, reward, done, info = env.step(env.action_space.sample())
    counter += 1

print(counter)
```

- 2000+ steps
- In order to maximize the reward → Q learning algorithm

How to use OpenAI Gym

- The agent will have memory, based on Q action table value.

```
for episode in range(1,251):
    done = False
    G, reward = 0,0
    state = env.reset()
    while done != True:
            action = np.argmax(Q[state]) #1
            state2, reward, done, info = env.step(action) #2
            Q[state,action] += alpha * (reward + np.max(Q[state2]) - Q[state,action]) #3
            G += reward
            state = state2
            env.render()
    if episode % 50 == 0:

        print('Episode {} Total Reward: {}'.format(episode,G))
```

- Solves 250 environments.

Conclusions

- The field of reinforcement learning is rapidly expanding with new and better methods for solving environments.

- Reinforcement learning will play an important role in the future of AI.

Questions?