



**THE OPEN VIDEO PROJECT**  
a shared digital video repository

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**The Open Video Digital Library: The  
Challenge of Transition from Test Bed to  
Sustainable Library**

Digital Humanities Lecture Series  
Texas A & M  
February 1, 2008

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Interaction Design Lab

# Theoretical View

- Digital video is crafted expression
  - Multiple channels (analog and digital)
  - Visceral as well as intellectual effects (analog and digital)
  - A descendant of film but with potential dynamics/behavior (digital)—changes over time, every time
- Digital Libraries are journeys (learning environments) rather than destinations for patrons and librarians
  - Beyond libraries as repositories to sharium
- Open Video deals with reusable (open) video objects
  - A journey toward new forms of expression and reflections on history
  - What do you do with 24/7 feeds of video from every street corner in Manhattan?

# Digital Video Status

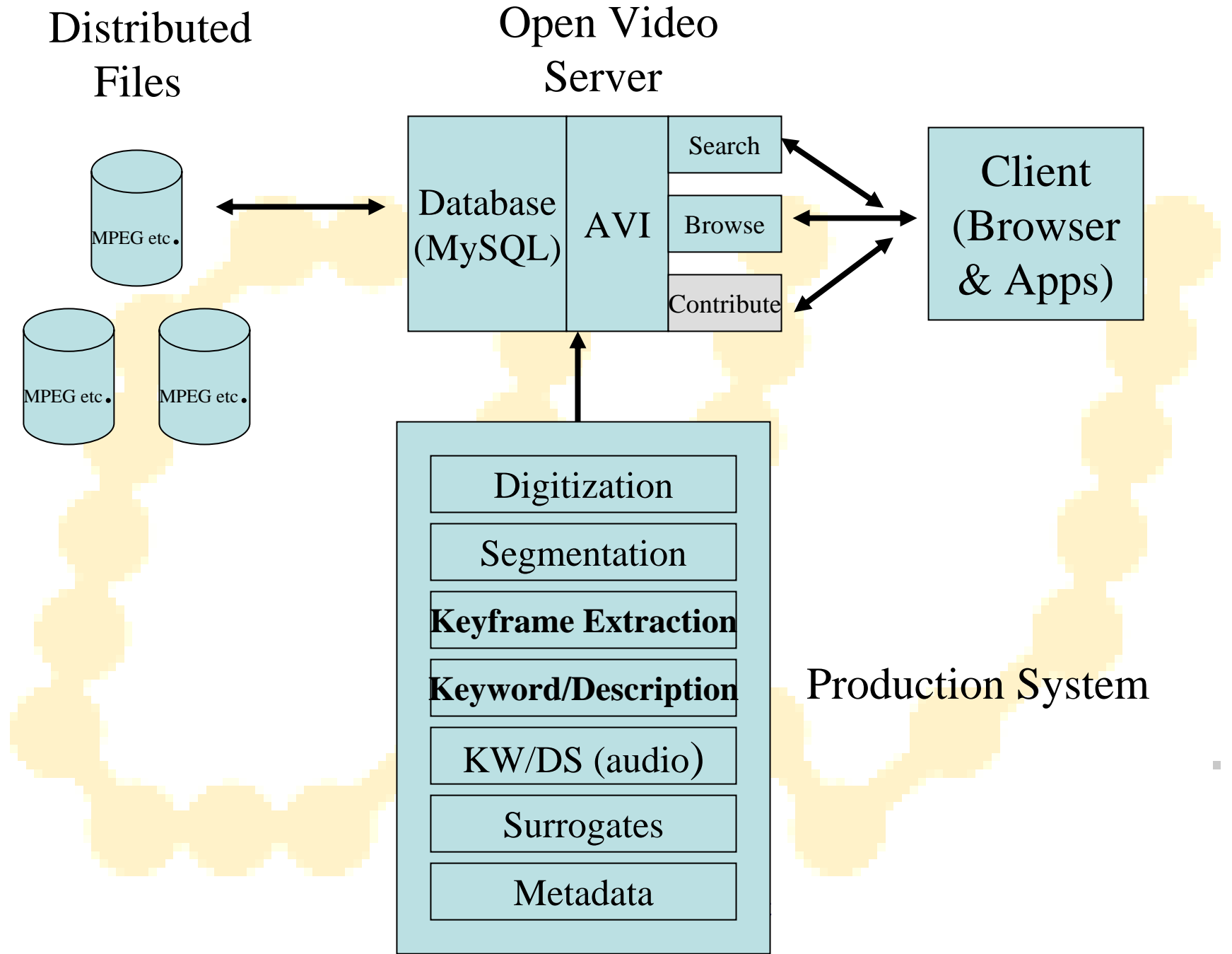
- Digital video a burgeoning DL challenge: YouTube phenomenon (fall 2007: 65K new videos/day; 20TB/mo; 100M views/day)
- Substantial research activity on storage, retrieval from engineering perspective (see IEEE, ACM MM)
- Many large-scale DLs and services
  - InforMedia, Fischlar, ECHO, Internet Archive , Open Video, public.tv, researchchannel
- Most attention on system/collection building rather than services
- Commercial attention on system and management
  - IBM, MERL, Microsoft, Artesia, Virage
- NIST TREC Video Track for retrieval evaluation
- Nice advances on capture, critical need for reuse tools
- Crucial need for evaluation that includes human factors
- Crucial need for sustainability models
  - Public service, advertising, pay-per-view, institutional repository?

# Open Video Vision/Contributions

- An open repository of video **files** that can be re-used in a variety of ways by the education and research communities
  - Open and encourage contributions, reuse
- An easy to use DL based upon the *agile views interface design framework*
  - Multiple, cascading, easy to control views (pre, over, re, shared, peripheral)
  - Views based upon empirically validated surrogates
  - An environment for building theory of human information interaction
- A set of methods and metrics to study how people understand digital video through surrogates
- Research agenda coupled to production service

# Background & Status

- Begun 1995 with colleagues at UMD & BCPS; current instance at UNC initiated in 1999
- Funding: NSF# IIS-0099538 1999-2004; NSF IIS 0455970 2006-07; Library of Congress NDIIPP (2007-08); IBM (2007); Google (2007)
- Collaborators/Contributors: I2-DSI, ibiblio, CMU, UMD, Prelinger Archive, Internet Archive, NASA, ACM
- ~4000+ video segments
- ~40000 unique visitors per month
- ~1.8M hits/month
- MPEG-1, MPEG-2, MPEG-4, QT
- OAI provider
- Ongoing user studies

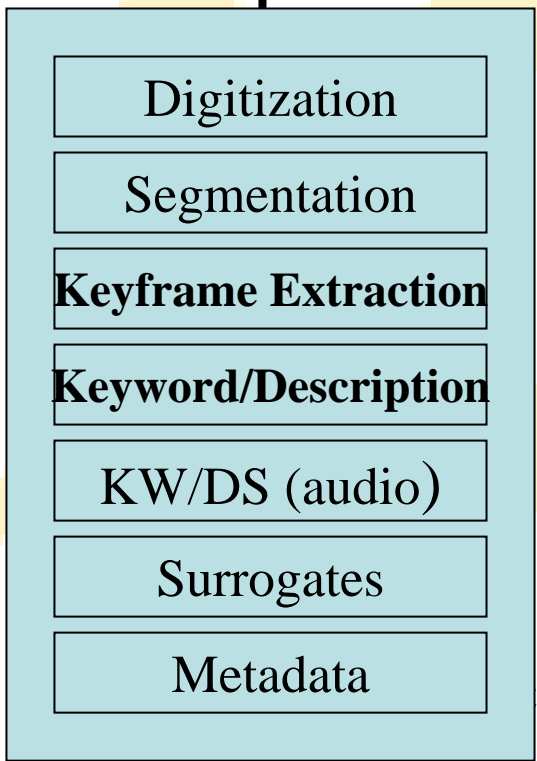
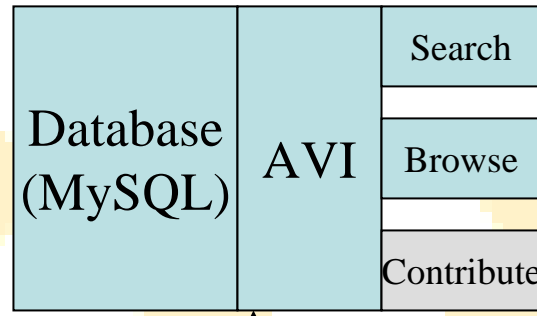
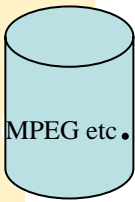
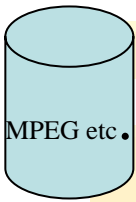
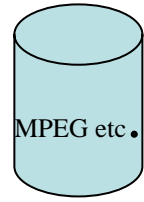


Distributed Files

Open Video Server

Client (Browser & Apps)

Production System



# Backend Tools and Services

- Workstations, servers, disk arrays
- Tape players (VHS, Beta SP, PAL), boxes of tapes, DVDs (ugggg)
- Final Cut Pro, Media Cleaner, Adobe Premier
- Bandwidth (UNC-CH switched ethernet)
- Linux OS, PHP scripting language, MySQL DBMS, Apache server
- SILS backup service, SRB preservation

# Backend Tools and Services (cont')

- Merit (UMCP UMIACS), ported to Linux to extract candidate keyframes
- Speech to text (e.g., Sphinx at CMU)
- VAST keyframe/posterframe extraction, selection, and management
- Transaction logs and scripts (for evaluation and for recommenders)
- Peer to peer exchange
- ISEE (shared remote video use, e.g., DE)
- Indexer workstation (VIVO)



# Tools and Services for User Studies

- Database driven web pages for user interaction
- Usability workstation (multiple camera, mixer, VCR)
- eye tracking system; BioPac
- Speech synthesis (Cepstral 'Amy' license for audio keywords)
- Java and Perl scripts for managing, moving files, managing server (security, upgrades, etc.)

## Search



ex. "water" or "space shuttle"

[Detailed Search](#)

## Browse

### Genre

- Documentary [494]
- Educational [99]
- Ephemeral [1140]
- Historical [187]
- Lecture [16]
- Other [5]

### Duration

- Less than 1 minute [182]
- 1 to 2 minutes [243]
- 2 to 5 minutes [294]
- 5 to 10 minutes [287]
- More than 10 minutes [916]

### Color

- In color [901]
- In black & white [1040]

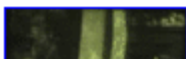
### Sound

- With sound [1556]
- Silent [385]

### Collections

- University of Maryland HCIL Open House Video Reports
- The Informedia Project at Carnegie Mellon University
- Internet Moving Images Archive
- 2001 TREC Video Retrieval Test Collection
- CHI Video Retrospective
- Digital Himalaya Project

## Special Collection Spotlight



### Digital Himalaya Project

Digital Himalaya is a pilot project to develop digital collection, archiving and

## Project News

- Redesigned Project Web Site
- Understanding Video Symposium
- Edison films added
- More previews

[more...](#)

## Featured Video

### • New



**HCIL Symposium  
2002 - Introduction,  
segment 01 of 10**

#### Other new videos

- HCIL Symposium 2002 - International Children's Digital Library, segment 03 of 10
- HCIL Symposium 2002 - HCIL/Washington Post Promo, segment 10 of 10
- HCIL Symposium 2002 - Searching Foreign Language Collections, segment 08 of 10

[more...](#)

### • Popular



**Atom Bomb [Joe  
Bonica's Movie of  
the Month**

#### Other popular videos

- Classic Television Commercials (Part II)
- NASA 25th Anniversary Show, Segment 01
- Bunjee


[more...](#)

### Modify Search

Search:    
 for   
 Genre:    
 Duration:    
 Format:    
 Color:  Color  B&W  Either  
 Sound:  Sound  Silent  Either


[Detailed Search](#)

Layout:  Sort by:    
 Results per page:

- 

**Video Browsing Interfaces for the Open Video Project (2001)**  
 Overview of The Open Video Project.  
**Genre:** Educational  
**Keywords:** Open source; Digital video; Interface; Browse;  
**Duration:** 04:52  
**Popularity (downloads):** 341

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- 


**Talking to the Ceiling: An Interface for Bed-Ridden Manually Impaired Users (1999)**  
 Video demonstration from the 1999 CHI conference.  
**Genre:** Educational  
**Keywords:** Interface; Impaired; User; CHI;  
**Duration:** 07:04  
**Popularity (downloads):** 193

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- Preview not available

**Manipulative User Interfaces: Exploring Physically Embodied User Interfaces (1999)**  
 Video demonstration from the 1999 CHI conference.  
**Genre:** Educational  
**Keywords:** Interface; Manipulative; Explore; Embodied; User; CHI;  
**Duration:** 03:31  
**Popularity (downloads):** 62

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**OLGA - A Multimodal Interactive Information Assistant (1998)**  
 Video demonstration from the 1998 CHI conference.  
**Genre:** Educational  
**Keywords:** OLGA; Interactive; Information; Assistant; CHI;

**Modify Search**

Search: All fields

for

Genre: Educational

Duration: - Any Duration -

Format: - Any Format -

Color:  Color  B&W  EitherSound:  Sound  Silent  Either[Detailed Search](#)











Page 1 Search Results (93 videos found)

Layout:



Sort by: Relevance

Results per page: 10


Title	Year	Duration	Genre	Popularity
 Video Browsing Interfaces for the Open Video Project	2001	04:52	Educational	341
 Talking to the Ceiling: An Interface for Bed-Ridden Manually Impaired Users	1999	07:04	Educational	193
 Manipulative User Interfaces: Exploring Physically Embodied User Interfaces	1999	03:31	Educational	62
 OLGA - A Multimodal Interactive Information Assistant	1998	06:48	Educational	219
 Digital Ink: A Familiar Idea with Technological Might!	1998	08:33	Educational	200
 ambientROOM: Integrating Ambient Media with Architectural Space	1998	05:30	Educational	143
 An Animated Direct-Manipulation Interface to Digital Library Services	1997	06:58	Educational	77
 Technology at Home: A Digital Personal Scale	1997	01:40	Educational	199
 A GUI Paradigm Using Tables, Two Hands and Transparency	1997	10:18	Educational	156
 A Tour of Teamrooms	1997	08:40	Educational	159

**Search**ex. "water" or "space shuttle" [Detailed Search](#)**Related Video**• **Video Grab Bag****Clerks tying bags,  
U.S.P.O.****Other random videos**

- Measure of a Man
- Old mail coach at Ford, U.S.P.O.
- Worlds Smaller than Saturn,  
segment 03 of 4

[more...](#)**Video Details****Hoover Dam Construction, segment 12 of 17** **7-sec excerpt**

Progress was made on structures appurtenant to the dam

 **Storyboard** **FastForward****Download:** **MPEG-1** • 10.22 MB**This video is one segment of a larger video title. See all 17 parts »****Video Information**

<b>Year:</b>	1996
<b>Genre:</b>	Documentary
<b>Keywords:</b>	
<b>Duration:</b>	00:01:09
<b>Color:</b>	Yes
<b>Sound:</b>	Yes
<b>Amount of Motion:</b>	Medium
<b>Language:</b>	English
<b>Sponsor:</b>	Bureau of Reclamation
<b>Contributing Organization:</b>	Carnegie Mellon University, Informedia Project
<b>Transcript Available:</b>	Yes

**Search**

Search

ex. "water" or "space shuttle"

Detailed Search

**Related Video**

**Video Grab Bag**



**Dynamic American City, The (Part II)**

**Other random videos**

- The Rio Grande, segment 07 of 9
- Mining operations, Pennsylvania coal fields
- Jealousy

[more...](#)

**Video Details**

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Detailed Search

### Related Video

#### Video Grab Bag



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### Digitization Information

<b>Digitization Date:</b>	1996
<b>Digitizing Organization:</b>	Carnegie Mellon University Informedia Project

# Agile Views Interface Research

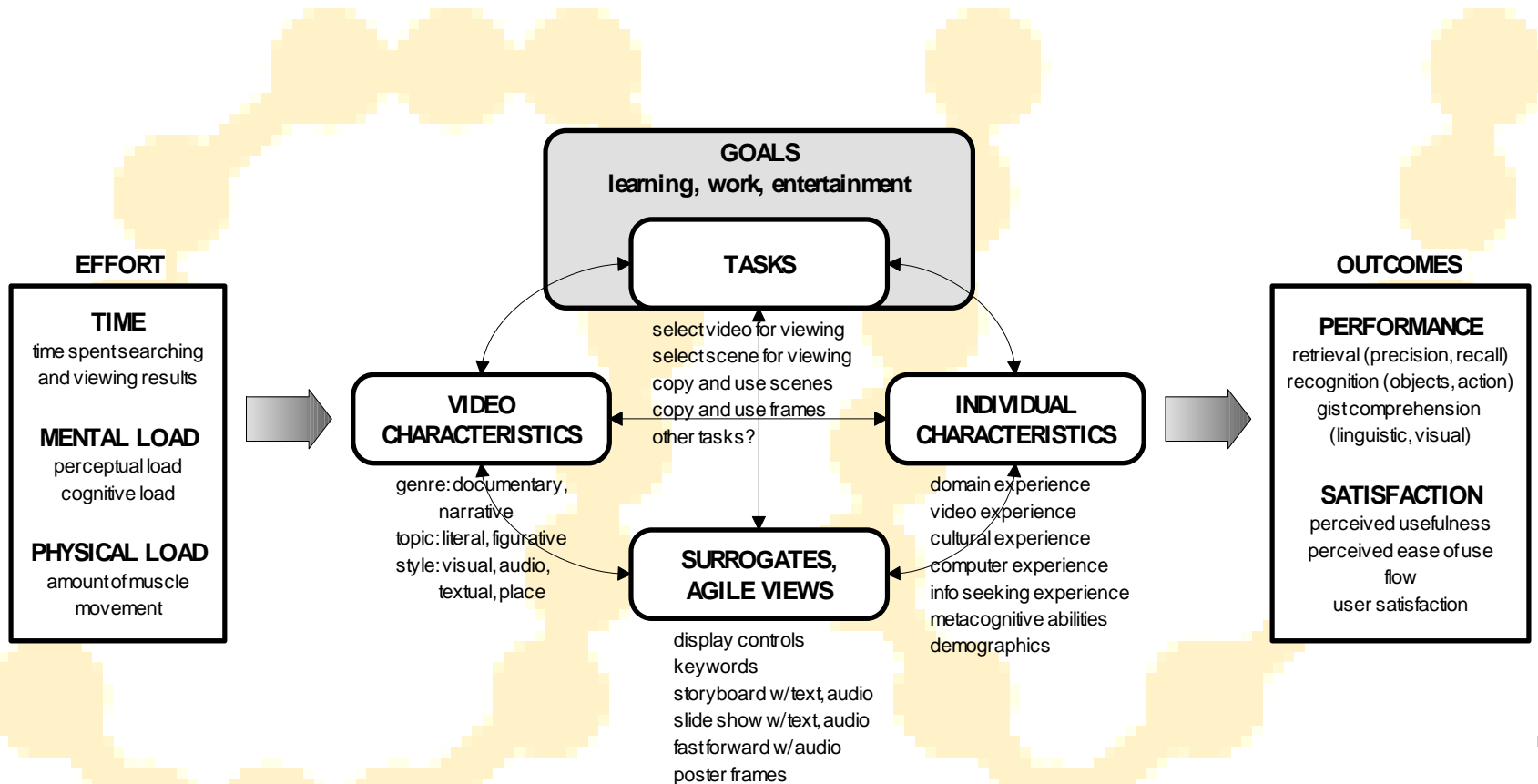
- Provide a variety of access representations (e.g., indexes) and control mechanisms
  - Overview, preview, review, peripheral view, shared view
  - Text search plus view browsing (facets)
- Leverage both visual and linguistic cues to create surrogates for gisting
- Create and test surrogates in different views



# Digital Video Surrogates

- Classes
  - Textual
  - Visual
  - Audio
  - Combined
- Cost benefit analysis: maximize 'meaning' per unit time (gist and vlist)
  - Transmission time
  - Compaction rate
  - Cognitive processing time
- Performance vs. Preference

# User Interaction Research Framework



# Surrogates Examined

- Storyboard with text keywords (20-36 per board@ 500 ms)
- Storyboard with audio keywords
- Slide show with text keywords (250ms repeated once)
- Slide show with audio keywords
- Fast forwards 32X, 64X, 128X, 256X
- Poster frames (1-3)
- Real time clips/excerpts (7 sec)
- Text (title, keywords, etc.)
- Visual features (e.g., in/out, people, etc.)
- Spoken descriptions
- Spoken keywords
- Combined visual (storyboard, fast forward) and spoken (descriptions, keywords)

# Tasks

	<b>Text</b>	<b>Still Image</b>	<b>Moving Image</b>	<b>Audio</b>
<b>Recognition/ Selection</b>	Object selection (text) Keyword selection Description selection Title selection	Object selection (graphical) Keyframe selection	Excerpt selection	Select Spoken Description Select Spoken Keyword
<b>Generative Inference</b>	Gist writing (free text)	Visual gist determination		

# Metrics

**Accuracy**

**Confidence**

**Time to complete**

**Usefulness, usability, engagement, enjoyment, preferences**

# User Studies

- Qualitative Comparison of Surrogates (Spring 02, ECDL 02)
- Fast Forwards (Fall 02, JCDL 03)
- Text or Pictures (Spring 03, CIVR 03)
- Narrativity (CHI 02, ASIST 03)
- Shared views and History Views (Geisler dissertation)
- TREC evaluation (Spring/summer 03; 05)
- ViSOR (Gruss Master's paper)
- Look vs Read (Hughes Master's paper)
- Video relevance (CHI 05; ASIST04; Yang dissertation)
- Cognitive load (Mu dissertation)
- Teachers using video (Brown dissertation)
- Spoken Audio and Storyboards (CHI 07)
- Spoken Audio and Fast Forwards (current)

# Take Away Summary

- User studies inform design
- Give people multiple views and easy control mechanisms
- No silver bullets (many factors determine performance and preference)
- Words are powerful for gisting, visuals are liked and offer distinct value
- Video offers new kinds of potentials for learning and communication

# Two Related Spin Offs

(aka how to sustain when funding ends)

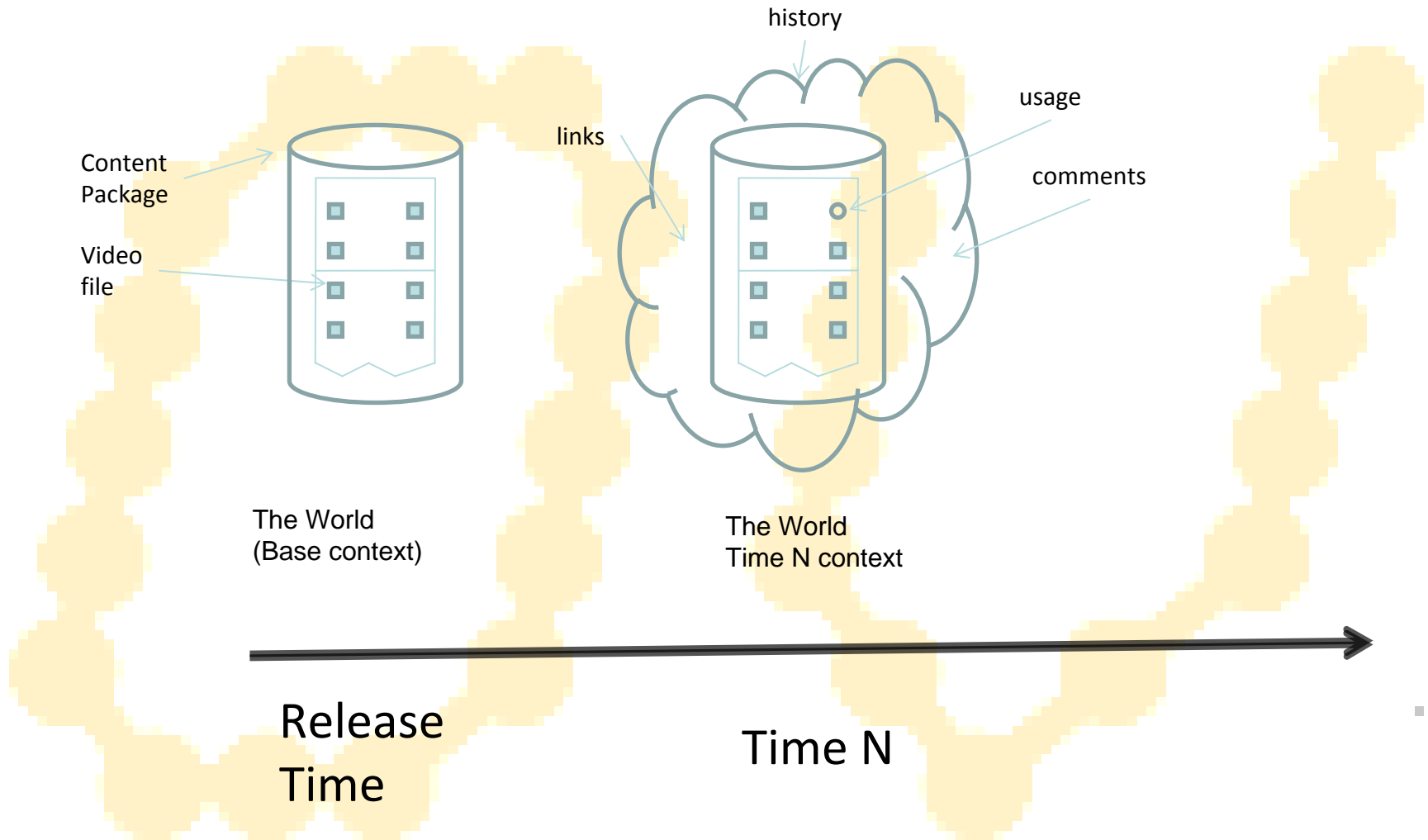
- Sustain the OV Vision
  - Support student assistants
  - New research directions
  - Open information services
- What about the OV production system?
  - OV 2.0
  - Transition to Library?

# Video Preservation Project

- What kind and how much context to preserve?
- National Digital Information Infrastructure Preservation Program (NDIIPP) funding via NSF and LoC.
- Focus on specific topics
  - 2008 Presidential campaign (15K May 07-present)
  - Energy, truth commissions, health, pandemics
- Harvest video, metadata, and activity from YouTube; use API to query rather than crawl
- Create Curator's tools and services
- **Fundamental DL issue of content/metadata/context boundaries in WWW objects**



# Content, Metadata, & Context: Boundaries?



# Information In Life Series for UNC YouTube Channel

[www.youtube.com/uncchapelhill](http://www.youtube.com/uncchapelhill)

- Google video hosting of subset of OV (2005-06)
- YouTube Education Channels
  - Information In Life series: lectures, interviews
  - Campus policies and logistics

# Sustainability?

- Personal → Local → Global
  - How do people make sense of video?
  - How does video get integrated into interpersonal communication (e.g., mobile/ubiquitous)?
  - OV production system sustainability and preservation?
- The research & practice mobius strip works for a person, unclear whether this scales to institution or global levels, thus need for partnerships (TAMU Cervantes, industrial labs, etc.)



# THE OPEN VIDEO PROJECT

a shared digital video repository

## Q&A

• **Primary Investigators: Gary Marchionini, Barbara M. Wildemuth**

• **Lead Developer: Gary Geisler**

• **Ron Brown, April Edlin, Rich Gruss, Brenn Hill, Anthony Hughes, Xiangming Mu, Terrell Russell, Yaxiao Song, Larry Taylor, Tom Tolleson, Curtis Webster, Todd Wilkens, Meng Yang**

Gary Marchionini, UNC

