

GATHERINGS IN BIOSEMIOTICS — 2022



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All photographs in this booklet by Claudio J. Rodríguez Higuera

Editing and typesetting by Claudio J. Rodríguez Higuera.

Design feedback by Pavel Baranek. Language corrections by Tyler Bennett. City information compiled by Ludmila Lacková.

Gatherings in Biosemiotics 2022 organized by Ludmila Lacková, Claudio J. Rodríguez Higuera, Tyler Bennett, Lenka Pivoňková, Pavel Baranek, Libuše Kormaníková, Martina Slenčková, Tereza Dosoudilová, Karel Čapka, Zdeněk Joukl and Barbora Jurková.

For more information, visit biosemiotics.upol.cz.

If you need immediate assistance, please contact us by phone:

Ludmila Lacková: +420 737 197 702

Claudio J. Rodríguez Higuera: +420 731 258 776

Tyler J. Bennett: +420 732 782 669

FROM PROTEINS TO ALGORITHMS: A (BIO)SEMIOTIC APPROACH TO ARTIFICIAL INTELLIGENCE

Vinicius Romanini | Ludmila Lacková

University of São Paulo, BR | Palacký University in Olomouc, CZ

After nearly three decades of a 'winter,' artificial intelligence based on neural networks (NN) has been warmed up by big data and now seems in a spring mood. There are great expectations that an all-purpose general machine based on multi-layered NN will be capable not only of 'deep learning,' but also of emulating most – if not all – characteristics of a complex living being, including expression of emotions, action based on moral choices and even aesthetic judgments that would allow it to create art. The definition of intelligence is critical when such claims are made. In the early 60s of last century, Rosenblatt, Minsky and their followers took the biological functioning of the brain as the prototype for building artificial neurons and emulating intelligence. The culminating point was AlphaGo and similar algorithms that can not only 'learn' and master any board game, but also solve many difficult problems in chemical, medical and pharmaceutical fields, such as diagnosis and the synthesis of new molecules. But this is not the final proof of intelligence as envisioned by Alan Turing. Turing was adamant in putting human communication as the highest possible bar in the pursuit of artificial intelligence. We are far from this yet. One mocking dictum among philosophers of mind is that 'intelligence is and always will be whatever a computer cannot do – yet,' which exposes the everlasting difficulty between what C. P. Snow once called the 'two scientific cultures': hard and soft, hard being mathematically minded and soft being humanistic in its nature. Maybe biosemiotics, understood here as the general logic underlying the behavior of living beings, could be of some help in solving this aporia. Biosemiotics is much more about the mind than the brain, meaning that it is much more concerned about the general logic of perception, representation, and communication than the activation threshold of neuron networks and their convergence to a final state. We will propose here a model inspired from protein folding as a minimal syntax for AI, developed based on Peirce's notions of habit and abduction. Since artificial intelligence is taken to be the next turning point in the evolution of human culture, we find it critical that we might be developing something that we do not re-

ally understand. It is not an overstatement to say that this might be a real threat to our civilization. We hope that biosemiotics can contribute to the debate.

References

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