The Different Semiotic Tools
used by Biological and Artificial Intelligence

Victoria N. ALEXANDER
Dactyl Foundation, USA

ÖZET

As researchers work toward developing Artificial General Intelligence (AGI), many setbacks have been encountered. For example, after the initial apparent success of Large Language Models (LLMs) mimicking competent humans answering exam questions or writing letters, LLMs are now known to sometimes produce factually incorrect responses that can be called "hallucinations." However, updated LLMs appear to be improving and the hope is that, with more data and more training, they will improve exponentially with improvements in data processing.

But what if some fundamental assumptions about the nature of intelligence are misguided or incomplete? In this talk, I will critique the reliance upon digital symbols only in artificial intelligence designs. From a Biosemiotics perspective, intelligence depends heavily upon other types of signs, namely icons and indexes, that, unlike symbols, have physical qualities that interact with each other and their physical medium, giving rise to a complexity that is not possible with digital symbols. I will argue that while symbols work well for recording and recalling facts, they are not useful as tools for learning new things.

I will rely upon examples of non-neural cognition in biological systems (Alexander, 2024), which evolved prior to and is simpler than cognition in neural tissue, to illustrate the phenomenon of icon and index sign use for learning new behaviors and adapting to new environments. Basically, biosemiosis can, in part, be attributed to the tendency of living systems to harness self-organized structures and formal properties.

Alexander, V.N. (2024), The creativity of cells: aneural irrational cognition. *Journal of Physiology*, 602: 2479-2489. https://doi.org/10.1113/JP284417.