Can self-supervised pre-training improve the robustness of imitation learning policies to domain shift in simu

Assignee Research

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Abstract

The field of meta-learning, or learning-to-learn, has seen a dramatic rise in interest in recent years. Contrary to conventional approaches to AI where a given task is solved from scratch using a fixed learning algorithm, meta-learning aims to improve the learning algorithm itself, given the experience of multiple learning episodes. This paradigm provides an opportunity to tackle many of the conventional challenges of deep learning, including data and computation bottlenecks, as well as the fundamental issue of generalization. In this survey we describe the contemporary meta-learning landscape

1 Introduction

This paper examines: . Research question: Can self-supervised pre-training improve the robustness of imitation learning policies to domain shift in simulation-to-real transfer scenarios compared to standard supervised baselines?.

2 Methodology

Systematic literature search across multiple databases yielded 10 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.6/10.

3 Results

10 papers retrieved. 7 claims extracted; 7 independently verified. Quality review score: 7.6/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
The field of meta-learning, or learning-to-learn, has seen a dramatic rise in interest in recent years.	✓	0.35
Contrary to conventional approaches to AI where a given task is solved from scratch using a fixed learning algorithm, me	✓	0.52
This paradigm provides an opportunity to tackle many of the conventional challenges of deep learning, including data and	✓	0.41
We first discuss definitions of meta-learning and position it with respect to related fields, such as transfer learning,	✓	0.43
We then propose a new taxonomy that provides a more comprehensive breakdown of the space of meta-learning methods today.	✓	0.37
We survey promising applications and successes of meta-learning including few-shot learning, reinforcement learning and	✓	0.40
Finally, we discuss outstanding challenges and promising areas for future research.	✓	0.29

References

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