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Survey - Asynchronous Methods for Reinforcement Learning

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Abstract This paper aims to address the issue of often high computational requirements for Reinforcement Learning application by validating techniques introduced by asynchronous methods. First go over the general principle and the motivation behind asynchronous methods. Brief history when asynchronous where used for RL the first time. Next cover the theory of techniques of shared weight updates.Taking technical challenges into account such as process communication and memory requirements. Description and discussion of the super-linearity phenomena when using asynchronous methods. Discuss application areas for asynchronous methods and advantages and potential problems when using them.

Keywords Reinforcement Learning · Asynchronism · Super-linearity

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Introduction

Try to give proof for this phenomena otherwise rely on empirical experiments

1 Introduction

From a historical perspective asynchronous have appeared very early in the research. One of the earliest use cases of asynchronous methods for RL was in the context of Dynamic Programming with a technique called Prioritized Sweeping -¿ Reference. *-¿ shortly go over Dynamic Programming*

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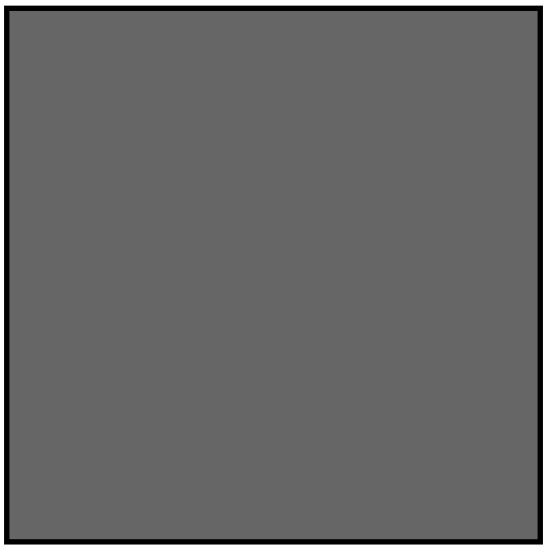

Fig. 1 Please write your figure caption here

Your text comes here. Separate text sections with Motivation History Theory Mathematical Formulation

2 Superlinearity phenomena

Text with citations [2] and [1].

2.1 Applications

Describe application areas Asynchronous learning with multiple agents Swarm robots

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Paragraph headings Use paragraph headings as needed.

$$a^2 + b^2 = c^2 \tag{1}$$

3 Conclusion

Advantages when using async updates Disadvantage problems, limits for using asynchronous methods

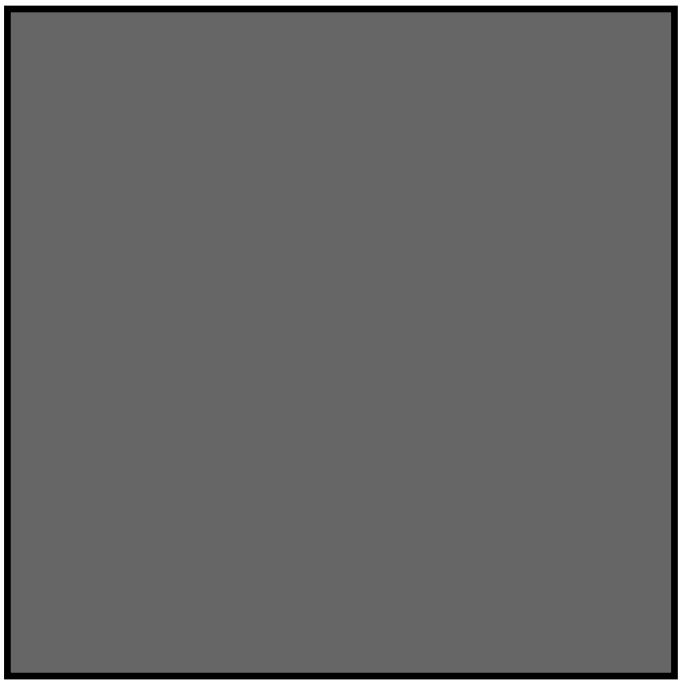

Fig. 2 Please write your figure caption here

Table 1 Please write your table caption here

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References

1. Author, Article title, Journal, Volume, page numbers (year)
2. Author, Book title, page numbers. Publisher, place (year)