

Flexible Learning Reading Group @TU Berlin

5th Session: 23rd of October 2019

Machine behaviour

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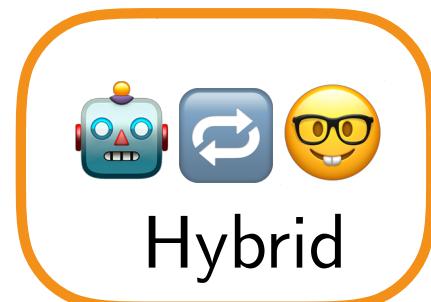
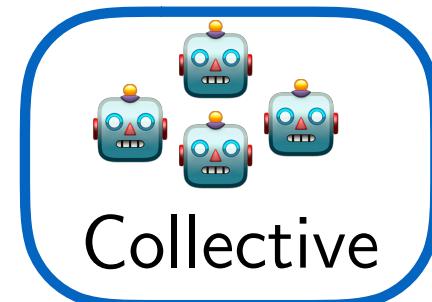
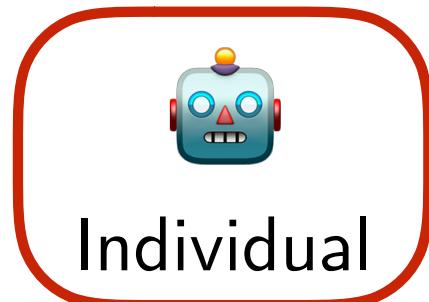


Mechanism

Develop

Function

Evolution

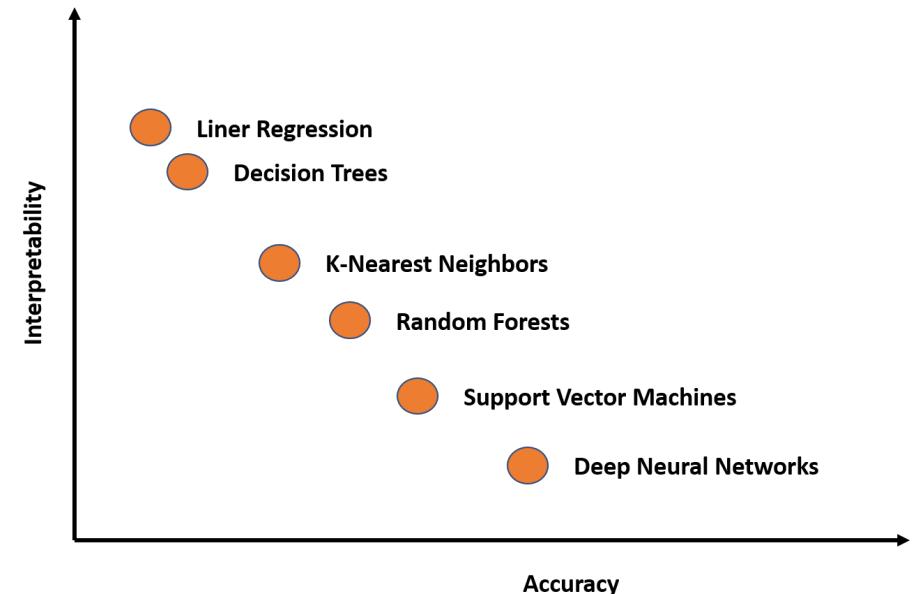


Key Claim & Motivation

Ubiquity



Complexity



Towards an „Artificial Science“
Empirical Treatment of Machine Behaviour

An Integrative Ethology Approach

Mechanisms

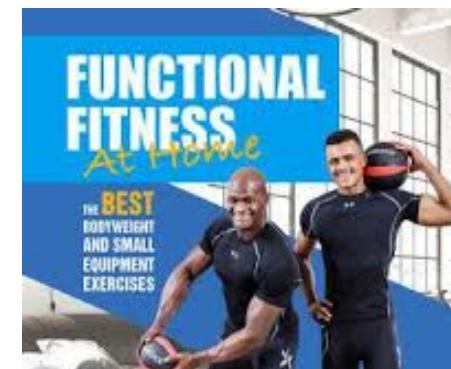


Development

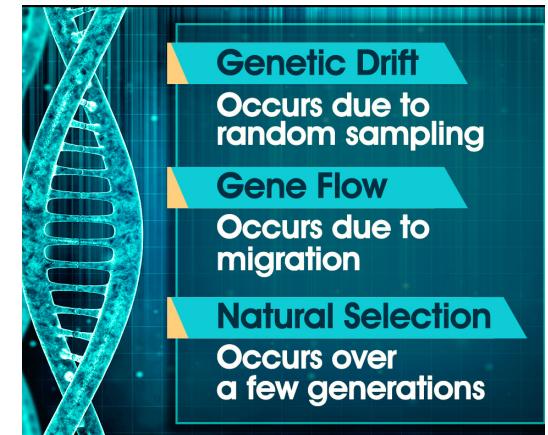


(a) Continuous Development

Function



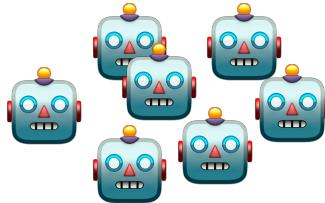
Evolution



Scales of Inquiry



Individual



Collective



Hybrid

1 Algorithm
Itself

2 Within-
Machine

3 Between-
Machines

1 Machine
Interactions

2 Local vs
Global

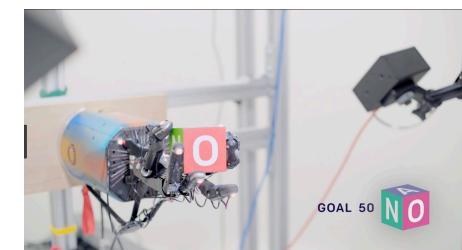
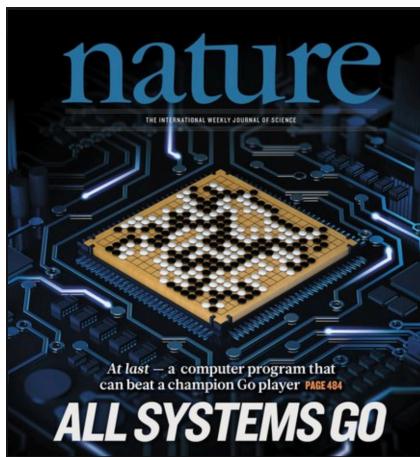
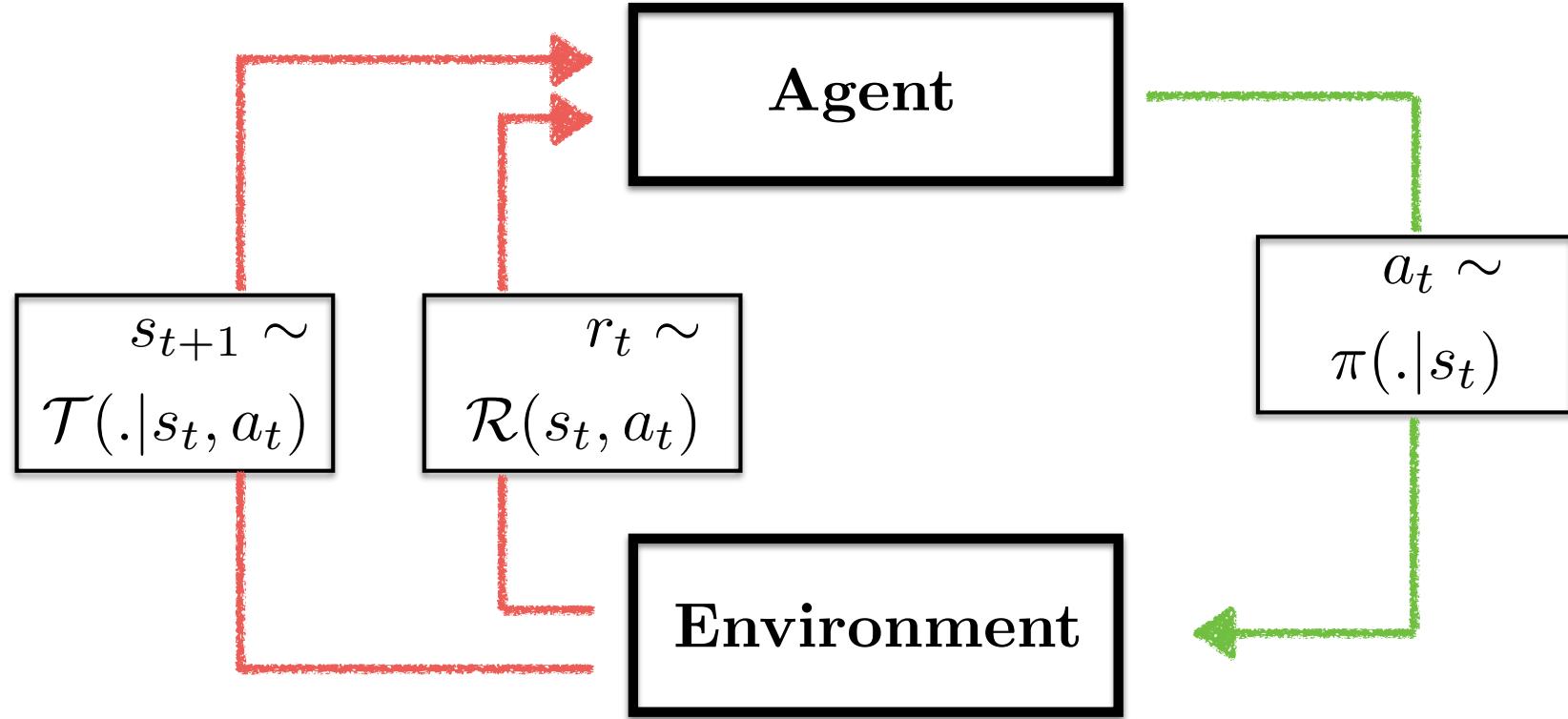
3 Language
Emergence

1 Human to
Machines

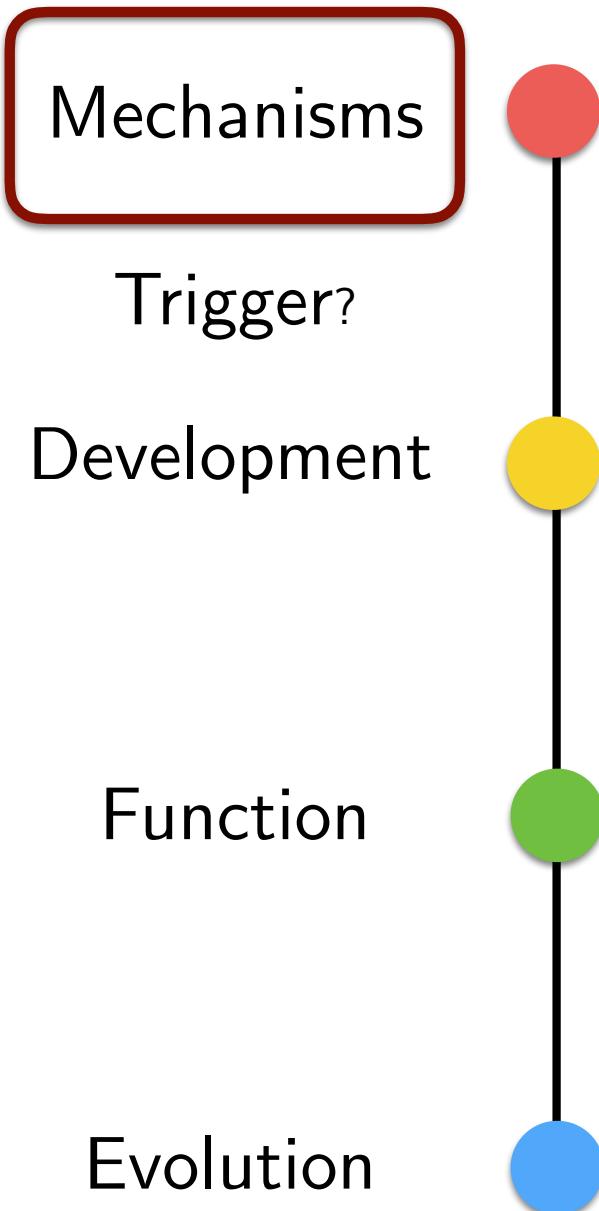
2 Machines to
Humans

3 Enhance
vs Replace

Current Reinforcement Learning Research

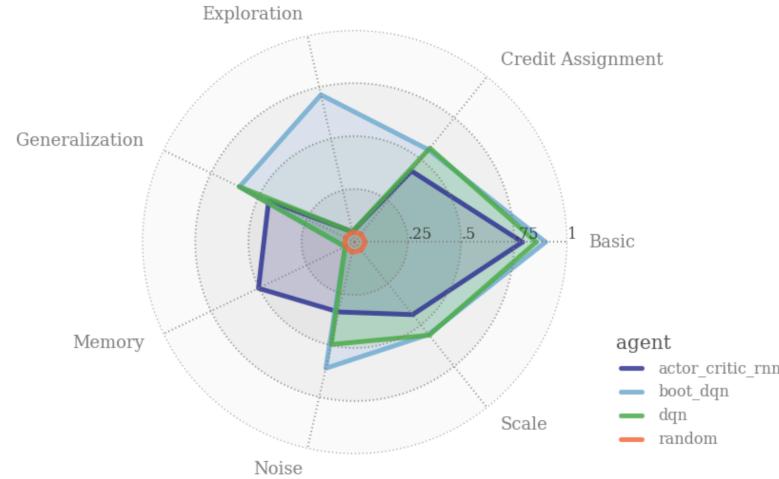


... A Deep RL Perspective



Deepmind 19' - Behaviour Suite

Behaviour Suite for Reinforcement Learning (`bsuite`)



Animal-AI Olympics 19'



... A Deep RL Perspective

Mechanisms



Development



Acquisition?



Function

Evolution

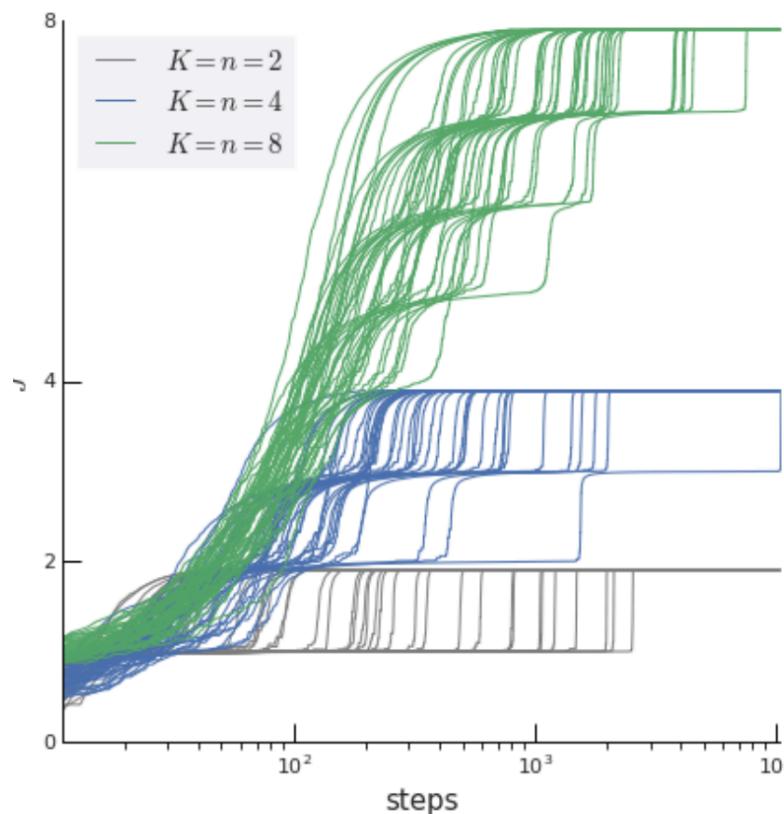


2019-04-25

Ray Interference: a Source of Plateaus in Deep Reinforcement Learning

Tom Schaul^{1,*}, Diana Borsa¹, Joseph Modayil¹ and Razvan Pascanu¹

¹DeepMind, *Corresponding author: tom@deepmind.com



... A Deep RL Perspective

Mechanisms



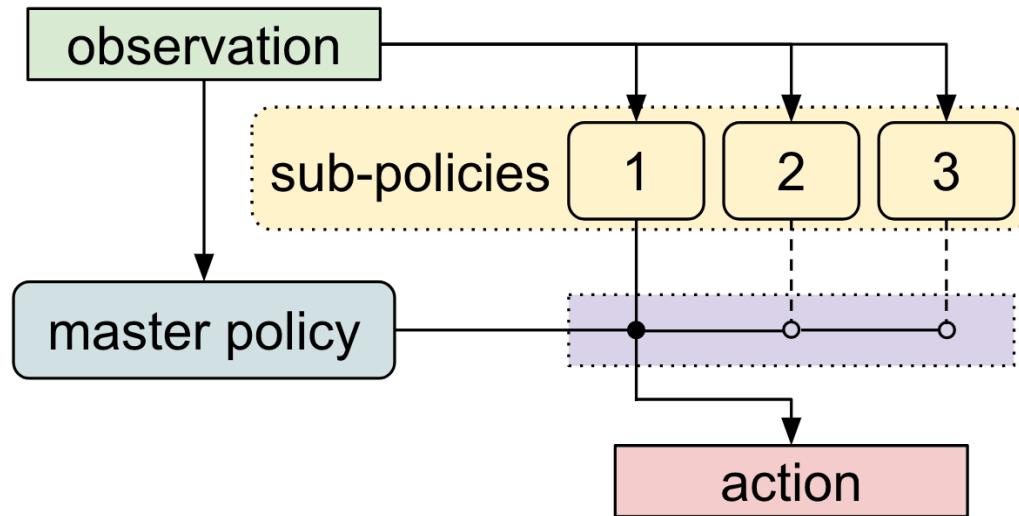
Development

Function

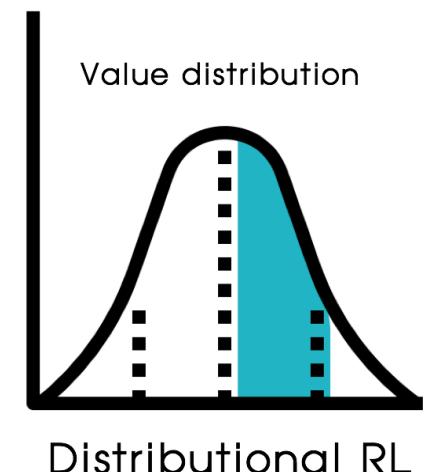
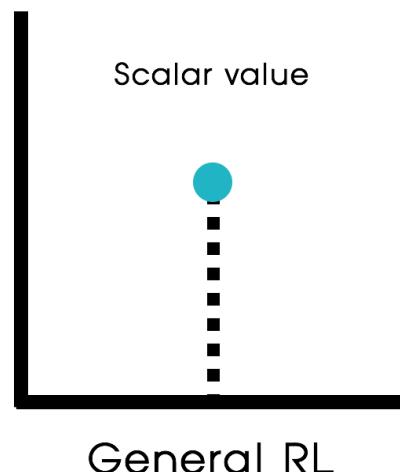
Contribution?

Evolution

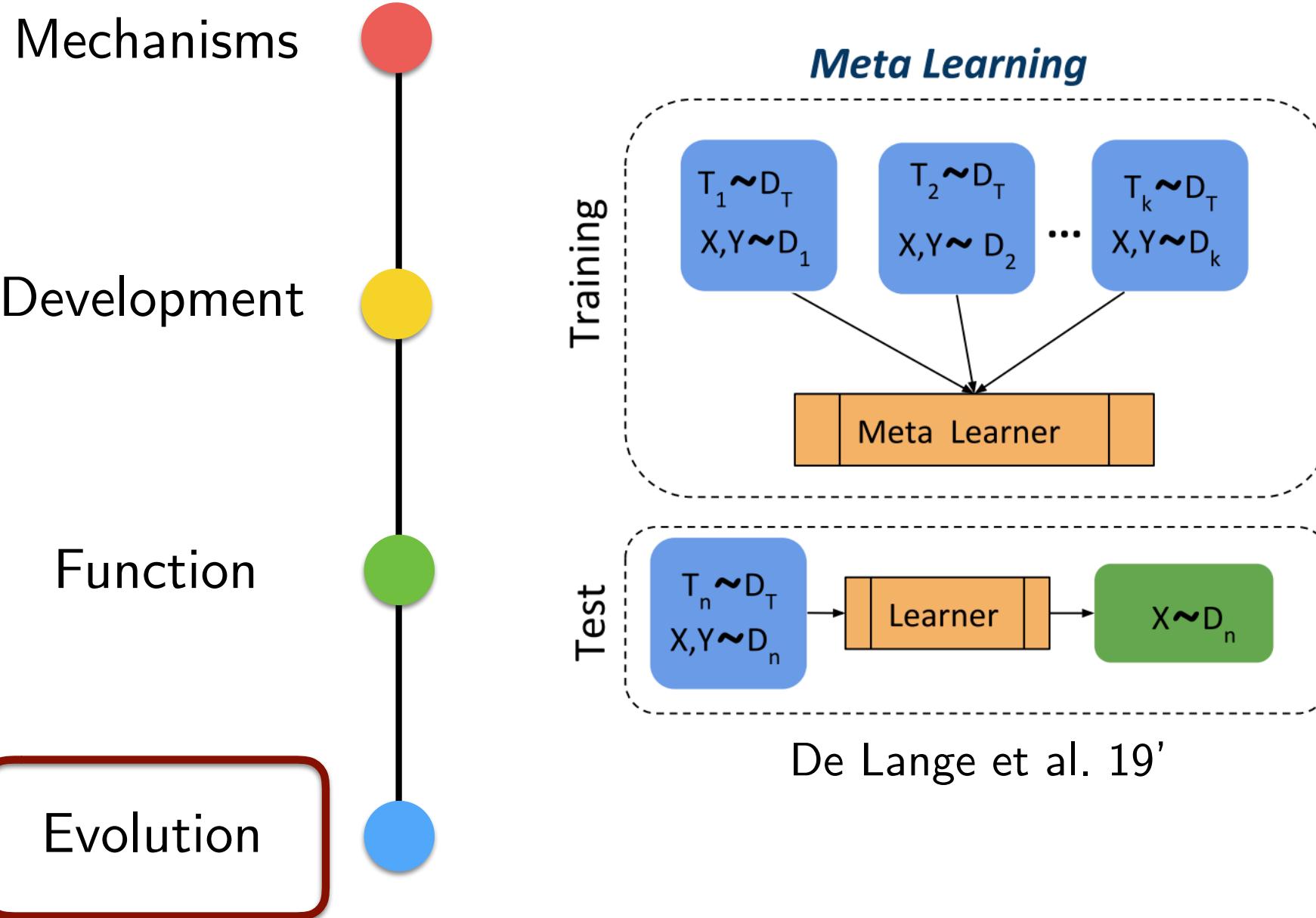
Hierarchical RL



Distributional RL



... A Deep RL Perspective



Responsibility
-> Study

**Training Data
Importance**

**Machines not
Humans/Animals**

**Key Take-Aways
& Thoughts**

**Fundamental
Legal & Ethics Qs**

**Causality/
Experiments
Required**

**Cross-Disciplinary
Challenge/
Opportunity**

Session 6: 6th of November 2019 (Wednesday!)

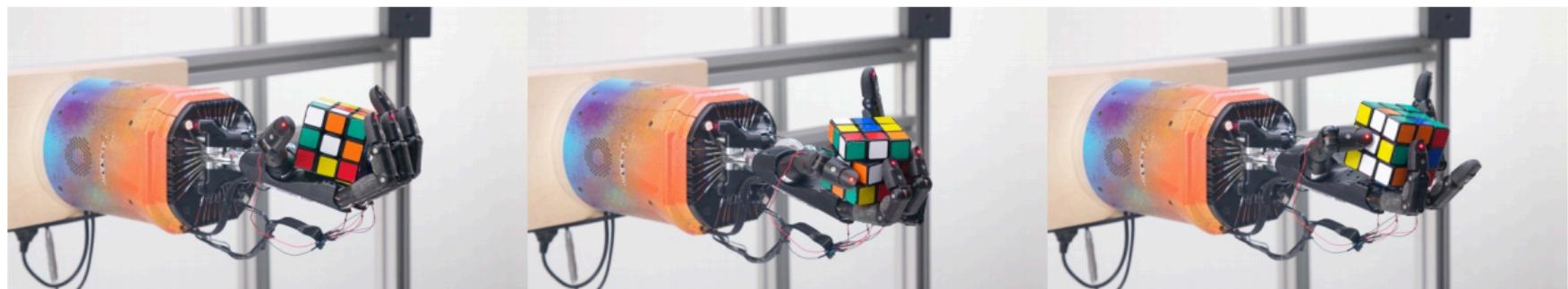
SOLVING RUBIK'S CUBE WITH A ROBOT HAND

A PREPRINT

OpenAI

Ilge Akkaya,* Marcin Andrychowicz,* Maciek Chociej,* Mateusz Litwin,* Bob McGrew,* Arthur Petron,*
Alex Paino,* Matthias Plappert,* Glenn Powell,* Raphael Ribas,* Jonas Schneider,* Nikolas Tezak,*
Jerry Tworek,* Peter Welinder,* Lilian Weng,* Qiming Yuan,* Wojciech Zaremba,* Lei Zhang*

October 17, 2019



Or your favourite new paper ;)