Chapter 2


Jordi Vallverdú
Universitat Autònoma de Barcelona, Spain

Max Talanov
Kazan federal University, Russia

ABSTRACT

The purpose of this chapter is to delineate a naturalistic approach to consciousness. This bioinspired method does not try to emulate into a 1:1 scale real mechanisms but instead of it, we capture some basic brain mechanisms prone to be implemented into computational frameworks. Consequently, we adopt a functional view on consciousness, considering consciousness as one among other cognitive mechanisms useful for survival purposes in natural environments. Specifically, we wish to capture those mechanisms related to decision-making processes employed by brains in order to produce adaptive answer to the environment, because this is the main reason for the emergence and purpose of consciousness.

INTRODUCTION

The purpose of this chapter is to delineate a naturalistic approach to consciousness. This bioinspired method does not try to emulate into a 1:1 scale real mechanisms but instead of it, we capture some basic brain mechanisms prone to be implemented into computational frameworks. Consequently, we adopt a functional view on consciousness, considering consciousness as one among other cognitive mechanisms useful for survival purposes in natural environments. Specifically, we wish to capture those mechanisms related to decision-making processes employed by brains in order to produce adaptive answer to the environment, because this is the main reason for the emergence and purpose of consciousness (Ross, 2010; vanGaal et al 2012). From an evolutionary perspective, consciousness is cognitive mechanism useful for self-evaluation processes as well as for taking somehow elaborated decisions and managing attention processes (Damasio, 1999; Taylor, 2010). Thanks to the neuromodulators involved into attention processes, we can establish a clear connection between neuromodulatory activities and consciousness emergence (Montemayor & Haladjian, 2015). Despite of the previous ideas, in no case we suggest that consciousness is the highest and privileged way to manage multi-haptic data received by an organism. It is one of the several ways that employs the brain to process valuable information, although it is clear that consciousness owns several self-monitoring mechanisms and usually it makes possible to guide the whole system towards a required action.

We propose the crucial mechanism for emotional information processing, the neuromodulation, which must be placed into the multi-dimensional architecture of the cognition. The neuromodulators influence several emotional, intentional and processing mechanisms in the brain. For example: the presence of the DRD4 (the gene of dopamine receptor D4) is involved in subtle, and complex behavior. We use the naturalistic approach to consciousness and its emergence that is related to the active and determinant role of neuromodulators and we propose modeling consciousness emergence pathways. Our research is oriented towards the design of multi-dimensional cognitive systems into AI research. Some of our previous results (from NEUCOGAR project Vallverdu et al, 2016) are presented here as validation of our foundational ideas in the field.

THE DEBATES ON THE MEANING OF WORD ‘CONSCIOUSNESS’

David Chalmers’ Online database on consciousness is exhaustive and “monumental” (http://consc.net/online), indicating the great interest for this topic, expressed by philosophers, psychologists, neurologists, anthropologists or computer scientists.
Co-Evolving Better Strategies in Oligopolistic Price Wars
[www.igi-global.com/chapter/evolving-better-strategies-oligopolistic-price/21167?camid=4v1a](www.igi-global.com/chapter/evolving-better-strategies-oligopolistic-price/21167?camid=4v1a)

Simulation and ABC to Improve the Performance of Emergency Department
Abbas Al-Refaie, Mohammed Shurrab and Ming-Hsien Li (2012). *International Journal of Artificial Life Research* (pp. 15-31).