Multimedia Visualization and Interactive Systems – Drawing Board Possibilities and Server Realities

Dr. Ray Uzwysyn
University of Miami, Digital Library Initiatives
Presented For Sparking Synergies: Bringing Research and Practice Together
University of Miami Libraries
UM Digital Library Initiatives

10 Servers
500,000 visits/month

http://www.library.miami.edu

Work with a range of research academics from Anthropology and Architecture to Cell Biology, Marine Science, Physics and Sociology building Digital Libraries

http://digital.library.miami.edu

3 Servers
Paradigm Shift Case Study
Cuban Rafter Phenomenon: A Unique Sea Exodus (2005)
http://balseros.miami.edu

The Cuban Rafter
Phenomenon
A Unique Sea Exodus

Introduction
Main Site

Technical & Conceptual Deconstruction
What makes a Paradigm Shift Digital Library?

- Fertile new territory to debate Conceptual Theory vs. Digital Implementation (Drawing Board Possibilities and Server Realities)

- Application brings hopes of research and challenges of praxis together in fundamentally different remix than before

- Site acts as a fulcrum for larger shift ground to a new emphasis and balance

Problem: How do you build a New Millennia Digital Library?

In our case a traditional open source text heavy (PhP/MySql/database silo shop to one that has begun to think seriously about new media/multimedia interactive digital library possibilities
Background

Spring 2003 Dr. Holly Ackerman, Latin American Studies Specialist and Fulbright Scholar Approaches Dept.

Ford Foundation Grant between University of Miami, St. Thomas Centre for Human Rights, Florida International University Cuban American Studies Program

Three Goals

1) Produce Conference on 10th Anniversary of Cuban Rafter Phenomenon
Assembling existing global experts on transatlantic Migration
(Between 1959-2005 approximately 100,000 citizens left Cuba by sea in small vessels and reached the states alive.)

2) Produce New Media Digital Library to codify this recent history expanding the range of academic research possibilities (Experimental with Capital “E”)

3) Codify, aggregate and present current state of this body of knowledge (aid to Disaster Preparedness, Next Ten Years, Lessons Learned)
What are the characteristics of this digital library?

- Should contain a wide range of existing documents pertaining to this history
- Traverse an expanded range of academically non traditional media types (i.e. audio interviews, video footage, maps, statistical data, images, video, archivally intact gov. documents)
- Expand notion of traditional academic text/database search retrieval information system
- Maintain Ph.D. level historiographic depth structure and integrity of archival sources (unedited interviews, footage)
Dr. Ackerman was very open to expanding digital library boundaries (experimentation).

- did not want to use grant to produce traditional front end text box search/backend database (PhP/MySql, Content DM, DSpace) Digital library that department previously specialized in producing Google type lists
The Old and the New

HTML
Front End

PHP
Middleware

MySQL
Database
Search/
Retrieval
Document
List
Backend

Text Box
Search
Author
Keyword
Material Type

http://scholar.library.miami.edu/cubamoderada/
Long Scrolling List Syndrome

Increasingly our ‘academic clients and users’ were unhappy with these types of applications.

Variety of Reasons

even though this was robust and exhaustive, policy decision makers and others coming to this body of information could not see woods from trees to begin to see and make decisions regarding larger pictures
Human Users, Scrolling Lists, Server Possibilities

Is there a more elegant way of solving this problem?

- Application being largely used to make policy decisions regarding Cuba
- Search Results were pulling up accurate but overly long picture (old problem of precision/recall)
- Remixing the metadata did not cut it?

<table>
<thead>
<tr>
<th>BIBLIOGRAPHY ON MODERATE CUBAN POLITICS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resource Type:</strong> Newspapers, Periodiquitos &amp; Pamphlets</td>
</tr>
<tr>
<td><strong>Catalogo de letras. Miami, FL:</strong></td>
</tr>
<tr>
<td>Began in the 1960's as a general forum for cultural and political writers both on the island and in the diaspora, Catalogo de letras politics.</td>
</tr>
<tr>
<td><strong>El Independentista. Miami, FL: 1983:</strong></td>
</tr>
<tr>
<td><strong>La nación. Miami, FL: 1958:</strong></td>
</tr>
<tr>
<td>The various municipalities of Cuba formed an association in exile and this is their newsletter. Each municipality sponsors so a good primary source showing the attitudes of exiles over time. It is available on microfilm via Reproduction. Microfilm, University of Florida, Client George A. Smathers Libraries, University of Florida, 1993/1 microfilm reel: 35 mm.</td>
</tr>
<tr>
<td><strong>Noticias Católicas: NC. Washington, D.C.: 1954:</strong></td>
</tr>
<tr>
<td>Published by the Catholic Church, this is a newsletter that served as a communication vehicle for moderate to center-left groups. It has a portion of 1962.</td>
</tr>
<tr>
<td><strong>NotiCuba. Washington, D.C.:</strong></td>
</tr>
<tr>
<td>This is the official publication of Cuba Independencia y Democratica headed by Huber Malle. It appears both in print and electronic. <a href="http://www.cubaid.com/NotiCuba-CD.html">http://www.cubaid.com/NotiCuba-CD.html</a></td>
</tr>
<tr>
<td><strong>Papel periodico. Miami, FL: 1971:</strong></td>
</tr>
<tr>
<td><strong>Presencia. Miami, FL: 1980:</strong></td>
</tr>
<tr>
<td>This is the newsletter of the Junta Patriótica Cubana.</td>
</tr>
</tbody>
</table>
Online Site Comparison

New Media Expression vs. Substance

Increasing Online Media Richness

High Online Expressiveness (Design/Style)
(Rich Media Possibilities, Video, Audio, Interactivity)
Advertising, Fashion, Games Sites
Generally Little Substance,
Points Well Made to “Sell Product

Rafters Site Goals
Robust Academic Structure
High Degree of New Media Expressiveness

Traditional Online Academic Digital Libraries
Text Heavy/ Database Search + Text, Images, etc.

Increasing Academic Depth Structure/Substance

Text
Images
Audio
Video
Interactivity

100
Serious Focus on Visual Narratology, Multimedia and Visual Metaphor for Information Architecture

- What does this create?
  Interactive Information System
  Interactive Multimedia Digital Archive
  New Media Digital Library
  Interactive Flash Based Multimedia Website
  Streaming Video Interactive 2D
  Online Educational Resource
  Rich Media Online Historiographical Archive

Is this a digital library or do semantic debates regarding terminology herald something new
The Drawing Board: Taxonomy, Folksonomy or Visual Metaphor for Information Architecture

- This was recent history and the cognitive coordinates (histories) were still largely fluid and uncodified.
- Old idea: Use Metadata Specialist and construct ontology/taxonomy (Proved impracticable as contents/material was coming in on a rolling basis in various formats (video, audio text) LCSH and Getty Image Taxonomies seemed ossified and out of date
Back to the Drawing Board: Folksonomy and the Dictatorship of the Proletariat for Information Architecture

2nd Idea) Use Existing experts to organically produce ‘folksonomy’ based on collaborative feedback among experts

Proved overly long and produced another long scrolling list taxonomy that made the principal investigator unhappy
The Big Experiment: Overarching Visual Metaphor and a Cognitive Map to Guide Information Architecture

- Solved Problem of Taxonomy and also provided intuitive mode of Navigation
  - Navigation on left, Map on Right
- More than simple map, the interface provides a cognitive cartography and Humanly intuitive way to navigate

The Cuban Rafter Phenomenon: A Unique Sea Exodus
New Visual HCI Interface Possibilities

Zoomable Fly-Through Humanly Intuitive Navigation and Cognitive Landmarks

Problem Solved: Context Preserved (Upper Left)/Humanly Intuitive Map

Link to Image, Document and Video Libraries
Zoomable Interface (1.800 Gig Map) – Front End (Zoomify)
Links to Digital Video, databases, document and Image Libraries – Streaming and other Server Back ends (Real Media Streaming Server).
Web Development Technical Background

- DreamweaverMX used to quickly build pages (integrate different media types, Real video, audio datasets, keep track of changing translations (allowed major sections of website to be done easily both in Spanish and English)) CSS, Frames and templates were used to build larger site structure

- Adobe Acrobat used to maintain archival integrity of source documents (press releases, news articles, gov documents)
Other Technical Possibilities

- New Interactive Possibilities of Macromedia Flash heavily used to provide more robust interactivity and human engagement

- Visual horizontal timelines

- Visual metaphors for navigation and condensed structure to present large amounts of information in single screen spaces

(Possibilities in Studio 8 largely untapped)
Visualization and Progressive Incremental Iterations

- Still Image Slideshows (Javascript application) – archival images delineating history of period.
- Entire Site Context Preserved in larger visual narratology.
- Once big picture is worked out the thousand pages of details fall into a natural place.
Academic Video/Audio Possibilities

- Video Files – Copyright easily obtained for robust amount of news footage of rafter phenomenon (educational usage, footage digitized, converted to Real Media Files, Served from Real Media Streaming Server, (Adobe Premiere)

- Spanish/English Audio Interviews digitized, converted to MP3: Plentiful OpenSource Software Buzzsaw Audio Ripper, Lame, served via Flash

New Flash Video (fvp.) possibilities, Quick streaming + very robust interactivity possibilities (Actionscript 2.0) + New Database Components (Adobe/Macromedia Recent Merger)

Sixties, Course Video Archive
http://scholar.library.miami.edu/Sixties

Cuban Theatre Archive
http://scholar.library.miami.edu/archivoteatral
Digital Library Interactivity
Technology and New Conceptual Paradigms

(Actionscript 2.0/ Flash Schneiderman’s Leonardo’s Laptop, Manovich, Language of New Media,

(The visual timeline here contains a spectrum of media types: real video archival footage of the rafters, image and PDF archival document links, links to US Coast guard statistics and outside links to ancillary databases)
**HCI Focus**

- **Keywords**
  - Cognitive Cartography
  - Visual Metaphor
  - Visual Narratology

- All media types can be attached to the skeleton of a Humanly centered visual metaphor (text, audio, video, datasets, images) which contains the databases.
Paradigm Shift to New Visual Cognitive Cartography

The rafters application heralded a gradual and synergistic methodological paradigm shift for our department.

Old Paradigm ‘Digital Library
Emphasis on “Container”, “Silo”
Passivity,,Repository,Textbased

New Paradigm Academic Digital Resource, emphasis on Fluidity,
Hybridity of Media, Synthesis, Action

Organically generated visual Metaphor, cognitive cartography
Visual narrative, HCI,Flash,
Actionscript, Zoomify Possibilities

TextBox HTML Search
Metadata attached to Text, Images, Video Material
(Backend PhP/MySQL Or other Database)
Technical Specifications

**Rafters Model**
- Digital Assets (Documents, Images, Audio, Video, Databases)
- Visual Map (Zoomify: Streamable, Tiling Algorithm Technology)
- Flash (compiled swf file)
- HTML (Frames Based Casing)

**Advantages**
- (fully customizable Map can be chosen, imported, Human Genome, Stars, Cuba, size unlimited)
- Zoomify Enterprise Provides Higher Annotative Possibilities
- (Used by U.S. Government, Raytheon in lieu of Java Runtime API, less development time, less clunky)
- Rich Interactivity Possibilities Provided by Flash and Actionscript 2.0
- Studio 8 (Macromedia RIA Rich Internet Application Platform + Merger with Adobe Provides New Possibilities)
Mashup Technology and Lightweight Developer Models

Two Existing Databases Remixed: Craigs List + Google Maps
Google has opened their API (Navteq, Multimillion dollar Map database open, Up to 50,000 hits/day
http://www.google.com/apis/maps/

AJAX Model
presentation, XHTML, CSS;
dynamic display/interaction, Document Object Model;
data interchange/manipulation: XML, XSLT;
asynchronous data retrieval, XMLHttpRequest;
JavaScript binding everything together.

Advantages
Anyone can use this with a little Javascript knowledge, not as much programming needed (no Flash.)
Not strictly true: different set of tools

Disadvantages
limited to Google Map specified annotation features
Final Questions: Are these Methodologies strictly for Humanities/Social Sciences?

- National Cancer Institute, UC Davis Center for Comparative Medicine Using more robust form of Zoomify (Enterprise) for medical research). Other areas: GIS, semiconductor inspection, materials science, Chemistry and Biotech, Security, Astronomy, Bioinformatics, Human Genome
- Zoomify sits on top of Flash
- Any process where humans make ‘models’
- Current state of research: exploring limit cases and synthesis with databases

http://www.zoomify.com/enterprise/
Lessons Learned:
Synergies and Humanly Usable Digital Libraries

- After a year and a half of use, our Webtrends Weblog Statistics show that this is our most widely used Digital Library (approx. 47,000 hits per month compared to 3000-5000 of other MySQL/PHP Digital Libraries
- Cognitive map and focus on visual narratology and interactivity sucks users in for second/third viewings (same IP addresses)
- 2-3 viewings prefer mixture of map + text centric taxonomy to explore site
- New Synergistic Effects with other MySQL/PHP database‘digital image/video libraries’
Conclusions

- The Balseros site was successfully used as a large screen kiosk during the Cuban Rafters Conference. It continues permanently at http://balseros.miami.edu.

- It acted as a paradigm case study for our department and is currently used largely as a living library, continuously updated as a learning and policy resource. Future plans include turning the entire structure into an open weblog format.

- Currently, this is the next frontier as academic ‘digital library’ boundary walls are still in place (organically living digital libraries).
Select Bibliography

Articles


Books

Websites

- Human Computer Interaction Laboratory. (Shneiderman et al., College Park Maryland) http://www.cs.umd.edu/hcil/ (click Visualization)
- Flashforward http://www.flashforward2003.com (Click on past winners for excellent examples)
- Macromedia. http://www.macromedia.com (Click on Sites of the month for technical deconstructions)
  
- University of Miami Digital Initiatives. http://digital.library.miami.edu
- Xerox Parc Research Group http://www.parc.xerox.com/research
Thank You for Coming

Questions?

http://balseros.miami.edu
http://digital.library.miami.edu

Presentation Available at:
http://www.library.miami.edu/Presentations/Rafters.ppt

Contact Information: Ray Uzwysyn
ruzwysyn@miami.edu