

# Autognomic Intellisite

**Jon Ray Hamann**

*University at Buffalo, State University of New York, Baird Research Park, USA*

## INTRODUCTION

The 20th century saw the beginning of the evolution of learning machines from the growth of Boolean computers into Bayesian inference machines (Knuth, 2003). For some this is the crux of Artificial Intelligence (AI); however, AI research generally has yielded a plethora of specifically engineered, but formally unrelated, theories/models with varied levels of applications successes/failures, but without a commonly-explicatable conceptual foundation (i.e., it has left a *theory-glut*). Despite these many approaches to AI, including Automated Neural Nets, Natural Language Processing, Genetic Algorithms, Fuzzy Logic and Fractal Mathematical computational approaches, to identify only a few, AI itself has remained an elusive goal to achieve by means of a systems architecture relying on an implementation based on the systemic computer paradigm.

The 21st century experience is overwhelmingly one of an ever-accelerating, dynamically changing world. Just staying in place seems nearly impossible—getting ahead is becoming increasing unfathomable in a world now characterized by an evolving dominance of Information Science and Technology Development in exponentially tighter (shorter) innovation cycles (IBM, 2008). In business, for example, there is the continuous challenge to ensure that the business's products appear obviously differentiated from the competition, while staying current with the never-ending hot new trends that buffet the industry. A prime case in point is that of staying current with the trends in the computer solutions industry since adapting a computer dependent business (and most are) for the *next big trend* can be expected to be mitigated, if not made completely obsolete, by the *next next big trend* already on the radar screen.

## BACKGROUND

It is becoming increasingly evident to a growing number of key decision makers that innovation development and management demands a technological assist (Roco & Bainbridge, 2002). This technology, however, must dramatically Augment Human Intelligence in the near future while moving toward a General Autonomous Artificial Intelligence in the longer term (Singularity Institute for Artificial Intelligence, Inc., 2001). Despite the recognition that meeting the demands of accelerating innovation is only likely through advancing

AI, which in turn has the potential to impact every aspect of human life, the problem/dilemma for AI developers is that there is no *standard theory of mind*.

To further accentuate this circumstance, the networking of computers has in turn led to the Web with essentially an unlimited growth of data/information (i.e., an *info-glut*). The industry's response, however, to the info-glut problem, has been an ever-growing abundance of Web-access tools, which to an average user seem ironically as only another "glut" (a *technology-glut* or *tool-glut*).

Proposed theories of the Web, like with AI, are also numerous and without a common foundation on which to build a mutual understanding of *AI and the Web*. There are also a plethora of heuristic technological approaches to *AI and the Web* ranging from Intelligizing™ the Web through Learning/Thinking Webs to the Web as a Global (Super) Brain and Virtual Reality as Social Superorganism [See for instance these topics at Principia Cybernetica Web (2008)]. Basically, however, research on *AI and the Web* is categorizable as to whether the focus is on the preeminence of *brain vs. mind* (Roco & Bainbridge, 2002), as for the Human Cognome Project keyed to reverse engineering the human brain, or *mind vs. brain*, via a modular description of a general intelligence capable of open-ended recursive self-enhancement (Singularity Institute for Artificial Intelligence (2001), *General Intelligence and Seed AI*) or, alternatively, on the *co-evolution of mind & brain*, characterized by *Project AutoGnome™/CoGnome™/CogWeb™*, this being the approach of Ai3inc.

The explication of the Web as a Virtual Reality (a computer-based CyberSpace) which is an *image* (sign, symbol, icon)—*communication* system, that is, a *Semiotic* (Goodwin & Queiroz, J., 2007) Relational System, is also of the essence of *Mind*. Ai3inc's long-term focus is on an approach to Synthetic Mind/Artificial Intelligence via a patented technology known as the AutoGnome. This addresses a uniform solution to all of the foregoing problems of glut by way of an Intellisite™, an *Intelligent Website*. The AutoGnome, as an Automated Inference/Inquiry/Intuition software exploiting Mechanized Semiosis, also provides an optimal approach to a General Theory of an Autonomous Virtual Society (Virtuality)—this being an autonomous semiotic universe of Virtual Minds (WebGnomes™); hence Virtuality is related to (Human) Reality through the Virtual Reality of the Web. It is the provision of the foregoing which implicates a *standard theory of mind* that is the focus of As It Is, Inc.'s current development of "Semiotic Relational Systems: The

*AutoGnome as Synthetic Mind*” and “*AutoGnomics and Intelligent Systems Development*” including the present “*AutoGnomic Intellisite*” (Hamann, 2007a).

## Relational Systems Foundations

Generally, a canvassing of human experience has reports thereof falling into two fundamental forms—experience of Systems (objects, things, stuff, matter, etc.) and experience of Relations (connections, interactions, functions, transformations, etc.). Historically, this record has been largely confined to a form in which Relations were assumed to exist only between/among Systems, Systems Related to other Systems (SRS'). Between 1963-1968, work was introduced in which Relations were also taken to logically exist both as Relations between/among Systems and other Relations (SRR') and as Relations between/among Relations and other Relations (RR'R"). Based on the presumption of the foregoing and with certain Systems or Relations taking the place of (i.e., imaging (signifying)) other Systems or Relations (this being the notion of image) and with certain Systems or Relations being part of other Systems or Relations (this being the notion of subsumption), the foundation of a Relational Evolutionary paradigm, Relational Systems (RS), was promulgated. (Hamann, 2007b)

## From Image and Subsumption to Mathematics and Logic

First, a Relational Conjecture is restated to form and substantiate the notion of *image*: It is conjectured that the origin of an *image* (or *sign*) system as a chaotic ordering (emergent) event in the evolution of physical/chemical systems is a necessary and (possibly) sufficient condition for the origin of *Life* (and thus *Intelligence/Mind*) (Hamann & Bianchi, 1970).

Second, beginning with the simplest fundamental derivative of the Presumption of *subsumption*, that is, the notion of *distinction* (Spencer-Brown, 1969; Shoup, 2008) whereby there is formed a *boundary* which generates *twoness*, a mathematics of distinction has been created and grown into a general candidate for an approach to a universal language for formal systems, that is, multiboundary mathematics. Inherent to this Boundary Mathematics is a Boundary Logic (from which Boolean Logic is derivable as a special case), which is leading to a more powerful computer design (Bricken, 2007). Generally, taking a *universal formal system* as an axiom system with the property that any other consistent axiom system can be interpreted within it, the mathematics of distinction implies a mathematics of subsumption which, in turn, implies a membership theory as a first step towards a universal language for mathematics (Etter, 2006).

## Theory of Mind and of Virtuality

An approach to understanding the “origin” and nature of “mind” is in development based loosely at this point in the process on the System of Boundary Mathematics. This is interpreted as deriving from the Foundations notions of Relational Systems. A theoretical architecture has been posited regarding the formalization of an order (an instantiation of the Mathematics of Subsumption in terms of a degree of partial subsumption) and its derivative calculus, the latter taken as a formulation of the disorder experientially related to the given order, which also implies a reorder(ing) disorder format. Within a Nonseparable System of order/disorder/reorder Relations, this architecture suggests The Form of a meta-theory of theory formation. The Form, in turn, has been invoked in formulating Theories of Intelligence/Mind and Virtuality.

Assume, in a simple, but common instance of the foregoing, that *ordered* experience is *formally signifiable* as a Boolean Network (lattice, algebra, graph or diagram) composed of *points* (nodes, objects, states or Systems) and *lines* (edges, connections, transitions or Relations). Assume further that experience is not totally ordered and that the *disorder* is *formally signifiable* by extending the Boolean Network to the form of a Bayesian Network via a Coxian theory of the algebra of probable inference/inquiry. (Cox, 1961) And finally, assume that *reordering disorder* is *formally signifiable* via the Cox/Jaynes (Jaynes, 2003) form of maximum entropy (maxent) or its generalized probabilistic optimization principal. This approach to modeling both the Web (as a Virtual Reality) and Mind is warranted by the “natural” Network-of-*Images* view of the Web and by the historical predominance of connectionist theories of Mind, and neural-network analyses of mental processes and states.

The resulting synthesis of the foregoing is an approach to Relational Science of Signs, including *signification* and *communication*, that is, a Theory of *Semiotic* Relational Systems. This is the necessary basis upon which is built a Theory of Mind and of Virtuality with technologically engineered applications as Synthetic Intelligence(s)/Synthetic Mind and Virtual Reality. (Hamann, 2007a)

## AutoGnomic Technology

Based on the work of Charles Sanders Peirce and his successor, Charles Morris, Gene Pendergraft (Pendergraft, 1993), proposed the architecture of a special kind of system, called the AutoGnome, which would be able to perform mechanized (automated) inference using principles derived from semiotics. A venture for the implementation of such an architecture in software code was begun and has resulted in the building of a first release of an AutoGnome System, AutoGnome 01, being a partial implementation of the General AutoGnome Specifications, but representing only about 10-15% of the

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