

Methodology

Comprehensive Examination Question 3:

What methods are available to evaluate **generative art** systems inspired by **cognitive sciences**? Present and compare at least three methodologies.

Ben Bogart
July 28th, 2011

Outline

- **Background of Research**
 - A machine that dreams
- **Methodologies**
 - Computational Cognitive Modelling
 - Evaluation of Meta-creation
 - Art-as-Research
- **Discussion**

Background of Research

A Machine that Dreams

This research is centred on the production of an artwork intended to “dream” and emphasizes the following aspects:

1) Scientific Foundation:

- Rigorously inspired by *theories in cognitive science and neurology*
- Rigorous link between theory / concept and *implementation*

2) Generative and Meta-creative Art:

- *Generative* computational processes
- The relation between synthesis and recollection

3) Fine Art:

- Electronic media, conceptual and site-specific *art practises*.
- Inspiration, knowledge sharing and public discourse

Methodologies

Each methodology corresponds to a particular conception of the project:

1) Computational Cognitive Modelling

- The work is a computational model of a neurological and cognitive conception of the dreaming mind-brain

2) Evaluation of Meta-creation

- The work is meant to exhibit creative behaviour

3) Art-as-Research

- The work is art produced in a research context

Computational Cognitive Modelling

“A systematic methodology for cognitive modelling”

[Cooper et al.]

The aim of this methodology is to ensure that the computational system explains and predicts empirical data.

Cognitive Modelling

- Theories are generally represented in **natural language** and/or **box and arrow diagrams**. Metaphor is often used and may introduce “obscurities”.
- Computational representation requires “...precise statements of theory by forcing the detailed specification of all aspects essential to the theory’s implementation, **including many aspects which might otherwise be overlooked.**”

Potential Issues with Computational Models

- 1) The use of computational methods with little theoretical foundation
 - Such a system **may still predict empirical data**, but “...is in direct conflict with the standard scientific method of evaluating a theory by testing its predictions.”
- 2) Implementation details may obscure the “asserted theory”
 - “...[A]ny computational instantiation of a theory will include aspects which are **not theoretically motivated**.”

Computational Modelling

- A rigorous use of computational modelling requires a *distinction* between implementation details and theoretically rooted elements.
 - This allows the behaviour of the system to be attributed to the theory, and not the implementation details.
 - If multiple implementations of the same theory, in various programming environments, exhibit the same behaviour then support for the theory is strengthened.
- Cooper et al. propose an “executable specification language” called Sceptic to resolve these issues.

Computational Modelling: Discussion

- How is the fidelity / level of abstraction of the model determined?
- What is the mapping between empirical data and the system's behaviour?
- The distinction between theory and implementation detail could extend to aesthetic aspects.

Computational Modelling: Summary

- **Method:**
 - implementation of theory in computational form.
- **Product / Knowledge:**
 - Predictive and explanatory model that validates the asserted theory.

Computational Modelling: Model of Dreaming

- While explanatory / predictive power would be an added bonus, this is **not the emphasis of the project**.
- A model that predicts and explains EEG or perhaps brain imaging data is conceivable; a model that **predicts the content of dreams** is highly problematic.

Meta-creation / Generative Art

“Evaluating Evaluation: Assessing Progress in Computational Creativity Research” [Jordanous]

The aim of this methodology is the systematic evaluation of artifacts in order to determine *how*, rather than *if*, systems exhibit creativity.

Evaluating Meta-creative Systems

- Often a system is presented to a peer group in order to determine if it exhibits “creativity”.
- Evaluation in this vein tells us *what* is creative, but not *how* it is creative.
- “Scientific evaluation is important for computational creativity research, allowing us to compare and contrast progress.”

Evaluating Meta-creative Systems

Evaluation Guidelines

- 1) Identify the key components that the system needs in order to be considered creative.
 - a) What does creativity mean in general, independent of domain?
 - b) What does creativity involve for a particular domain? What does it not involve?
- 2) Using these results explicate the standards of creativity used to evaluate the system.
- 3) Develop tests to measure to what degree the system meets the standards.

Evaluating Meta-creative Systems

Sample Procedure

- 1) Creativity in general resulting from an analysis of vocabulary used in journals studying creativity compared with journals not studying creativity.
- 2) An analysis of the importance of these general aspects of creativity resulting in a weighting of each element for this domain.
- 3) Human subjects evaluate the output of the system in terms of the above standards.

Evaluating Meta-creative Systems

Discussion

- Is a global set of criteria for creativity possible?
- How focused is the specification of the domain?
- The artifacts produced by the system are evaluated, not the design of the system itself (the behaviour validates the system)
- The science or art of creative machines? (Is the system an artwork or model of creativity?)

Evaluating Meta-creative Systems: Summary

- **Method:**
 - quantitative analysis of the human evaluation of potentially creative artifacts according to prescribed domain-specific weighting of global creativity criteria.
- **Product / Knowledge:**
 - understanding of creation

Evaluating Meta-creative Systems: Dreaming as Creative Behaviour

- “Creativity” does not appear possible without intention, goals or a domain.
- For this project, the system is more significant than the artifacts, therefore validating the system via its artifacts is inappropriate.
- This work is an explicit rejection of evaluation criteria in “creative” (originative) artifacts.

Art-as-Research

[Strehovec, Haarmann, Busch and Bogart]

The acceptance of inherent rigour and the knowledge
productive powers of artistic practises

Art as Service (New Media)

“New media art as research: art-making beyond the autonomy of art and aesthetics” [Strehovec]

- The integration of art, science and daily life
- Art research for the purpose of exploring what art is.
- From **genre, form, creativity, author, and value**
- To **software, process, experience, service and interface**
- Example: “Cult of a New Eve” [Critical Art Ensemble]

Art in Relation to Philosophy

“Artistic Research: A Tool of Cognition Parallel to Philosophy?” [Haarmann]

- Critical awareness of power structures in relation to knowledge.
- Similarities between art and philosophy:
 - Often individually practised, but embedded in cultural discussion.
 - Products are “monographic” works (books & exhibitions)
- Image-making as a specialized representational activity like mathematical notation.
- Example: Cindy Sherman [Mauer]

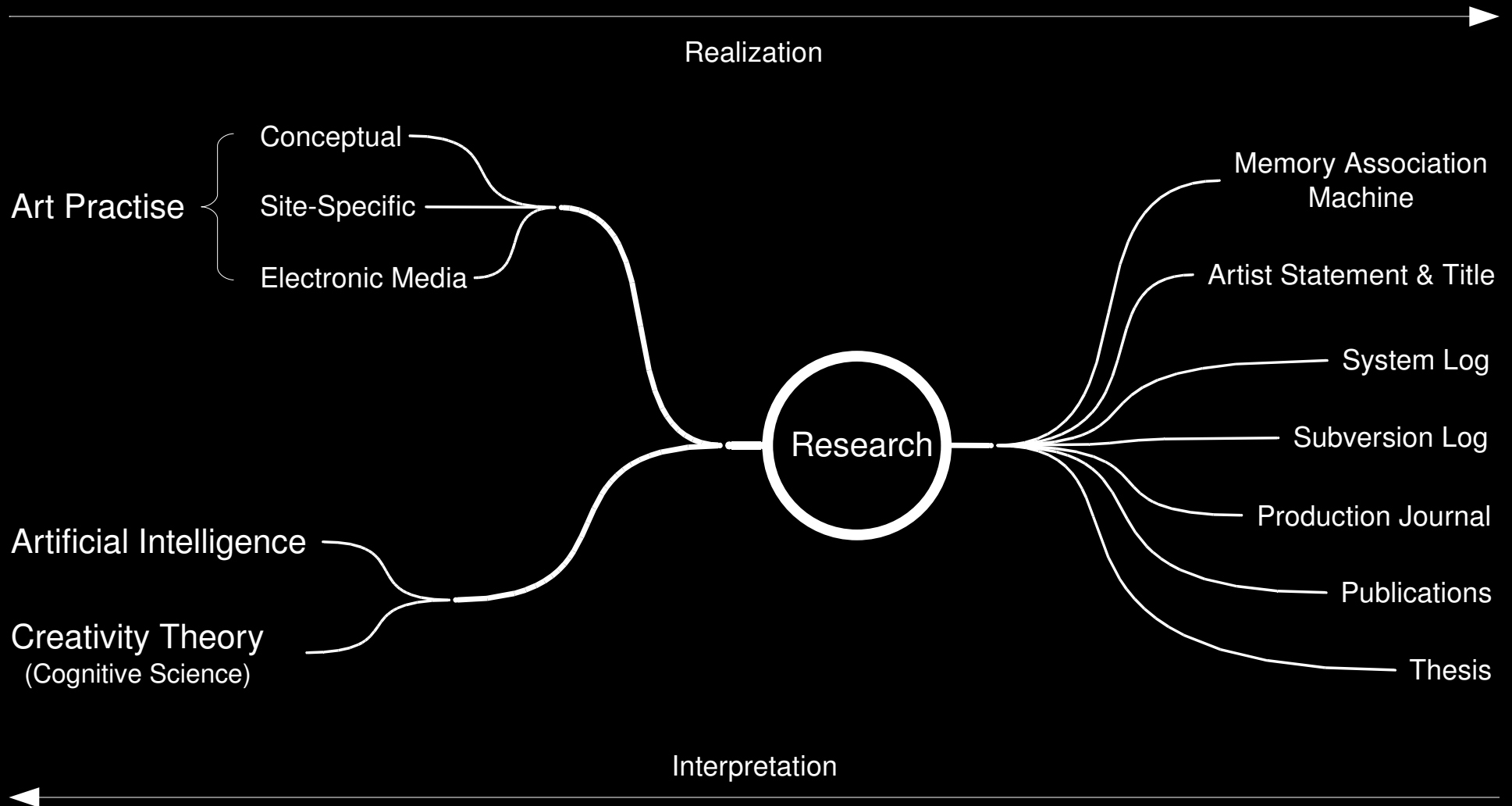
Art-as-Research

“Artistic Research and the Poetics of Knowledge” [Busch]

- Makes direct use of scientific knowledge and processes, but not methods.
- Products are “critical knowledge” and not aesthetic objects.
- Research is the central aim of the work.
- Art-as-research “...becomes the site of knowledge production and does not restrict itself to integrating previously known concepts.”
- Example: Andrea Fraser [Fraser]

Growing Form from Context

[Bogart]



Art-as-Research: Summary

- **Methods** (all artistic practises provide methods):
 - elaboration / variation / trial-and-error / self-reflection
 - image making / process making (software development)
 - surf / sample / manipulate
 - writing / lecture / presentation / artist talk
 - cultural production
- **Product / Knowledge:**
 - critical knowledge
 - theory
 - artworks as theoretically rooted embodiments of knowledge
 - publications / autoethnographic accounts / process logs

Summary Discussion

“Beware the hegemony of the humanities and the social sciences in formulating best practices for fine-art research. This has been one of the pitfalls of research development in the United Kingdom. I recommend looking to the natural sciences for comparators, where observation of natural phenomena and experimental strategies are normal methods.” [Jones]

“the point cannot be to turn the practice of art into research by merely imitating recognized methods of science, because practices, methods, symbolic communication media, and horizons of understanding do differ from one discipline to another.”
[Haarmann]

Validity

- Artworks are manifested in context of **causal / material** and **cultural / social** relations.
- The value of artworks cannot be reduced to artistic intention, as they transform and are enriched by the differences of context over time and space.
- Therefore the central method is *situating the work in the context* of causal and cultural relations.

Rigour

“How do you know you're not kidding yourself?”

- The ability for self-deception requires production in a process that inherently lacks rigorous self-reflection.
- Such a process is lacking evaluation at every stage of development, not just in the concrete production, but also in the assumptions, the purpose and the very methods used.
- “*Giacometti’s doubts and the continual self-criticism of his art, the insistence behind the repetition of his themes that every statement is provisional and necessarily unfinished, reveals a thoroughly twentieth-century understanding of the human condition.*” [Nemiroff]



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