Hypermedia and Interactivity

> In this ideal text, the networks are many and interact, without any one of them being able to surpass the rest; this text is a galaxy of signifiers, not a structure of signifieds; it has no beginning; it is reversible; we gain access to it by several entrances, none of which can be authoritatively declared to be the main one; the codes it mobilizes extend as far as the eye can reach, they are indeterminable; the systems of meaning can take over this absolutely plural text, but their number is never closed, based as it is on the infinity of language.
>
> Roland Barthes. *S/Z.* 1970.

The use of the terms *linear/flat/text* as opposed to *non-linear/interactive/hypertext* to describe access to a stream of information has been in existence at least since the mid-twentieth century. This lecture will explore the meaning and history of these notions as well as their application to the development of rich content for the Internet. We will look at

- the advantages and disadvantages of various presentation structures;
- principles, best practices, and current state of the art of user interactivity;
- and how context, both social and theoretical, is affecting this critical aspect of content creation.

Short history of the Internet

Being a genealogy of its roots, main impetus, and original problems to be solved

- Communication between and coordination of information from multiple radar stations
- Dispersing electronic communication, command, and control due to threat posed by nuclear attack
- Giving different computers the ability to share data.
- Areas of development and spread: military–scientific–academic to commercial–entertainment–personal uses
- ARPANET (Advanced Research Projects Agency Network)
  - Message packets independent (developed at the National Physical Laboratory in the UK) and not machine specific
  - J.C.R. Licklider—visionary head for two years then ...
  - Robert Taylor—organized and implemented
- TCP/IP (1974) replaces earlier protocols
- Defense Department was concerned about the growth of ARPANET so it split into a military and civilian version
- NSFnet (National Science Foundation. 1984), created for academic use, eventually replaced ARPANET and became the Internet
- Implemented through protocols
  - file: local machine
  - gopher: remote file access, selection, and search
  - ftp: two-way remote file transfer
  - mailto: email
  - news
  - telnet: two-way remote access to server
  - http: request-response hypertext transfer

Leading to

Short history of the World Wide Web ...

- WWW
  - Tim Berners-Lee
    - 1989 working at CERN (*Conseil Européen pour la Recherche Nucléaire*) proposed a system utilizing the Internet to share documents over different computer networks
    - developed the first interface to those docs, i.e. a text browser, incorporating concept of hypertext
    - CERN published the source code free in 1992

- Marc Andreesen at NCSA (National Center for Supercomputing Applications) and the graphical-user-interface Mosaic
- Netscape and Windows IE
- w3c: standards for html, xhtml, css, dhtml, etc.
- Mozilla and Firefox
- Scripting and databases: client-side (JavaScript) and server-side (PHP, ASP, python, perl, etc.; MySQL, SQL Server, Oracle, etc.)
- Multimedia: Flash, video, audio, etc.
- The Web started out as a utopian, populist project: the computer revolution should benefit everyone.
- Potential impact on artists
  - a form of production, like video
  - a means of distribution, like a gallery, but located everywhere

And a few remarks about hypertext

For purposes of this discussion, text is loosely defined as any *stream of information.* This streaming always exists in the use of the text (i.e. reading or viewing) and conditionally exists in its presentation.

The presentation of a particular text can be said to fall somewhere on the following spectrum:

'linear'	'non-linear'
text	hypertext
immersive	interactive
medium invisible	medium visible
lack of contextual indicators	contextual indicators present
push: provider controls access to stream	pull: user controls access to stream
closure of meaning	openness of meaning

Notes:
Performance art can fall anywhere on the above line.

Early computers presented text linearly, viz. without much context. This is still the simplest way to do it when learning to program text presentation.

For all printed texts (text presented all at once) linear is somewhat a misnomer since the user controls the access to the stream—you can always skip around a book and tell at a glance where you are in the text.

- Text vs. hypertext
  - 'Linear' texts, meaning the linear presentation or use of a text:
    - Vocalized narratives
    - Theater and music performances generally
    - Broadcast radio
    - Movies at the cinema and 'pushed' television (partial exception: Robert Nelson's film with a progress bar is a little less non-linear)
    - Art based on extant telecommunications networks, e.g. fax art
    - Deductive reasoning (all the beans in this bag are white; these beans come from this bag; therefore; these beans are white)
  - "Non-linear" texts (more or less):
    - *Ramayana* with its web of associated stories;
    - *The Talmud* whose base text is lost in the network of commentary and annotation;
    - Encyclopedias, phone books, anything with an index, table of contents, annotations, or footnotes and references.
    - Movies on DVD, i.e. randomly accessible.
    - Inductive reasoning (these beans are white; these beans come from this bag; therefore all the beans in this bag are white;)
    - Abductive reasoning (all the beans in this bag are white; these beans are white; therefore these beans come from this bag;)
- Moving from text to hypertext on the computer
  - All texts have multiple levels of meaning; thus, at the risk of over-simplifying:
    - Text { denotation }
    - Hypertext { connotation: reference, association, connection }
    - The new element is the linking to connoted texts (cf. Bush vs. Whorf article).
- Early efforts
  - Vannevar Bush and the 'memex' (1930s to 1950s)

- The problem to be solved: an ever increasing volume of specialized information.
- What was needed was something to 'mechanize' mental associations between texts, i.e. user-generated associative indexing, to facilitate finding information.
- Bush suggested speech recognition and wireless access
- Bush speculated that human language and writing would have to adapt to the needs of the machine
- He first proposed microfilm then magnetic tape to store information
- Example trail: the bow

- Ted Nelson's Xanadu System (1960s to 1970s)
  - Nelson coined the term 'hypertext'.
  - Texts were linked through association.
  - Changes to texts would be tracked.
  - He advocated a graphical interface and use of a pointing device (mouse).
  - Like Bush's system, links are user generated.
- Douglas Engelbart and oN Line System (NLS) (1960s).
  - Engelbart proposed a computer system to augment human memory.
  - It used symbolic linking between texts.
  - It included notions of e-mail and teleconferencing, multiple windows, and on-line help.
  - Incidentally, he invented the mouse with Bill English.

Examples and strategies

adaweb.walkerart.org/

- Darcey Steinke. *Blindspot.* A narrative using html elements for enhancement.
- Matthew Ritchie. *The Hardway.* On-line game as art. (Does neither well.)

eden.garden1.1.projects.sfmoma.org/ – parses the CDATA stream and reinterprets it (part of **010101.sfmoma.org/** – art in technological times). This site requires a plug-in which apparently is no longer available.

www.stanza.co.uk/ – digital artist on the Web.

www.xs4all.nl/~mrkvb/VHTbestanden/VHTmainpage.html – Video Home Training (more Flash than Web).

www.newmedia-art.org/ – new media from the Centre Georges Pompidou.

www.netbase.org/t0 – Netbase / t0 : Institute for new culture technologies.

www.thought-thieves.org/mamb/ – Thought Thieves.

www.ubu.com – concrete poetry, sound, etc.

www3.kingdomofloathing.com/login.php – Kingdom of Loathing.

www.sissyfight.com/

adaweb.walkerart.org/context/oracle/ – Berkeley Oracle.

www.sero.org/dyt/ – Dump your trash.

oos.moxiecode.com/ – Outside of society (Flash tile-based games).

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Martin Ryder. ‘Theoretical sources’. carbon.cudenver.edu/~mryder/itc_data/theory.html

David Solomon Bennahum. ‘Into the Matrix’. www.memex.org/