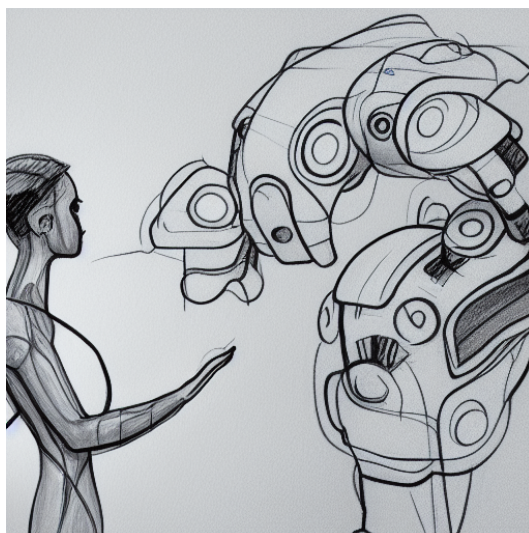


Towards Interactive Social Artificial Agents

Formation and Exploitation of Cultural Models in

Autonomous Artificial Agents



By **Tristan Karch**

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Abstract

Introduction

We can think of two approaches to this problem: developmental approaches, in particular developmental robotics, and reinforcement learning (RL). Developmental robotics takes inspirations from artificial intelligence, developmental psychology and neuroscience to model cognitive processes in natural and artificial systems ([Asada et al., 2009](#); [Cangelosi & Schlesinger, 2015](#)). Following the idea that intelligence should be *embodied*, robots are often used to test learning models. Reinforcement learning, on the other hand, is the field interested in problems where agents learn to behave by experiencing the consequences of their actions under the form of rewards and costs. As a result, these agents are not explicitly taught, they need to learn to maximize cumulative rewards over time by trial-and-error ([Sutton & Barto, 2018](#)). While developmental robotics is a field oriented towards answering particular questions around sensorimotor, cognitive and social development (e.g. how can we model language acquisition?), reinforcement learning is a field organised around a particular technical framework and set of methods.

Part I

Formation of Cultural Models

Chapter 1

Foundations: Emergence of Communication in Population of agents

1.1 Language Games

1.2 Communication in Multi-Agent Reinforcement Learning

Chapter 2

Learning to Guide and to Be Guided in the Architect-Builder Problem

2.1 Motivations

2.2 The Architect-Builder Problem

2.3 ABIG: Architect-Builder Iterated Guiding

2.4 Experiments

Chapter 3

Emergence of Graphical language

3.1 Motivations

3.2 Graphical Referential Games

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Part II

Exploitation of Cultural Models

Chapter 4

Foundations: Vygotskian Autotelic Artificial Agents

4.1 Socio-cultural Interaction

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Chapter 5

Grounding Spatio-Temporal Language with Transformers

5.1 Motivations

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Chapter 6

Language as a Cognitive Tool to Imagine Goals in Curiosity Driven Exploration: IMAGINE

6.1 Motivations

6.2 Playground

6.3 Imagine

6.4 Experiments

Chapter 7

Conclusion

Conclusion goes here.

Appendices

Appendix A

First app

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