ART<>SCIENCE: AN ONTOLOGY

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With an increasing diversity in how traditional artistic and scientific practices are being brought together to generate new forms of expression and/or inquiry, the question of how to characterize such cross-over work is raised. To address this, we are developing an ontology and a process model that take into account the nature of project work, the processes by which they are created and the reception contexts through which they are disseminated.

Historically, notions of art and science have fluctuated in the degree of their [in]compatibility. With the re-emergence of art as a tool through which knowledge drawn from the biological sciences is being explored, unexpected relationships between traditional scientific and artistic practices are beginning to materialize. Beyond the incorporation of scientific imagery into works of art, the increasing commercialization of biological-research technologies now gives artists access to new methods and materials in their pursuit of artistic form and expression. [1] From transgenic chimeras to 'semi-living' constructions, artists are producing works that transcend the boundaries of these two cultures of inquiry; their works are scientific in formulation but express ideas and beliefs that extend far beyond the realms of scientific inquiry and interpretation. Scientific work, also, is open to cross-disciplinary influences in the adoption of artistic methods to frame and present scientific data and in the selection and rendering of research-derived imagery for gallery contexts. The notion of the 'performative' in science as a methodological tool for exploring behavior in simulated biological and mathematical systems also represents a striking new direction in this regard, [2] suggestive of a more mutually symbiotic relationship in which user interaction has simultaneous artistic and scientific merit.

With the crossing of boundaries at the levels of conception, methodology, publication and reception, the body of such 'cross-over' projects within the arts and sciences is becoming increasingly diverse. Towards generating a better understanding of how the interaction between artistic and scientific practices is shaping the creation of these projects we are currently adopting an ontological and process modeling approach. Through an ontological framework, i.e., a systematic account of a domain of discourse through the explicit description of its objects and the describable relations amongst them, [3] we aim to generate a formal representational vocabulary that bridges these two traditions of practice allowing us to model knowledge in the domain of art-science cross-over work. By combining this systematic account of these projects with a process model outlining the key stages of production, a much richer account of this knowledge domain can be created.

Our combined system is being developed from the perspective that all projects, whether cross-over in nature or more traditionally situated within a practice, constitute a form of inquiry through which new meaning can be derived from the queried subject. By approaching the description of processes underlying project creation in more fundamental terms of action types in relation to entities, i.e., through perspectives that are independent of the traditions in which they are used, a common framework for describing and comparing project types can be generated. By describing action types that are either common or exclusive to traditional artistic and scientific practices in these terms, a clearer picture of how

cross-over works navigate between different practices as a function of the creation process can be attained. Indeed, by categorizing projects not as single entities but as multi-faceted products of processual activities, a more nuanced description of projects is possible. The rest of this paper will be dedicated to briefly outlining our conception of this ontological framework and process model.

The ontology component of our work will build upon V2_'s Capturing Unstable Media Conceptual Model (CMCM), [4] designed to accommodate the documentation of electronic art projects in which a project is more broadly defined as "the entire, distinct process of a well-defined activity," [5] such as a scientific research project or artistic project, and its well-defined and distinct temporal outcomes as would be shown, for example, in an exhibition or publication. We consider V2_'s view on the nature of projects, and their mode of documentation, as highly suitable for the basis of our current work. With its flexibility in accommodating multiple authors, different project-formats and mediating between the influence of diverse artistic and technological practices, it serves well the cross-over projects that we address here. We are currently broadening the scope of this ontology to better accommodate projects of more traditional artistic or scientific origin, thereby supporting comparisons between project types. In addition, we are adapting CMCM to work with Basic Formal Ontology (BFO), [6] an upper-level ontology framework that more rigorously distinguishes between entities that continue or persist through time (termed 'continuants') and the events or processes in which they participate (termed 'occurrents'). This framework permits us to further categorize processes both in terms of their real-world components and their practice-independent, operational character, such as the degree to which they are input specific, reproducible and algorithmic in nature.

The process model component of our work defines the key stages in the creation of a project from conception through to project outcome, constituting a standardized framework across projects within which the ontology is organized and expressed. The model is envisioned as a series of key processing stages bridged by entities serving input and/or output roles. The starting point of the model is an instance of, for example, a material or digital entity, termed the 'Source'. The first stage, termed 'Handling' receives this entity as input and denotes those processes required to make explicit (i.e. perceivable) Source characteristics that are to be communicated through the project outcome. This may involve a re-contextualization of the Source or a more interventionist strategy in which the Source is itself altered. The output of this stage, the 'Handled Entity' is in turn the input for the second processing stage termed 'Capture', in which this entity is translated into a form that can directly participate in a project outcome, the 'Captured Entity'. Again we differentiate between context-level translation, in which the explicit form itself is re-contextualized as the Captured Entity, and form-level translation in which a change in its material nature occurs. The final processing stage, termed 'Dissemination', denotes the preparation of the Captured Entity for a specific dissemination form, the 'Disseminated Entity'. This final entity will have a reception context that reflects particular aspects of the full process through which it was created, a context that is also outlined via the ontology. Note that the multiple rounds of the process model are permitted in which either the Captured or Disseminated Entity can serve as Source, thus recognizing that in cross-over work materials may be engaged that originated in other projects.

As a simple illustration of some of these key terms, consider their application to a project utilizing a DNA sequencing methodology. The project would concern the sequence of nucleotides constituting a DNA molecule in a cell sample (Source); the actions required to prepare, operate and visualize the DNA sequencing reactions (Handling), producing an experimental outcome (Handled Entity); the use of digital photography and image-treatment methods (Capture) to make a record (Captured Entity) of the Handled Entity; finally, the actions undertaken in Dissemination to present that record as a Disseminated

Entity in a scientific or artistic reception context, an example of the latter being Gary Schneider's 'Genetic Self-Portrait' of 1997–8. A scientific reception context may constitute a peer-reviewed journal with detailed descriptions of key methodologies performed in the creation of the Disseminated Entity. A gallery context, in its contrasting approach to dissemination, will promote different types of engagement with the entity. It is a more systematic and detailed account of these differences in reception context that we hope to capture in our work.

Summary

In summary we are developing an ontology and a process model to address the domain of art/science cross-over projects, taking into account the nature of project work, the processes by which they arise and the contexts in which they are interpreted. In doing so, we hope to give an account of these works that may aid both the creation of innovative art projects and promote new ways of communicating and exploring knowledge from the biological sciences.

References and Notes:

1. *Jens Hauser, "Forward/Backward – Living/Still," SymbioticA's Web Site, 2007, http://www. stillliving.symbiotica.uwa.edu.au/pages/exhibition.htm (accessed July 5, 2011).*
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3. *Ling Liu and M. Tamer Özsu, eds., "Ontology," in Encyclopedia of Database Systems (New York : Springer-Verlag, 2009).*
4. *Sandra Fauconnier and Rens Frommé, "Deliverable 1.2 Documentation and Capturing Methods for Unstable Media Arts," V2_'s Web Site, 2003, http://archive.v2.nl/v2_archive/projects/ capturing/1_2_capturing.pdf (accessed April 4, 2011).*
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