

Chapter 7.9

Noble Ape's Cognitive Simulation: From Agar to Dreaming and Beyond

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ABSTRACT

Inspired by observing bacterial growth in agar and by the transfer of information through simple agar simulations, the cognitive simulation of Noble Ape (originally developed in 1996) has defined itself as both a philosophical simulation tool and a processor metric. The Noble Ape cognitive simulation was originally developed based on diverse philosophical texts and in methodological objection to the neural network paradigm of artificial intelligence. This chapter explores the movement from biological observation to agar simulation through information transfer into a coherent cognitive simulation. The cognitive simulation had to be tuned to produce meaningful results. The cognitive simulation was adopted as processor metrics for tuning performance. This

“brain cycles per second” metric was first used by Apple in 2003 and then Intel in 2005. Through this development, both the legacy of primitive agar information-transfer and the use of this as a cognitive simulation method raised novel computational and philosophical issues.

ARTIFICIAL LIFE, NOBLE APE AND AGAR

There is no coherent, universally accepted history of artificial life. The term artificial life was coined by Christopher G. Langton in the late 1980s (Langton, 1997). From the late 1980s to the early 1990s a number of popular and academic books covered the topic of artificial life either as a surveying of the art (Emmeche, 1991; Levy, 1992) or covering the author's particular interests in artificial life (Dawkins, 1987). Contemporary

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practitioners of artificial life tend to attribute one of these books as the basis for their development - Dawkins' *Biomorphs* (1987) or Dawkins' inspired possibilities (Ventrella, 2005; Barbalet & Stauffer, 2006; Barbalet & De Jong, 2007) or Sims' *Blockies* (1994) (Barbalet & Klein, 2006). Dawkins, Sims and the inspired practitioners' simulations were based on genetic algorithms.

Noble Ape was framed in the broadest possible surveying of these books. No particular book was the focused basis for the development. In fact, Dawkins' earlier work (1976) was considered over Dawkins' later work (1987) with regard to the social framing of Noble Ape. Without any guiding artificial life text, the foundational theme of Noble Ape was that artificial life empowered the developer to take from any area of interest and assemble a testable simulation environment to see how these theories inter-played. This was a view born in isolation.

In 1996, the open source Noble Ape Simulation was created to produce a rich biological environment and to simulate the movement and cognitive processes of the Noble Apes, a sentient ape-like creature that wandered through the simulated environment (Barbalet, 2005c). One of the primary interests of the Noble Ape Simulation was the development of simple societies and whether the environment could contribute to the structure of the societies created. Would a harsh environment with limited food and water create an authoritarian society? Would an environment teeming with food and water produce a casual and contemplative society? What would happen through transitions of famine or war? How would the societies develop through these experiences?

If there was a seminal theme through the original development of Noble Ape it was through the ideas of Logical Atomism (Russell, 1956). These ideas were not developed in the age of contemporary computing however they appeared applicable through the description of sense-data processing and the idea of atomic sense information. Logical Atomism presented the idea that

sense data was provided in discrete processable quantities. Through providing sense data over time, the development of a coherent self could be generated. These ideas were further refined in Noble Ape Philosophic (Barbalet, 1997) into a coherent means of taking the external world and making an internal created representation. It is important to note that this internal representation can be without observable reference in terms of relationships between the external information (or the sense data presentation of the external information) and the internal representation. This still gave no indication of the method of processing. In terms of the cognitive simulation it defined vision (shorthand for all external sense data), the identity which was the material of the cognitive simulation, fear and desire. Fear and desire were the two operators that acted on the identity to manipulate the vision information over time.

The artificial life project closest to Noble Ape was PolyWorld (Yaeger, 1994). Like Noble Ape, PolyWorld was an example of the "intelligent agents in a simulated environment" class of artificial life simulations. Although the projects were completely independent, they shared a number of the same high-level concepts - computational genetics, physiology, metabolism, learning, vision and behavior.

The primary distinctions between Noble Ape and PolyWorld related to two components. Noble Ape contained a more detailed simulated environment, including an undulating topography, a changing weather simulation and a biological simulation containing a diversity of simulated flora and fauna. The other distinction, and the subject of this chapter, was the means of simulating the intelligent behavior of the agents. PolyWorld used a neural network model of intelligence. Noble Ape did not.

The motivation not to use a neural network intelligent agent model in Noble Ape was due to Kirsh (1991). Kirsh asserted that simple processes could provide "concept-free" intelligence which was shared through all intelligent life from simians

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