Machine Learning HW15

ML TAs

ntu-ml-2020spring-ta@googlegroups.com

作業內容

在本次作業當中,你們將實做並比較幾項 Deep Reinforcement Learning 方法:

- Policy Gradient
- Actor-Critic

作業的實做環境為 OpenAI 的 gym 當中的 Lunar Lander。其餘實做細節請參考助教提供的範例程式。

Policy Gradient 方法

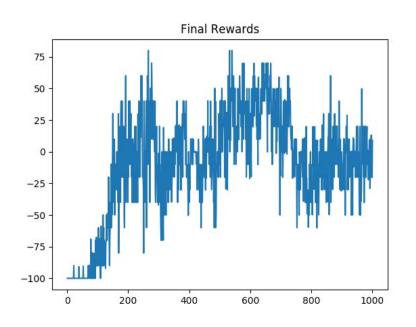
```
Algorithm 1 Policy Gradient
   function REINFORCE
       Initialize policy parameters \theta
       for each episode \{s_1, a_1, r_1, \dots, s_T, a_T, r_T\} \sim \pi_{\theta} do
            for t = 1 to T do
                 Calculate discounted reward R_t = \sum_{i=t}^{T} \gamma^{i-t} r_i
                \theta \leftarrow \theta + \alpha \nabla_{\theta} \log \pi_{\theta}(a_t|s_t) R_t
            end for
        end for
       return \theta
   end function
```

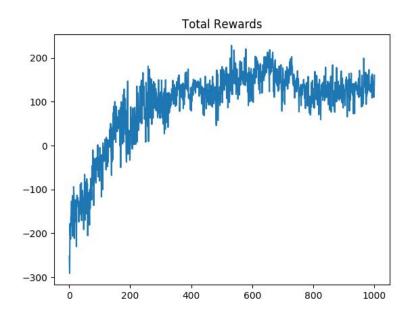
Actor-Critic 方法

Algorithm 2 Actor-Critic

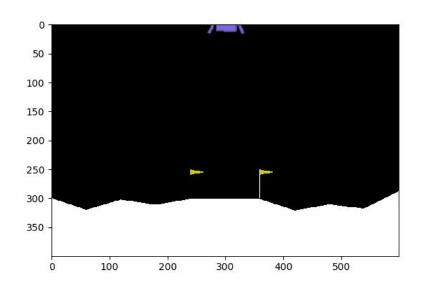
```
function REINFORCE WITH BASELINE
    Initialize policy parameters \theta
    Initialize baseline function parameters \phi
    for each episode \{s_1, a_1, r_1, \dots, s_T, a_T, r_T\} \sim \pi_{\theta} do
        for t = 1 to T do
             Calculate discounted reward R_t = \sum_{i=t}^{T} \gamma^{i-t} r_i
             Estimate advantage A_t = R_t - b_{\phi}(s_t)
             Re-fit the baseline by minimizing ||b_{\phi}(s_t) - R_t||^2
             \theta \leftarrow \theta + \alpha \nabla_{\theta} \log \pi_{\theta}(a_t|s_t) A_t
        end for
    end for
    return \theta
end function
```

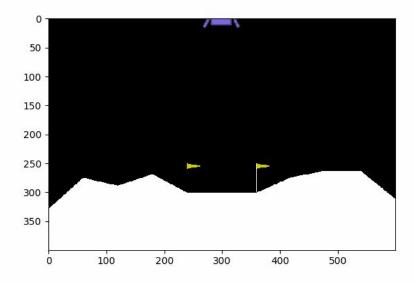
範例結果





範例展示





繳交項目

GitHub 上的 hw15-<account> 裡必須包含以下檔案:

- 1. Python 程式碼
- 2. 報告
 - 報告內容請參見<u>報告範本</u>
 - 以 PDF 格式繳交
 - 請命名為 report.pdf

注意事項

- 本次作業以報告為評分標準,所有圖表、表格等請貼在報告當中以利評分
- 所有作業相關問題請在 FB 社團貼文或是寄信至助教信箱,並於信件主題處註明:[HW15]