

Is it Alive? Sensor Networks and Art

Adam Brown, School of Art
University of Oklahoma - awbrown@ou.edu

Art and computer science converge in the investigation of emergence and self-organization through the field of sensor networks.¹ This investigation will be contextualized by looking at a field of study that the authors refer to as *Symbiotic Media*. *Symbiosis* is an intimate ecological relationship between the individuals of two (or more) different species. More specifically, we gravitate to the ideas of mutualistic, symbiotic relationships in which both species benefit. Symbiotic Media, applied metaphorically, guides our creative process while the practical application of symbiosis informs our practices - resulting in combinations of media and concept that could not exist by themselves.

We present an interactive installation, "Bion," that explores the relationship between humans and artificial life. "Bion" makes reference to an individual element of primordial biological energy identified as an "orgone" by the scientist Wilhelm Reich.

Background

*"Bions are transitional forms between non-living and living matter. The bion is the elemental functioning unit of all living matter. At the same time, it is the bearer of a quantum of orgone energy and, as such, functions in a specifically biological way."*²

Born in Austria and educated in the circle of Sigmund Freud, Wilhelm Reich was a highly acclaimed psychologist turned natural scientist who was convinced of the existence of an omnipresent primordial biological energy that he called orgone. According to Reich, this universal energy is blue in color and responsible for spontaneous life generation as well as weather patterns, celestial formations and orgasms. Furthermore, Reich claimed that orgone phenomena could be tested, accumulated, observed and measured by devices such as photosensitive film, an orgonoscope and an orgone energy pulsation demonstrator.

Orgone energy is a controversial subject within the scientific community. The pejorative scientific establishment refers to Reich's theories as "pseudoscience" or science that fails to comply with the standards and rigor of the scientific method. It is for this reason that Reich has stayed in the academic underground. Conversely, many believe in the legitimacy of Reich's work arguing that critics have misrepresented Reich, recounting him as a lunatic while failing to reproduce his experiments or to refer directly to any of his theories. Further, Reich supporters cite centuries of precedent describing similar biological energies. Aristotle believed in a "fifth element." Anton Mesmer investigated an illusive force he called "animal magnetism." The chemist and inventor of Kerosene, Baron Karl Von Reichenbach, pursued a dynamic phenomena he called "odic force." Spiritual investigations also speak of comparable energies such as "chi" or "ki" in China and Japan, and "kundalini" in India. Sufism believes in an essence of life called "baraka." Many other cultures have parallel beliefs in energies resembling orgone.

Artistic/Scientific Process

The installation is composed of hundreds of mass-produced, 3-dimensional glowing and chirping sculptural forms. Each bion, measuring approximately 4x3x2 inches is a synthetic "life-form" consisting of a tiny computer, an audio speaker,

Andrew Fagg, School of Computer Science
University of Oklahoma - fagg@ou.edu

blue lights (LEDs), and multiple sensors. The bions are suspended by fine gage wire connected to panels that are attached to the ceiling. When installed, the panels form clusters of bions arranged at different elevations. Each bion has the ability to communicate with the others and with viewers that enter the space.

The opportunity for artistic expression in this work exists at four distinct primitive levels and timescales. The first level makes use of circuit and interface software primitives, and provides a set of basic capabilities for the control of light, sound, and unit-to-unit communication. Second, the artist uses these primitives to craft the high-level rules for sequential auditory, lighting, and communication behavior. Third, at the time of installation, the artistic primitive becomes the individual bion units and their spatial configuration. Behavior of groups of bions is affected in a significant way by the local density of the units and by their relative elevation. At the fourth level, the primitive becomes the network itself. By virtue of the interactive nature of the network, the presence and timing of the visitors in the installation affects the global behavior that the network elicits. Hence, the visitor becomes a participant in the artistic process.

The Visitor Experience

When a viewer approaches the installation space, she witnesses a dynamic array of blips of sound and blue light emanating in cloud-like patterns from all parts of the room. She notices that the source of the light and sound come from hundreds of small organic, shaped forms. The bions are communicating, unaware of the approaching visitor. She enters the room. One of the bions is alerted to the presence of a stranger and quickly communicates the information to the swarm of bions. One by one, in rapid succession, the bions signal other bions of the stranger and, in a wave-like pattern, become silent. The bions eventually become accustomed to her presence and begin to respond to her as if she was part of their ecosystem. They become attracted to her and glow more intensely when she nears. Eventually, she is incorporated into the dynamic array she once witnessed.

Making changes to one primitive level affects the emergent behavior of the whole installation. As the network is moved from one venue to another, the spatial grouping of the bions changes, yielding different opportunities for dynamic behavior. As changes are made to the core bion software (affecting the lighting/sound patterns or the timing of events), the individual, and hence group, behavior will change. The possibility also exists for the introduction of behavioral rules that adapt over time, creating an evolving experience over the lifetime of the installation. Taken together, these present a rich set of opportunities for both artistic and scientific exploration.

¹Estrin, D., Govindan, R., Heidermann, J., Kumar, S. (1999), "Next century challenges: scalable coordination in sensor networks," Proceedings of the 5th Annual ACM/IEEE International Conference on Mobile Computing and Networking, pp. 263-270

²Reich, Wilhelm. 1948. *The Cancer Biopathy*. Farrar, Straus and Giroux, New York.