The Neosentient Model: Information Processing Structures, Sentience, Resilience and Intelligence

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• Theoretical and Foundational Problems (TFP) in Information Studies – Neosentience

The goal is to arrive at a model for an intelligent autonomous learning robotic system via transdisciplinary information processes and information exchanges. The long-term goal of this model is to potentially enable Neosentience to arise via the system's functionality. Research related to this goal is accomplished through the use of an intelligent transdisciplinary database, search engine, a natural language API, a dynamic set of visualization modes, and a series of independent AI collaborators (what we call Micropeers) — *The Insight Engine 2.0* (I_E). Pragmatic benchmarks are used to define Neosentient robotic entities (as opposed to the Turing Test): the system can exhibit well defined functionalities: It learns (enactive approach and others like conversation theory); it intelligently navigates; it interacts via natural language; it generates simulations of behavior; it metaphorically "thinks" about potential behaviors before acting in physical space; it is creative in some manner; it comes to have a deep situated knowledge of context through multimodal sensing (the embodied, embedded approach); and it displays mirror competence. Seaman and Rössler have entitled this robotic entity *The Benevolence Engine*. They state that the inter-functionality of such a system is complex enough to operationally mimic human sentience. Benevolence can in principle arise in the interaction of two such systems. Synthetic emotions would also become operative within the system. The System would be benevolent in nature. The concept of Neosentience (coined by Seaman) was first articulated in the book *Neosentience / The Benevolence Engine by* Seaman and Rössler.[1]

• The 4 Es of Cognition

The goal is to enfold the Embodied, Embedded, Enactive and Extended approaches to understanding cognition in the human, and then seek to articulate the entailment structures that enable this set of dynamic interrelations to function. Because there are many different biological as well as machinic information systems involved in mapping and articulating such processes, this necessitates a new transdisciplinary holistic approach to biological study and its abstraction via biomimetics, to enable entailment structures to be re-applied in defining a model for a Neosentient system (a new branch of AI). The idea is to define a transdisciplinary holistic approach which seeks to examine dynamic, time-based Mind/Brain/Body/Sensing/ Environment relationalities.

• Information Processing Structures, Sentience, Resilience and Intelligence

The initial goal is to make the Insight Engine function in such a way as to "point" to potential new research data across disciplinary boundaries by using advanced information processing, computational linguistics, a Natural language API, and additional forms of AI acting as Micropeers (AI collaborators) to enable intelligent bridging of research questions, and the development of new information paradigms through bisociation (after Arthur Koestler) and poly-association (Seaman). These I_E information systems support researchers, empowering them to access relevant transdisciplinary information from the database, to contribute to the higher order goal over time of articulating a functional Neosentient Model. Such a model is informed from many intellectual perspectives and transdisciplinary conversations facilitated by the I_E system, a listserv, and future information oriented conferences. The Insight Engine embodies a series of intelligent processing structures, visualization systems, the mapping of relationalities related to the corpus of papers, books, media objects, key words, abstracts, diagrams, etc. (initially textually structured with pattern recognition visual and sonic systems later integrated, that will help build and navigate the database) and help outline the articulation of a very new variety of Bio-algorithm – informed by

[1] Rössler, O., Seaman W. (2011) Neosentience / The Benevolence Engine, Intellect Press, London.

the human body. Bio-informatic processing structures are to be abstracted and then re-articulated in a bio-mimetic manner in the Neosentient model. This dynamic combinatoric, self-organizing system seeks to be resilient and interactive with the environment, building new knowledge up somewhat like humans do, through pattern-flows of multi-modal sense pertubations, as well as incorporating a layering of other potential learning systems. Meta-levels of self-observation and the development of language to articulate such contextual learning is central for the embodiment of the system.

• A New Combinatoric N-dimensional Bio-algorithm

Cognitive Behavior is approached through a series of information-oriented processes. Central is to define all of the entailment structures that inform the emergent arising of sentience in the human (new incomplete territory), and seek to abstract those into an autonomous robotic system. The system will bring together a series of technologies from the research of diverse scientists and cyberneticists, and the study of complex systems, to help map this time-based set of relationalities that bridge mind / brain / body — multi-modal sensing systems, and environment. The notion here is to devise a self-organising bio-algorithm of combinatoric algorithms by studying the body, that will be derived from mind / brain / body / environment relationalities, and the sentience/consciousness that arises out of the body's interoperative functionality. This would necessitate moving back to exploring the biomimetic as opposed to the purely functional aspects of AI production. No single discipline of science, the humanities and/or the arts can tackle such a difficult information-related problem set. A special transdisciplinary team of teams would need to arise out of the use of I_E. This overarching research team (or set of teams) would potentially consist of groups of specialists from a series of fields that would also learn enough about the other member fields to be able to talk across disciplines. Conversation would be central to the ongoing development of this variable Bio-algorithmic network. Perhaps an earlier version of this kind of thinking was witnessed in the Biological Computer Lab headed by Heinz von Foerster, 1958-1976. Historical items related to the topic areas would also be included in the database. Perhaps one first must define a set of Boundary Objects. This approach is articulated in Susan Leigh Star's, 'The Structure of Ill-Structured Solutions: Boundary Objects and Heterogeneous Distributed Problem Solving', in M. Hubs and L. Gasser (eds), *Readings in Distributed Artificial Intelligence* (Menlo Park, CA: Morgan Kaufmann, 1989

• Research areas for the Insight Engine 2.0

Each research area will have a Micro-peer, these include the following (although new research areas will be added as needed): Neosentience; N-dimentional Combinatoric Bio-algorithm development; Bodily entailment structures; Mindful Awareness – self-observation; 2nd-order Cybernetics; Neuroscience; Neuroscience and the arts; AI and the arts – Computational Creativity; Biomimetics; The Connectome; AI; AI and Ethics; EI; The Biological Computer Lab (Cybernetics and 2nd Order Cybernetics); Science Fiction; The History of AI; Bridge Building between disciplines; Transdisciplinarity – A Multi-perspective Approach to Knowledge Production; Information – new approaches; Approaches to Learning - Conversation Theory etc.; Robotics and situated knowledge; Computational Intuition; Android Linguistics (Donahue); related new forms of mathematics; synthetic emotions; embodied computation.

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