AGENTS OF HABIT

REFINING THE ARTIFICIAL LIFE ROUTE TO ARTIFICIAL INTELLIGENCE

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1 Introduction

MAIN PROPOSAL
Habits as the departure point for understanding and modeling intelligent behavior.

HABITS

Biology - life → Psychology -mind

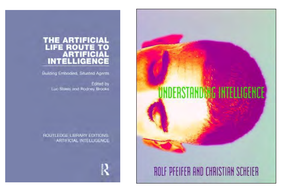
The notion of habit "holds the potential to become a blending category between the biological and the psychological" (Egbert & Barandiaran, 2014, p. 2).

2 Intelligence

Prevailing view in AI

Abstract, in-the-head, "higher-order" cognitive capacities that depend on internal models and inferential reasoning.

Artificial Life: reconceptualization of intelligence



Adaptive behavior of embodied and situated agents in open-ended, complex environments.

Radical Embodied Cognitive Science

Explain "Higher-order" cognition in terms of adaptive sensorimotor interactions of an embodied autonomous agent with its changing environment.

Mental skills as "enactive, non-representational forms of embodied coping that emerge from a pre-predicative perceptual ordering of differentiations and similarities" (Gallagher, 2017, p. 202).

→ Result from the formation and deployment of a repertoire of habits

3 Habits and relevance

Commonsense knowledge

Orthodox AI
A set of beliefs representing what an agent thinks to be true about the world (know-that).
More propositional knowledge + larger inference capacities

ALife route
Practical knowledge (know-how) provided by a self-organized, adaptive network of habits.

HABITS open up a space of action possibilities:
- relevance is not an extra ingredient that a designer has to incorporate or an artificial agent has to infer based on a representation of a previously neutral environment.
- relevance arises from a history of sensorimotor interactions.

Processes of habit formation and refinement
- incorporate past experience into its present acts (plasticity of the body);
- pragmatic awareness of the action possibilities;
- incorporation of sociocultural norms;
- anticipation of upcoming events;
- foreseeing of consequences of actions.

Sensorimotor autonomy

HABITUAL IDENTITIES
Sensorimotor processes self-organize in autonomous networks that give rise to an identity in the sensorimotor domain.

Habits constitute the self: "we not only *have* habits, but *are* habits" (Carlisle, 2006, p. 20).

A cognitive self emerges out of the self-organization of a network of habits (Barandiaran, 2008; Di Paolo, 2005; Di Paolo et al., 2017, Ramírez-Vizcaya & Froese, 2019).

Sensorimotor agents make sense of their environment and regulate their interactions with it based on the preservation of their habitual ways of life.

4 Conclusions

What might be needed for building an agent capable of common sense is a self-sustaining, autonomous network of habits from which a cognitive self can emerge.

"A design process is now transformed into the design of the right conditions (appropriate material substrate and organization) for an autonomous identity to constitute itself" (Di Paolo & Iizuka, 2008, p. 410).

Acknowledgments:
SR-V was supported by the Okinawa Institute of Science and Technology Graduate University (OIST).

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