

GUEST EDITORIAL PREFACE

Special Issue on the Semiosis of Cognition: Insights from Natural and Artificial Systems

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At the core of this special issue of the IFSSS is the concept of semiosis and the role it plays in cognition.

Cognition is here conceived as an embodied, embedded and always situated phenomenon not only emergent in organisms, such as mammals, but rather the capability of every living or artificial system to enrol with its environment in an essential dialectic relationship. This means it involves a cognitive entity endowed with a particular physical architecture interacting with the specific world it is immersed in, producing a semiosis that, according to the observer, defines events anchored in space/time structuring and giving substance to the entity's developmental and evolutive narrative.

By focusing on the role played by semiosis in the cohesion and sustainability of the microcosms defined by cognitive entities and their constructed worlds, the present issue takes an interdisciplinary stance that comprehends insights from the natural and artificial worlds. The diversity of worlds in this issue is representative of the richness of the topic and, simultaneously, of the increasing importance of studying the semiotic processes. Technologies

are invading the social space at an increasing pace, forcing scientific research to address the artificial semiosis.

In Biological Self-Organisation, Guenther Witzany points out that biological organisation was long assumed to represent mechanical cause and effect reactions on a quantum theoretical basis following the laws of thermodynamics. However, current empirical data show that an abundance of signaling molecules serve as information carriers in the exchange of information between biological agents evidencing, this way, the semiotic processes that are inherent in the interactions of cells, tissues, organs and organisms in the biological processes, involving all domains of life.

In Self-Organization and Semiosis in Jazz Improvisation, Walton, Richardson and Chenero refer the particular way two self-organized systems that become closely coupled define a teleodynamic system where each works to maintain the mutual constraints. The authors compare the dynamics of this system to the semiotic exchange between two improvising jazz musicians. According to the authors, this also forms a teleodynamic system where

musicians expend energy that constrains each other's sign behavior. This self-organization framework allows for new insight into developing theories of musical semiotics to address spontaneous, emergent musical performances. Non-linear time series analyses can provide the tools necessary for explicating the processes of these complex semiotic exchanges.

Claus Emeche in *Robot friendship: Can a robot be a friend?*, highlights the particular nature of human cognition focusing on a specific human interpersonal relationship- friendship. Emmeche points out that distinct forms of friendship as practiced and distinct notions of friendship have been investigated in the social and human sciences and in biology, suggesting a more general conceptualization of friendship as a triadic relation analogous to the sign relation. Based on this, the author inquires how one may conceive of robot-robot and robot-human friendships and how an interdisciplinary perspective upon that relation can contribute to

analyse levels of embodied cognition in natural and artificial systems.

In *The concept of [robot] in children and teens: Some guidelines to the design of social robots*, Ferreira and Sequeira focus on the role played by prototypes in the semiotic process of individuating and assigning an identity to world entities. In this paper, the authors discuss the existence of a prototypical visual mental representation associated to the concept of [robot] in children and teenagers. Based on an extensive survey that aims at determining the best design options from the viewpoint of the children a more fluent child/robot interaction is expected.

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