Reinforcement Learning Lab Session 8
A2C and PPO

April 23, 2020

Submitting the code and experiment runs

In order to turn in your code and report, create 3 folders that contains the following:

Cartpole

- A2C and PPO code on the Cartpole environment.
- Plots

LunarLander

- A2C and PPO code on the LunarLander-v2 environment.
- Plots

Report A scientific report explaining

- Difference between A2C and PPO?
- Try solving the LunarLander-v2 environment, using already implemented code for Cartpole. Set `N_TRIALS = 1` and `REWARD_THRESHOLD = 100`. You are only allowed to change `MAX_EPISODES`.
- Compare the performance of A2C and PPO in different environments
- Provide an analysis of the results you get.
- What could be potential improvements?

TODOs in the code

Please add your code wherever the `TODO` flag appears, i.e. in the following functions:

- In `BaseModel, forward:` `TODO:` write the forward pass method for the ANN, with correct usage of the layers.
- In `ActorCritic, forward:` `TODO:` convert actions to probabilities using softmax.
- In `cell after the ActorCritic class:` `TODO:` Write in the output dimension for the Actor and Critic.
- In `train:` `TODO:` get the action output from the policy (Actor).
- In `train:` `TODO:` get the value output from the state-value approximator (Critic).
- In `calculate_returns:` `TODO:` compute returns $G_t, \forall t : 1..T$
- In `calculate_advantages:` `TODO:` calculate advantages, i.e. $A(s, a) = Q(s, a) - V(s)$
- In `calculate_advantages:` `TODO:` normalize advantages.
- In `update_policy:` `TODO:` compute the policy loss based on `advantages` and `log_prob_actions`.
- In `update_policy:` `TODO:` compute the value loss using the Mean Absolute Error loss function.
- In **PPO** Run the code that reuses A2C methods to validate if PPO is running correctly with CartPole.

Installations

requirements.txt file has been shared which can be used by running

pip install -r requirements.txt

for any specific issues, clarifications related to any dependency, please contact instructors or visit.
https://pytorch.org/get-started/locally/
https://jupyter.readthedocs.io/en/latest/install.html
http://gym.openai.com/docs/