



# Toward Multimedia Surrogates

Los Angeles Chapter of the American Society for Information  
Science and Technology

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# Outline

- Surrogate roles
- The Representation Continuum
- Multimedia surrogates
- Open Video Case
  - Visual surrogates
  - Audio surrogates
  - The question of synchronicity
- Your surrogate
- Conclusions and Q&A

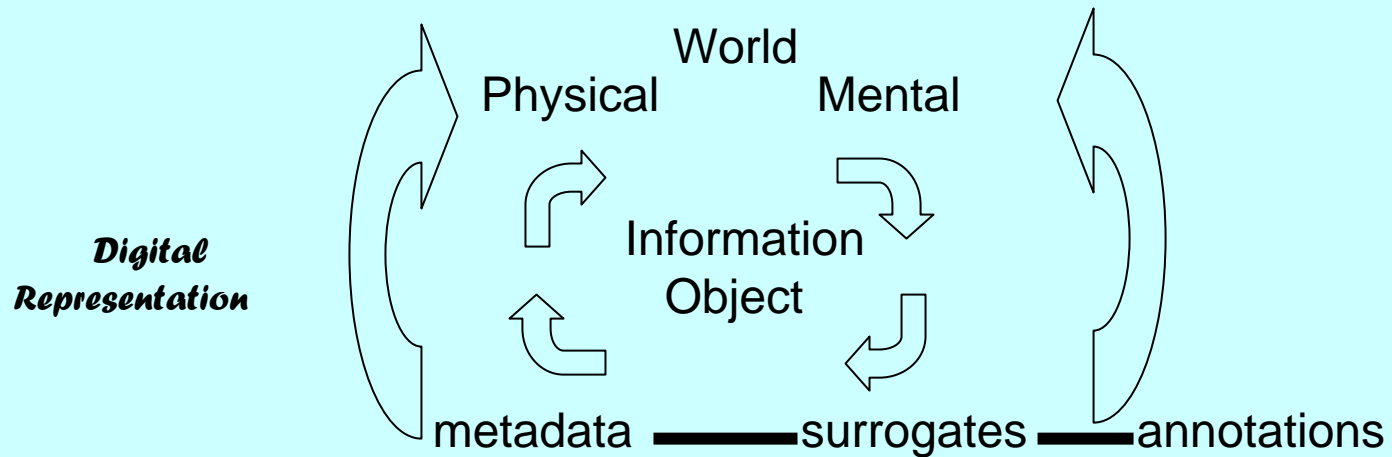
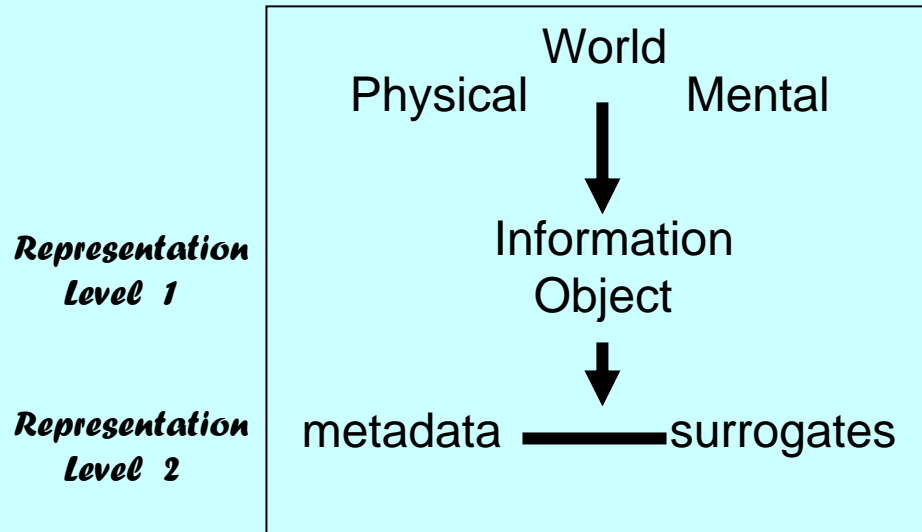
# What is (was) a Surrogate?

- Condensed representation constructed to stand for an information object
- Information compressions
- Surrogates
  - Enable decision-making by presenting search results in a uniform way
  - Support sense making and incidental learning
  - Save human time (compaction)
  - Save network capacity and system resources
- Examples
  - Abstract, gloss, summary
  - Title, bibliographic record
  - Preview, snippet
  - Profile
  - Logo

# The Blur

- The (relatively) Neat Past and the Very Scruffy Present
  - Blurring the ‘levels of representation’ model of information (primary-secondary-tertiary-n-ary)
- The metadata—surrogate continuum within the levels of representation continua
  - Metadata region mainly for retrieval
  - Metadata region mainly for and by machines (semantic web)
    - Automatic metadata generation advances
    - Implicit links and mining of interactions as metadata
  - Surrogate region mainly for sense making
  - Surrogate region mainly for and by people
    - Professional abstracting
    - Social tagging and annotations/links as surrogates

# Representation and the Digital Blur



# Multimedia Surrogates

- Two kinds of meaning:
  - Surrogates for multimedia (non-textual Information objects)
    - Text
  - Surrogates that are not text
    - Album art, movie posters
- My research has focused mainly on video information objects, however.....

# Video Surrogates

- Driven by the technical community (signal processing, video retrieval)
- Identify feature sets (e.g., color, luminosity, optical flow, faces/shapes) and invent/adapt matching algorithms (e.g., IR models of feature frequencies such as large inter-frame changes in color histogram patterns implies scene change)
  - Companies like Virage and Sonic Foundry; projects like MARVEL and MAGIC
  - University projects like Infromedia, Fisclar, Open Video
- TRECVID

# Non-Textual Surrogates

- Poster frame: an image selected to represent the video, usually a single frame extracted from the video.
- Storyboard: a set of keyframes displayed in chronological order, usually in a tabular format.
- Slideshow: a series of keyframes presented for viewing one at a time for a few seconds each, i.e. as if viewing a slideshow.
- Collage: a dynamically-created, interactive image constructed of text and images from multiple videos, perhaps at different display sizes.
- Fast-forward: most easily created by selecting every Nth frame and displaying the frames at normal speed (30fps).
- Skim: a video clip 'abstract' created by compacting visual and audio information while preserving the original frame rate.
- Trailer: a pre-produced series of clips excerpted from a video.
- Spoken keywords or descriptions.

### Modify Search

Search:    
 for

Genre:

Duration:

Format:

Color:  Color  B&W  Either

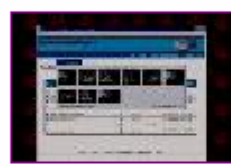
Sound:  Sound  Silent  Either

[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



#### 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



#### 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



#### 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

Search

[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**

**Hoover Dam Construction, segment 12 of 17**



7-sec excerpt

Progress was made on structures appurtenant to the dam

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<b>Sound:</b>	Yes

Detailed Search

### Related Video

#### Video Grab Bag



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

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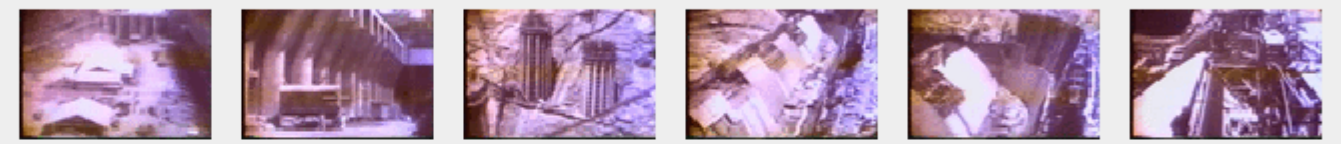


7-sec excerpt

Storyboard

FastForward

dam



**Download:**  MPEG-1 • 10.22 MB

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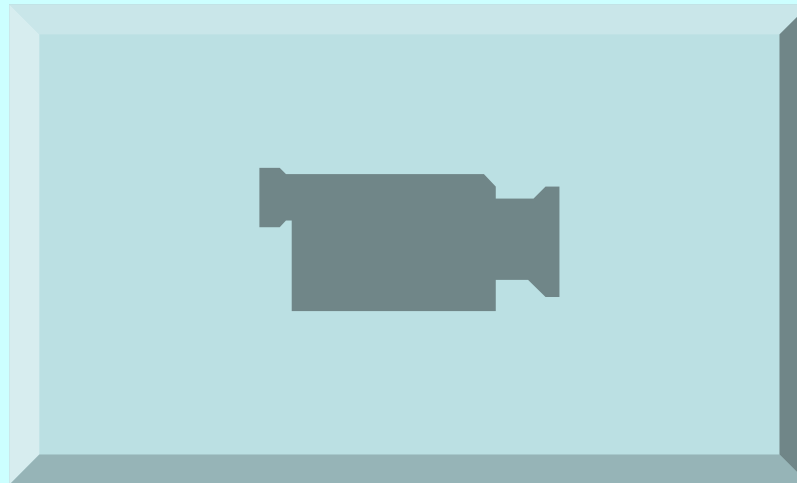
<b>Year:</b>	1996
<b>Genre:</b>	Documentary
<b>Keywords:</b>	
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<b>Sponsor:</b>	Bureau of Reclamation
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<b>Transcript Available:</b>	Yes

### Digitization Information

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

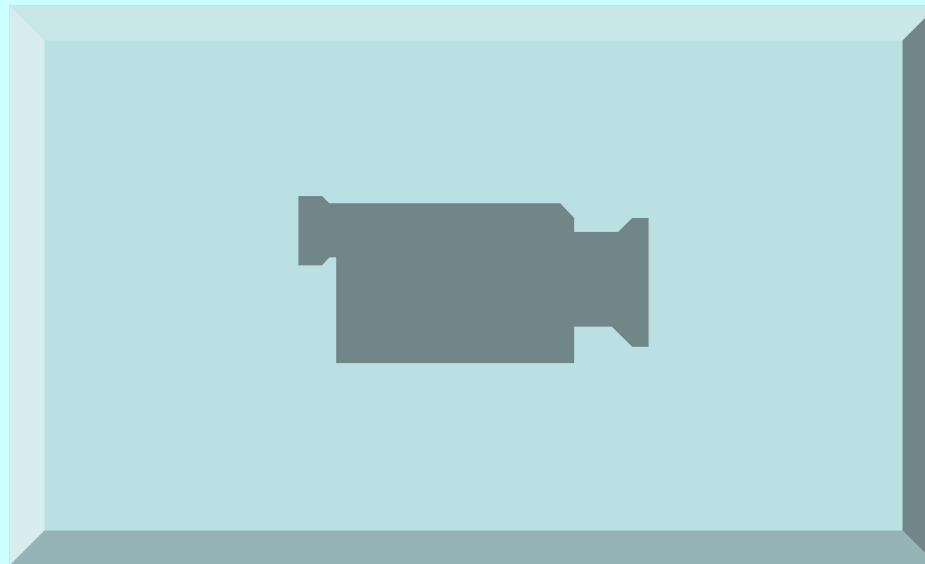


# Sample A. 9:19 at 32X



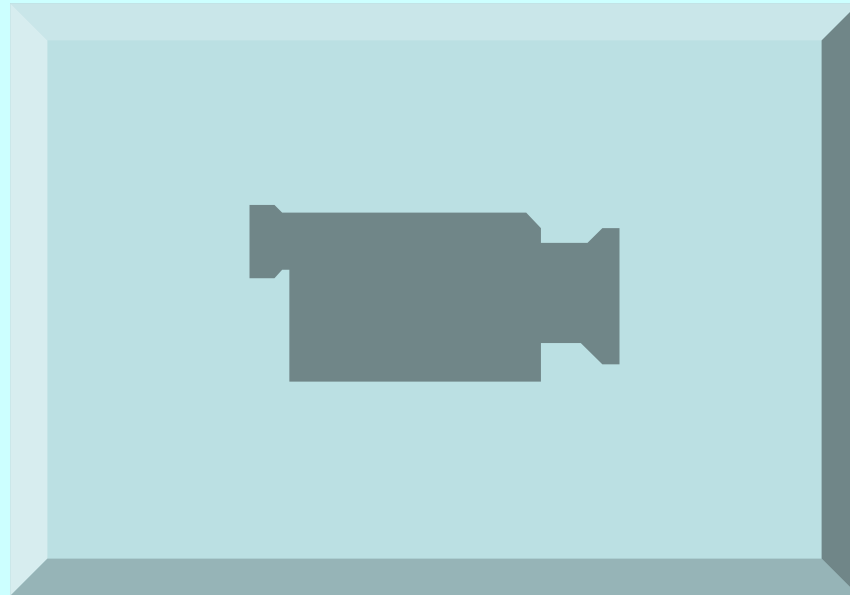


# Sample B. 19:48 at 64X



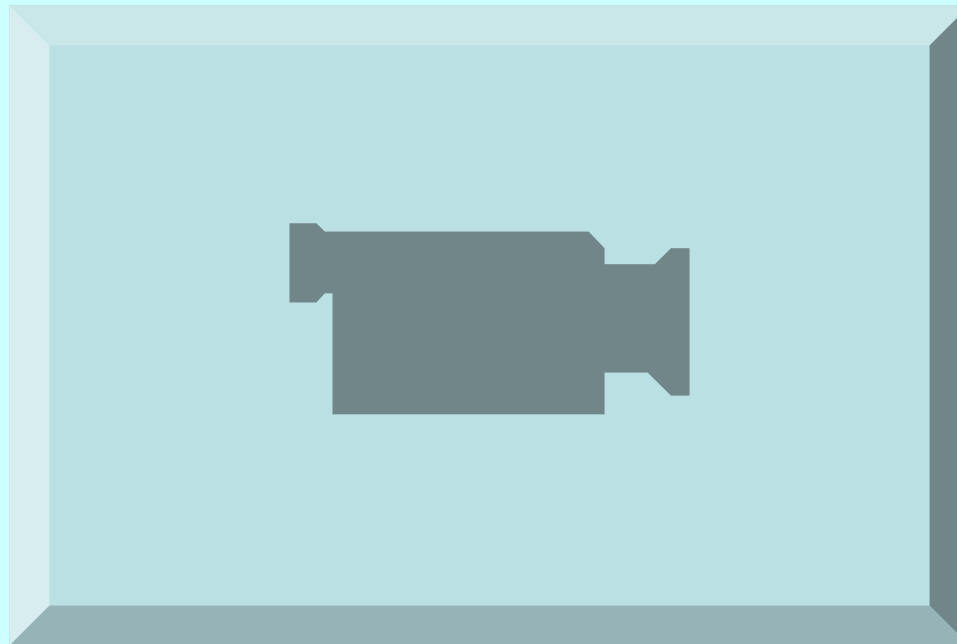


# Sample C. 14:00 at 128X



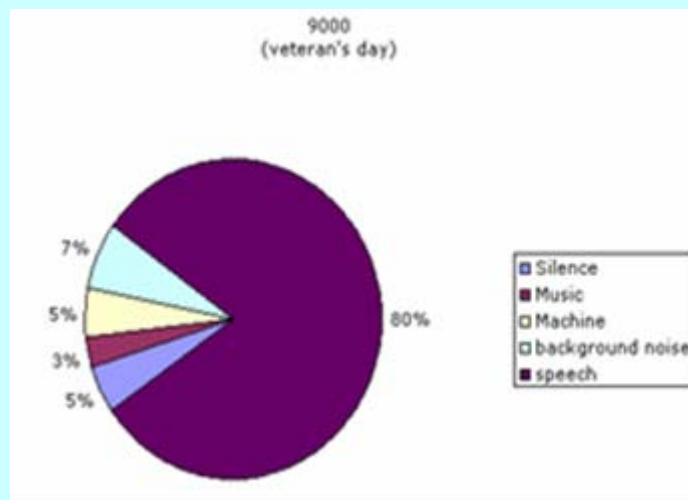
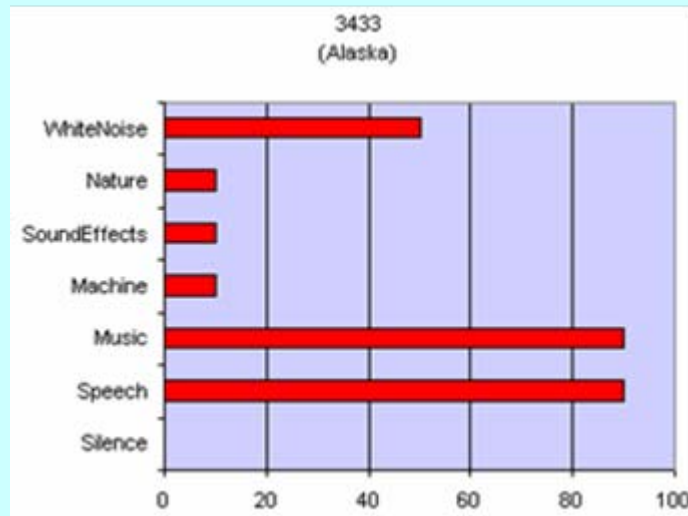


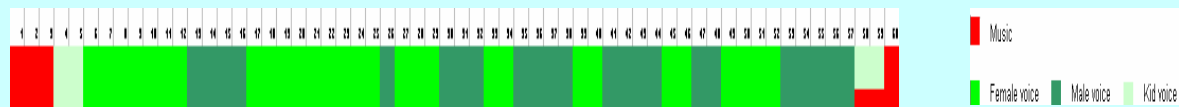
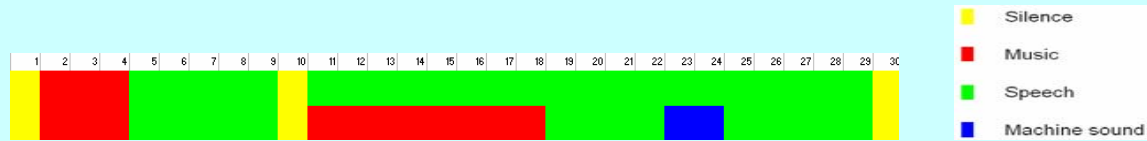
# Sample D. 14:09 at 256X



# Audio Surrogates

- Spoken descriptions, summaries, keywords
- Visual displays of audio signals
- Audio skims (excerpts)
- Compressed speech
- Parallel streams (cocktail party effect)





# Recent Study (CHI 07)

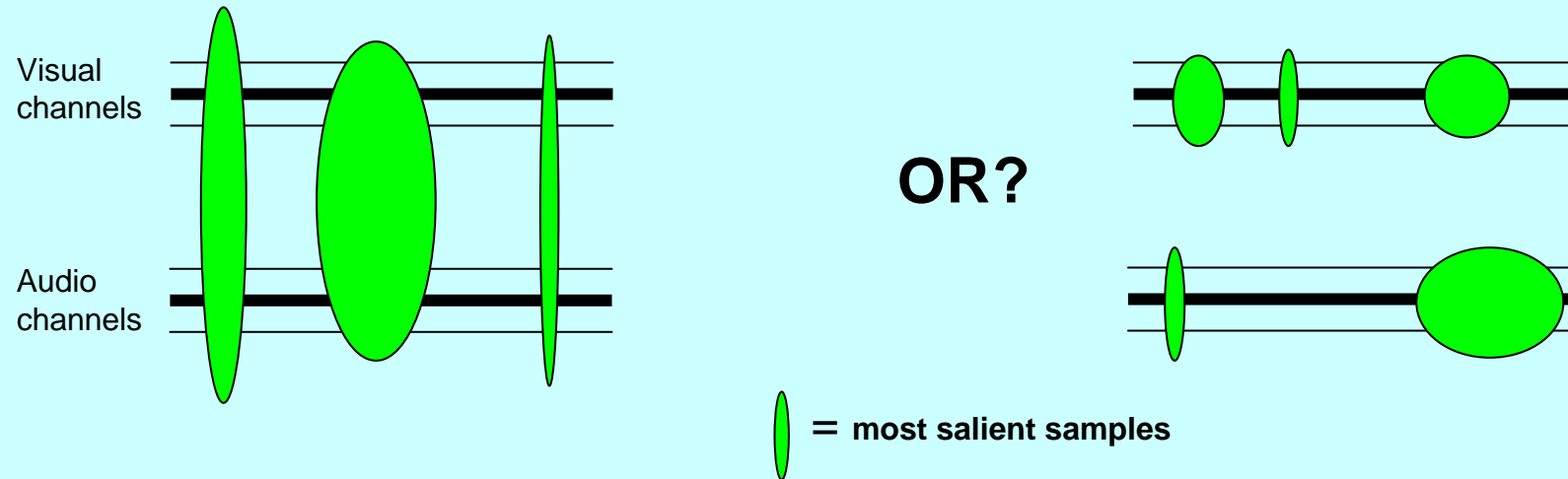
- 36 participants, within subjects design used audio-only (spoken descriptions), visual-only (storyboards), and combined surrogates to do 5 kinds of recognition and gist tasks.
- Accuracy, time to view, time to complete task, suite of affective measures
- Statistically reliable differences on 3 of 5 accuracy tasks, time to view, and most affective measures. Combined generally better and preferred, audio almost as good as combined, visual alone faster to consume but no time penalties for audio and combined on task completion.
- Implications
  - Add audio surrogates
  - Use audio in small form-factor devices
  - Audio and visual quality important
  - Synchronizing different channels in surrogates may not be necessary
  - User controlled tradeoffs: time, satisfaction, performance



# Synchronicity

- Coordinated media channels lead to better understanding, retention, and satisfaction
- What about multi-channel surrogates?
  - Assume surrogate channels should also be coordinated?
  - Perhaps more sense making possible if sampling across different channels and integrating in the head at consumption time rather than pre-coordination at indexing time?
- We have initiated a series of studies

# Tradeoffs




Pre-processed integration yields less cognitive load. Less sense making and retention?

User-centered integration (constructivist). More cognitive load. Better sense making and retention due to active participation and ?better? Information samples

# Broader Directions: Toward a Theory of Digital Surrogation


- Non-textual tags
  - Photo icons for people on cell phones
  - Audio annotations on digital cameras/phones
  - Geocodes on images (e.g., zonetag on Flickr)
  - Video upload comments on YouTube
  - Avatar characteristics on Second Life
- When do the surrogates become primary?
- When do the surrogates become annotations and annotations surrogates or primary?
- How do we create and use surrogates?


# Digital Surrogates are Malleable

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# A Hint of what is to come: YouTube related and responses

- Example 1. U2-----BOA
- Bank of America sings U2's One  
<http://youtube.com/watch?v=0qAugq1LFnU>
- David Cross covers Bank of America guy covers U2  
<http://youtube.com/watch?v=KC4cn-GleGM&mode=related&search=>
- Johnny Marr & David Cross - One - Bank of America Cover  
<http://youtube.com/watch?v=nGGChOuCyJk&mode=related&search=>
  
- Example 2. Original video: Ninja Assessment  
[http://youtube.com/watch?v=2Ote\\_x2C6CE](http://youtube.com/watch?v=2Ote_x2C6CE)
- Response: The Twins Watch "Ninja Assessment"  
[http://youtube.com/watch?v=39rEBkyGGi0&watch\\_response](http://youtube.com/watch?v=39rEBkyGGi0&watch_response)
- Response (spam?) Verizon commercial  
[http://youtube.com/watch?v=sQe05PYuzYo&watch\\_response](http://youtube.com/watch?v=sQe05PYuzYo&watch_response)

How might we understand this over time (e.g., 50 years)? The challenge of context is digital preservation (NDIIP Project)

# Please Don't Tell My Mother



# Personal Identity: Your Proflection

- What are the surrogates for you?
- What are your surrogates in cyberspace? (there are more than you might think)
- Proflection as surrogate for self
  - Projection of surrogates into cyberspace
    - Conscious (e.g., your webpage, Facebook profile)
    - Implicit (your click streams, your exoinformation)
  - Reflections of self in cyberspace
    - What others say/link about/to you
      - You are aware or not
    - What machines and algorithms say/link about you and all of your projections and reflections
- A fundamental issue of cyberinfrastructure
  - It is a stimulating and challenging new world for information professionals—the curse of interesting times and the euphoria of life in these times



# Q&A

# Thanks for your attention and questions

Thanks also to NSF, Library of Congress, NASA, Microsoft, and IBM for partial support of this work

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#### Research Article

## Technology, security, and individual privacy: New tools, new threats, and new public perceptions

Lee S. Strickland, Laura E. Hunt

College of Information Studies, University of Maryland, 4105 Hornbake Library, South Wing, College Park, MD 20742

**email:** Lee S. Strickland ([LSTRICKL@deans.umd.edu](mailto:LSTRICKL@deans.umd.edu))

#### INDEX TERMS

data security • personal information • privacy • public policy • information policy • technology impact • information technology

#### ABSTRACT

Highly portable information collection and transmission technologies such as radio frequency identification (RFID) tags and smart cards are becoming ubiquitous in government and business - employed in functions including homeland security, information security, physical premises security, and even the control of goods in commerce. And, directly or indirectly, in many of these applications, it is individuals and their activities that are tracked. Yet, a significant unknown is (a) whether the public understands these technologies and the manner in which personally identifiable information may be collected, maintained, used, and disseminated; and (b) whether the public consents to these information practices. To answer these and related questions, we surveyed a select group of citizens on the uses of this technology for business as well as homeland security purposes. We found a significant lack of understanding, a significant level of distrust even in the context of homeland security applications, and a very significant consensus for governmental regulation. We conclude that a primary objective for any organization deploying these technologies is the promulgation of a comprehensive Technology Privacy Policy, and we provide detailed specifications for such an effort.

Accepted: 26 February 2004

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#### Research Article

### How users assess Web pages for information seeking

Anastasios Tombros<sup>1</sup>, Ian Ruthven<sup>2</sup>, Joemon M. Jose<sup>3</sup>

<sup>1</sup>Department of Computer Science, Queen Mary, University of London, London E1 4NS, United Kingdom

<sup>2</sup>Department of Computer and Information Sciences, University of Strathclyde, Glasgow G1 1XH, United Kingdom

<sup>3</sup>Department of Computing Science, University of Glasgow, Glasgow G12 8QQ, United Kingdom

**email:** Anastasios Tombros ([tassos@dcs.qmul.ac.uk](mailto:tassos@dcs.qmul.ac.uk)) Ian Ruthven ([Ian.Ruthven@cis.strath.ac.uk](mailto:Ian.Ruthven@cis.strath.ac.uk)) Joemon M. Jose ([jj@dcs.gla.ac.uk](mailto:jj@dcs.gla.ac.uk))

#### INDEX TERMS

web pages • end user searching • criteria • online searching • evaluation • utility • relevance

#### ABSTRACT

In this article, we investigate the criteria used by online searchers when assessing the relevance of Web pages for information-seeking tasks. Twenty-four participants were given three tasks each, and they indicated the features of Web pages that they used when deciding about the usefulness of the pages in relation to the tasks. These tasks were presented within the context of a simulated work-task situation. We investigated the relative utility of features identified by participants (Web page content, structure, and quality) and how the importance of these features is affected by the type of information-seeking task performed and the stage of the search. The results of this study provide a set of criteria used by searchers to decide about the utility of Web pages for different types of tasks. Such criteria can have implications for the design of systems that use or recommend Web pages.

Received: 7 August 2003; Revised: 12 February 2004; Accepted: 12 February 2004

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#### Research Article

### The effects of the Children's Internet Protection Act (CIPA) in public libraries and its implications for research: A statistical, policy, and legal analysis

Paul T. Jaeger<sup>\*</sup>, John Carlo Bertot<sup>\*</sup>, Charles R. McClure<sup>\*</sup>

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#### INDEX TERMS

public libraries • content filtering • children • information access • information filtering • legal aspects

#### ABSTRACT

In upholding the Children's Internet Protection Act (CIPA), the U.S. Supreme Court has forced public libraries to face difficult issues about filtering Internet content. The implementation of filters creates a range of practical issues for libraries and also raises myriad research issues related to the effects of CIPA on public library services and on access to Internet-based information in public libraries. Using a multimethod, iterative research strategy, this article explores selected areas related to filtering that may affect the provision of Internet content and services in public libraries. This study presents preliminary data about the impact of CIPA on public libraries and

offers a perspective of what research is necessary to provide a better understanding of the impacts of CIPA and to determine what research would need to be conducted for potential future legal challenges to the application of CIPA in public libraries.

Received: 16 October 2003; Revised: 12 January 2004; Accepted: 12 January 2004

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Research Article

**Scholarly work and the shaping of digital access**

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**INDEX TERMS**

scholars • information seeking • organization of information • electronic documents • personal information systems • information storage and retrieval systems

**ABSTRACT**

In the cycle of scholarly communication, scholars play the role of both consumer and contributor of intellectual works within the stores of recorded knowledge. In the digital environment scholars are seeking and using information in new ways and generating new types of scholarly products, many of which are specialized resources for access to research information. These practices have important implications for the collection and organization of digital access resources. Drawing on a series of qualitative studies investigating the information work of scientists and humanities scholars, specific information seeking activities influenced by the Internet and two general modes of information access evident in research practice are identified in this article. These conceptual modes of access are examined in relation to the digital access resources currently being developed by researchers in the humanities and neuroscience. Scholars' modes of access and their "working" and "implicit" assemblages of information represent what researchers actually do when gathering and working with research materials and therefore provide a useful framework for the collection and organization of access resources in research libraries.

Received: 8 March 2004; Revised: 11 August 2004; Accepted: 11 August 2004

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Research Article

**On the Web at home: Information seeking and Web searching in the home environment**

Soo Young Rieh

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**INDEX TERMS**

World Wide Web • information seeking • search behavior • online searching

**ABSTRACT**

As more people gain at-home access to the Internet, information seeking on the Web has become embedded in everyday life. The objective of this study was to characterize the home as an information use environment and to identify a range of information seeking and Web-search behaviors at home. Twelve Northern California residents were recruited, and the data were collected through semi-structured at-home interviews based on a self-reported Search Activities Diary that subjects kept over a 3-5 day period. The data were analyzed on four levels: home environment, information seeking goals, information retrieval interaction, and search query. Findings indicated that the home, indeed, provided a distinct information use environment beyond physical setting alone in which the subjects used the Web for diverse purposes and interests. Based on the findings, the relationships among home environment, Web context, and interaction situation were identified with respect to user goals and information-seeking behaviors.

Accepted: 3 December 2003

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#### Research Article

### Popular music access: The Sony music browser

François Pachet, Amaury La Burthe, Aymeric Zils, Jean-Julien Aucouturier

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#### INDEX TERMS

music • browsing • peer to peer file sharing • digital libraries • audio retrieval

#### ABSTRACT

The intentionally ambiguous expression “Popular Music Browser” reflects the two main goals of this project, which started in 1998, at Sony Computer Science Laboratories. First, we are interested in human-centered issues related to browsing “Popular Music.” Popular here means that the music accessed is distributed widely and known to many listeners. Second, we consider “popular browsing” of music, i.e., making music accessible to nonspecialists (music lovers) and allowing sharing of musical tastes and information within communities, departing from the usual, single-user view of digital libraries. This research project covers all areas of the music-to-listener chain, from music description, descriptor extraction from the music signal, or data mining techniques, similarity-based access, and novel music retrieval methods such as automatic sequence generation, and to user interface issues. This article describes the scientific and technical issues at stake and the results obtained, and is illustrated by prototypes developed within the European IST project *Cuidado*.

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#### Research Article

### Introduction to bioinformatics

David Fenstermacher

Abramson Cancer Center, Room 1318 Blockley Hall, University of Pennsylvania, Philadelphia, PA 19104

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#### INDEX TERMS

bioinformatics • genomic information

#### ABSTRACT

Bioinformatics is a multifaceted discipline combining many scientific fields including computational biology, statistics, mathematics, molecular biology, and genetics. Bioinformatics enables biomedical investigators to exploit existing and emerging computational technologies to seamlessly store, mine, retrieve, and analyze data from genomics and proteomics technologies. This is achieved by creating unified data models, standardizing data interfaces, developing structured vocabularies, generating new data visualization methods, and capturing detailed metadata that describes various aspects of the experimental design and analysis methods. Already there are a number of related undertakings that are dividing the field into more specialized groups. Clinical Bioinformatics and Biomedical Informatics are emerging as transitional fields to promote the utilization of genomics and proteomics data combined with medical history and demographic data towards personalized medicine, molecular diagnostics, pharmacogenomics and predicting outcomes of therapeutic interventions. The field of bioinformatics will continue to evolve through the incorporation of diverse technologies and methodologies that draw experts from disparate fields to create the latest computational and informational tools specifically design for the biomedical research enterprise.

Accepted: 22 April 2004

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#### Research Article

### Modeling the information-seeking behavior of social scientists: Ellis's study revisited

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<sup>1</sup>School of Information Science & Policy, University at Albany, State University of New York, Draper 113, 135 Western Ave., Albany, NY 12222

<sup>2</sup>School of Information & Library Science, University of North Carolina, 201 Manning Hall, CB# 3360, Chapel Hill, NC 27599-3360

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#### INDEX TERMS

information seeking • search behavior • user studies • social sciences

#### ABSTRACT

This paper revises David Ellis's information-seeking behavior model of social scientists, which includes six generic features: starting, chaining, browsing, differentiating, monitoring, and extracting. The paper uses social science faculty researching stateless nations as the study population. The description and analysis of the information-seeking behavior of this group of scholars is based on data collected through structured and semi-structured electronic mail interviews. Sixty faculty members from 14 different countries were interviewed by e-mail. For reality check purposes, face-to-face interviews with five faculty members were also conducted. Although the study confirmed Ellis's model, it found that a fuller description of the information-seeking process of social scientists studying stateless nations should include four additional features besides those identified by Ellis. These new features are: accessing, networking, verifying, and information managing. In view of that, the study develops a new model, which, unlike Ellis's, groups all the features into four interrelated stages: searching, accessing, processing, and ending. This new model is fully described and its implications on research and practice are discussed. How and why scholars studied here are different than other academic social scientists is also discussed.

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#### Research Article

### A nonlinear model of information-seeking behavior

Allen Foster<sup>\*</sup>

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#### INDEX TERMS

search behavior • online searching • search strategies • information seeking • analytic models

#### ABSTRACT

This paper offers a new, nonlinear model of information-seeking behavior, which contrasts with earlier stage models of information behavior and represents a potential cornerstone for a shift toward a new perspective for understanding user information behavior. The model is based on the findings of a study on interdisciplinary information-seeking behavior. The study followed a naturalistic inquiry approach using interviews of 45 academics. The interview results were inductively analyzed and an alternative framework for understanding information-seeking behavior was developed. This model illustrates three core processes and three levels of contextual interaction, each composed of several individual activities and attributes. These interact dynamically through time in a nonlinear manner. The behavioral patterns are analogous to an artist's palette, in which activities remain available throughout the course of information-seeking. In viewing the processes in this way, neither start nor finish points are fixed, and each process may be repeated or lead to any other until either the query or context determine that information-seeking can end. The interactivity and shifts described by the model show information-seeking to be nonlinear, dynamic, holistic, and flowing. The paper offers four main implications of the model as it applies to existing theory and models, requirements for future research, and the development of information literacy curricula. Central to these implications is the creation of a new nonlinear perspective from which user information-seeking can be interpreted.

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#### Research Article

### The use of theory in information science research

Karen E. Pettigrew<sup>1</sup>, Lynne (E.F.) McKechnie<sup>2</sup>

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#### INDEX TERMS

information science • citation analysis • information theory • cross disciplinary fertilization

#### ABSTRACT

We report on our findings regarding authors' use of theory in 1,160 articles that appeared in six information science (IS) journals from 1993-1998. Our findings indicate that theory was discussed in 34.1% of the articles (0.93 theory incidents per article; 2.73 incidents per article when considering only those articles employing theory). The majority of these theories were from the social sciences (45.4%), followed by IS (29.9%), the sciences (19.3%), and humanities (5.4%). New IS theories were proposed by 71 authors. When compared with previous studies, our results suggest an increase in the use of theory within IS. However, clear discrepancies were evident in terms of how researchers working in different subfields define theory. Results from citation analysis indicate that IS theory is not heavily cited outside the field, except by IS authors publishing in other literatures. Suggestions for further research are discussed.

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