The Interactive Word Object

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Part 1: History / Prehistory
Written text is an object
Written text is an object (cont.)

- Architecture is a larger-than-life object
  - The edifice was meant to be permanent
- Inscriptions serve to convey authority
  - Glorifying deities, kings
  - Often accompanied by art depicting investiture
- Building inscriptions impose text on an entire space
Written text is an object (cont.)
Written text *is* an object (cont.)

- A Cuneiform tablet is a physical object
  - Temporary texts could be written on soft (unfired) clay
  - Firing the clay made the text permanent
- Commerce required text object to travel with trade goods
  - E.g. *bill of lading*
  - 75% of documents from major sites (e.g. Uruk) were economic
- Authentication (e.g. a seal) is required to identify the sender
Written text is an object (cont.)
Written text *is* an object (cont.)

- Cylinder Seal
  - Found at Memphis, depicting Darius, King of Persia
    - Contains both a narrative scene and an inscription
    - Inscription reads “Darius the great king”
  - The impression is an object and the seal is an object
    - The seal is a **machine** for reproducing text objects
Origin of Writing Token Theory

- Denise Schmandt Besserat theory of the origin of writing in Mesopotamia
  - Small ceramic tokens used as accounting bill of lading indicators
  - Then enclosed in a ceramic “envelope” (called a *bulla*)
    - *What’s in the bulla?* You have to break it to find out!
  - Then impressed onto the outside of the envelope to indicate its contents
  - Then a tablet with token impressions replaced the ceramic envelope
Notation Objects
Notation
Objects (cont.)
• Quipu
Part 2: An Interactive Word Object Sampler (demo)
Part 3: Benefits of Interactive Word Objects
Structure

- Non-linear navigation
  - “Traditional” hypertext links
    - E.g. reference to other text
    - The link can be typed
- Gathering
  - Bring resources in to the current text
    - (“traditional” hypertext link arrow should be reversed)
- Multidimensional mapping
  - Syntax relationships can simply be drawn / pictured
Structure (cont.)

- Escape from topology
  - Structures that are difficult to render in two dimensions can be mapped by actions
- Gestalts for “difficult structures”
  - Null structure
    - Elements juxtaposed “without structure”
  - Rings
  - Overlapping structures that don’t nest
Structure (cont.)

- Gestalts for “difficult structures” (cont.)
  - Part / whole relationships
  - Feedback loops
  - Self reference
- Externalized structure (e.g. syntax)
  - The text contains its own storage
  - Built-in visualization
  - Loci for behavior
Behavior

- In hypertext activity theory the minimal unit of behavior is called *acteme*
- Expand / Collapse
- Show / hide / access control
  - Conditional legibility
  - One-time names
- Attract / repel
- Travel to / return from
Behavior (cont.)

- View control
- Placemarking
- Reader-adjusted kinetics
- Units controlling other units
- Other-user modulation
Part 4: Issues / Conundrums
The Shannon Paradox

- There is a layer underlying communications: the *energy transaction*

- Communication occurs when
  - The writer has a clear vision of how the energy transaction will occur
  - It does occur that way and the reader is energized

- Energy transactions may occur where communications don’t
The Shannon Paradox (cont.)

• Art may be made to target the energy transaction layer *directly*
  • Such art may seek to *maximize inclusion* of the energy transactions that can occur

• The Shannon Measure of Information measures information by how much is *excluded*
  • Information is measured by the number of possibilities that might have been there but aren’t
The Shannon Paradox (cont.)

- The Shannon Paradox is the juxtaposition of:
  - *Inclusion*-oriented energy transaction approach
  - *Exclusion*-oriented communication approach
- The Shannon Paradox is “resolved” by considering the text both **code** and **channel** simultaneously
  - And even oscillating between code and channel
  - Information theory does embrace inclusive channel vs. exclusive code
Is the Text Stateless?

- There are venerable traditions that consider “the word” immutable
  - e.g. religious scriptures
- Writing turned language units into physical objects that couldn’t change state without document substitution
- However, social processes can apply state to text
  - The legislative process can transform a bill into a statute
Is the Text Stateless? (cont.)

- Social processes can apply state to text (cont.)
  - A person can legally change their name
  - Documents can be voided or rescinded
  - Information processes can transform a statement into a question and vice versa
- Versioning
  - A document may exist in multiple versions
  - There may be a formal system for recording versions
Is the Text Stateless? (cont.)

• Transactions
  • An exchange of mutual state changes among parties regarding a shared text
  • E.g. Order → Confirmation → Invoice

• Pathological states
  – Examples:
    • An *overdrawn* account
    • A *fraudulent* signature
  – Is database NULL a value or a state?
  – Is the result of 2 / 0 a value or a state?
Is the Text Stateless? (cont.)

• Contracts may explicitly describe state
  • E.g. what happens under default
  • Stateful text can be traded
    – E.g. credit default swaps
• An interactive text can contain its own state indicators
  – As opposed to state being external
Is the Text Stateless? (cont.)

- State-embracing text has its own form of Shannon Paradox
  - *Inclusive* of states
  - *Exclusive* of what is to happen in a given state / transition
Is the Text a Machine?

- The *substrate* of text is becoming almost exclusively machines

- There are many arenas of generative text:
  - The Law
    - Statute → Regulation → Litigation
  - Religion
    - Scripture → Commentary / Exegesis
  - Literary
    - Text → Criticism
Is the Text a Machine? (Cont.)

• Arenas of generative text (Cont.)
  • Journalism
    – Statement → “Other Side”

• Interactive text externalizes generativity
Is the Sentence a Machine?

- Formal language theory shows the equivalence of
  - Grammars
  - Abstract Machines
- Still important in computer science
  - “Chomsky Hierarchy” still useful
Is the Word a Machine?

- Names:
Is the Word a Machine? (cont.)

• Object-surrogates for names are thousands of years old
  • Cartouche
    – Oval surrounding an Egyptian royal name
    – Instrumental as the “entry point” to deciphering hieroglyphics
      • Interpretable as a name across millennia even absent any decipherment
  • Seal impression
    – Still in use in some places as a signature
• RFID name badge
Is the Word a Machine? (cont.)

• The RFID badge is unequivocally a word which is a machine
  • A surrogate name
  • A radio machine that responds to a signal with information
    – Encodes state
      • authorized / not authorized
    – Encodes information
      • ID number
      • Facility Code
Pathologies / Challenges of the Interactive Word Object

• Bugs, Features, and Weird Machines
  • The Interactive Word Object can be hijacked

• Who owns the words?
  • Plays have already been made to own words
    – Microsoft Smart Tags
    – Google Ad Words
  • Legislation / litigation already exists
    – DMCA
      • Web site takedowns
      • eBooks with DRM
Pathologies / Challenges of the Interactive Word Object (cont.)

- Who owns the words? (cont.)
  - Train wrecks have already occurred
    - Kindle 1984 remote deletion
- How do you preserve the interactive word object?
  - Old NASA tapes can’t be decompressed
  - Portation may conflict with intellectual property
    - No source code for “old” environments
    - File formats may be undocumented / proprietary
Pathologies / Challenges of the Interactive Word Object (cont.)

- How do you *preserve* the interactive word object? (cont.)
  - Insider communication vs. outsider unintelligibility has ALWAYS been part of language
Part 5: Interactive Word Object Futures
As In Mesopotamia: IT’S ACCOUNTING

• Algorithms already:
  • Make trading decisions
    – Faster than the speed of reflex
  • Are written into the instruments traded
  • Are written into the accounting rules

• Accountancy is in crisis
  • Tainted money cannot be traced
  • Instruments are bundles with unknown contents
    – WHAT’S IN THE BULLA!!
IT’S ACCOUNTING (cont.)

- Accountancy is in crisis (cont.)
  - Trading systems cannot handle negative numbers
    - But negative wealth is being traded
  - No consciousness of the implications of NULL
    - Assets became “toxic” not because their value became 0, or even negative: they became NULL
      - “Has Unknowable Value” was not a recognized state
What gets exchanged?

• Wal-mart is mandating RFID tags

• Just-in-time manufacturing has required EDI for decades
  • Standards (e.g. X12 / Edifact) for business documents
    – This is a form of language creation
    – EDI code lists are a form of constructed lexicon
Move the contents of the bulla from the inside to the outside

- Stateful trading instruments can describe their contents in real time
- The instrument *responds* to state changes
- Provenance carried with the instrument allows problems to be traced
- Cryptography provides the usual services:
  - Authentication
  - Non-repudiation
  - Authorization