A Criticism of the Conception of Ecological Rationality

Daniel Hsi-wen Liu (hwliu@pu.edu.tw)
Division of Humanities, Providence University
200 Chung-Chi Rd, Shalu, Taichung County 433, Taiwan

The embedded and embodied nature of cognition has been noticed in the 1990s, and has gradually more discussions in philosophy. Discussions centre around the idea that representations are dispensable to a certain extent in the modelling and explanation of cognition (Brooks, 1991; Clark, 1998; Clark & Grush, 1999; Keijzer, 1998; Wheeler and Clark, 1999). Recently, discussions of this nature proceed to explaining the mechanisms of organisms' adaptive flexibility in the ecological niche. The embedded characters of cognition are subtly explored in the notion of 'ecological rationality' (Bullock and Todd, 1999). An interactive-constructive (I-C) approach to modelling intelligence is recently raised, to take into account the dynamical embodied form of adaptiveness (Christensen & Hooker, 2000). This project follows the above trend of discussion but criticises the discussions of organisms' adaptive flexibility.

The primary target of criticism is Christensen & Hooker's (2000) vague account, against which this research will criticise that it begs the question: how is their notion of a 'capacity of coherent, context-sensitive, self-directed management of interaction' carried out on the basis of simple automata? To answer this question will this project argue that the embodied dynamics of cognition is maintained through the recurrent loops of external assessment and internal modification, with a view to manifesting the autopoietic unity of a system's factors, which is originally evident in the maintenance of life. 'Interactive skill construction' is a notion to which Christensen & Hooker (2000) resort in support of the process of 'anticipative skill construction'. At this point they also beg a question: how is self-directed anticipation constructed if no notion of self can be presumed in the cognitive systems? While Christensen & Hooker (2000) see their account as a primary model for cognitive learning, instead will I research in the context of perception, where no obvert functionality of self-control is as evident as learning. With this research will I put their notion of self-directed anticipation in a better profile of explanation.

The explanation envisaged in this research will be cast in terms of stepwise exploitation of environmental information on the basis of inherent a priori representations of the ecological niche. Conceptions that appear in Bullock and Todd (1999) are mainly the domain of decision-making, while I will argue grounded on the domain of perception. Largely against the aforementioned trend of embodied and embedded approach to cognition, but responding to Wheeler and Clark (1999), in this project will I argue for the importance of representations in the embodied and embedded capacities of cognition. On the top of Wheeler and Clark (1999), the previous discussion in this project has provided significant amount of argument, which would in turn bridge a link between representation and the embodied and embedded characters of cognition. With the above argument, this project will criticise Christensen & Hooker (2000) and consequently help the aforementioned trend of embodied and embedded cognition to move ahead.

The main idea of my criticism is that higher-level representations provide guidance in support of low-level organism, while low-level real-time adaptive activities serve to mandate system's processes. Hence the ecological rationality is recurrent between higher and lower level of representations.

References

Brooks, R. A. (1991). Intelligence without representation. *Artificial intelligence*, *47*: 139-160.

Bullock, S., & Todd (1999), Made to Measure: Ecological Rationality in Structured Environments. *Minds and Machines*, ***9***: 497-541

Christensen, W. D., & Hooker, C. A., (2000), An interactivist-constructivist approach to intelligence : self-directed anticipative learning. *Philosophical Psychology*, ***13***(1): 5-45

Clark, A. (1998) Twisted tales: Causal complexity and cognitive scientific explanation. *Minds and Machines* **8:** 79-99**.**

Clark, A., & Grush, R., (1999). Towards a Cognitive Robotics *Adaptive Behavior 7(1): 5-16.*

Keijzer, F. A. (1998) Doing without representations which specify what to do. *Philosophical Psychology*, Vol. 11, No. 3, pp. 269-302.

Wheeler, M. & Clark, A. (1999). "Genic Representation: Reconciling Content and Causal Complexity", *British Journal for the Philosophy of Science*,. ***50***: 103-135.