A Motion Capture and Imitation Learning-Based Approach to Robot Control

A Preprint

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June 19, 2022

Abstract

Imitation Learning is a discipline of Machine Learning primarily concerned with replicating the behaviour of agents that are known to solve a particular task or family of tasks in a demonstration data set. In an industrial robotics context this presents the opportunity to replace explicit programming of behaviour with demonstrations of the task to be performed. Motion capture is one of the methods with which such demonstrations can be collected. It offers lesser model complexity compared to more indirect approaches such as ones based on visual data, yet requires additional data pre-processing if signals beyond effector position and orientation are relevant to the task at hand. In this paper, an approach for motion capture-based imitation learning and implicit control signal estimation is introduced and evaluated on an object throwing task.

Keywords Imitation Learning · Motion capture · Robotics · Artificial neural networks · RNN

1 Introduction

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1.1 Motivating use case

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1.2 Related Work

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asgasgasgagsagaga asg

2 Materials and Methods

See Section 2.

2.1 Data collection

bla bla bla

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2.2 Pre-processing, extraction of implicit control signals

bla bla bla

2.3 Models

bla bla bla

2.4 Visualization and execution

bla bla bla

2.5 Evaluation metrics

bla bla bla

3 Results

bla bla bla

4 Discussion

bla bla bla

5 Examples of citations, figures, tables, references

5.1 Citations

Citations use `natbib`. The documentation may be found at

`http://mirrors.ctan.org/macros/latex/contrib/natbib/natnotes.pdf`

Here is an example usage of the two main commands (`citet` and `citep`): Some people thought a thing [Kour and Saabne, 2014a, Hadash et al., 2018] but other people thought something else [Kour and Saabne, 2014b]. Many people have speculated that if we knew exactly why Kour and Saabne [2014b] thought this...

References

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Guy Hadash, Einat Kermany, Boaz Carmeli, Ofer Lavi, George Kour, and Alon Jacovi. Estimate and replace: A novel approach to integrating deep neural networks with existing applications. *arXiv preprint arXiv:1804.09028*, 2018.

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