Meta Reinforcement Learning

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***Abstract*—Meta reinforcement learning is a research area of reinforcement learning. It applies meta learning approaches on reinforcement learning tasks to generalize the training result of reinforcement learning and adapt it to unseen tasks. Currently, multiple meta reinforcement learning methodologies are being researched, such as optimization-based approach, hyperparameter-based approach and so on. In this report, we first provide some fundamental knowledge about meta reinforcement learning. Then we give an overview of state-of-the-art meta reinforcement learning algorithms. Finally, a couple of algorithms are discussed in detail and their experimental results are also presented.**

Disclaimer: Section...by Ruoeheng Ma and Section...by Meng Zhang.

I. Introduction

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II. Fundamental Knowledge

In this section, we provide some fundamental knowledge for ease of understanding the algorithms discussed in the following sections.

A. Formulation of Reinforcement Learning and Meta Learning

In reinforcement learning, a value function

$$G_t =$$

no predefined value function is provided to tell the score of an action. In practice, a proxy of the true value function, known as a *return*, is used for estimation and optimization for the value function.

B. Hyperparameter

C. empty

III. Meta-Gradient Reinforcement Learning

One of the algorithm in meta reinforcement learning is the meta-gradient reinforcement learning introduced in [1] by Google DeepMind. This algorithm treats the discount factor γ and the bootstrapping parameter λ, which are discussed in section slowromancapii@, as meta-parameter $\eta = \{\gamma, \lambda\}$ to tune the return function.

IV. MAML

V. Conclusion

The conclusion goes here.

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References

[1] Zhongwen Xu, Hado van Hasselt and David Silver, *Meta-Gradient Reinforcement Learning*. URL:https://proceedings.neurips.cc/paper/2018/file/2715518c875999308842e3455eda2fe3-Paper.pdf