



Toward Multimedia Surrogates

**SILS CRADLE talk based on Los Angeles Chapter of the American
Society for Information Science and Technology talk in January
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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

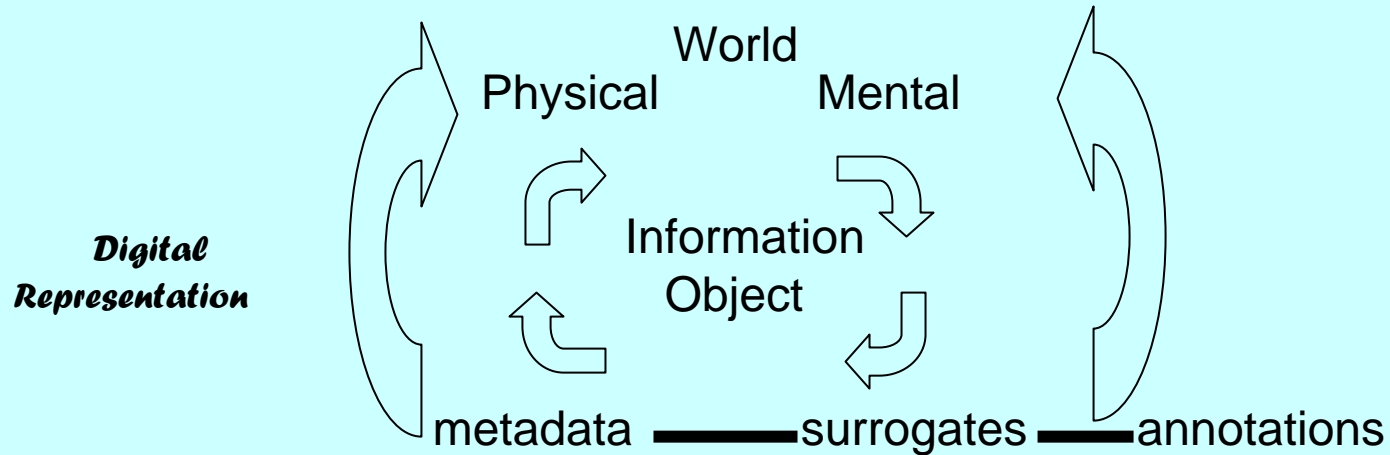
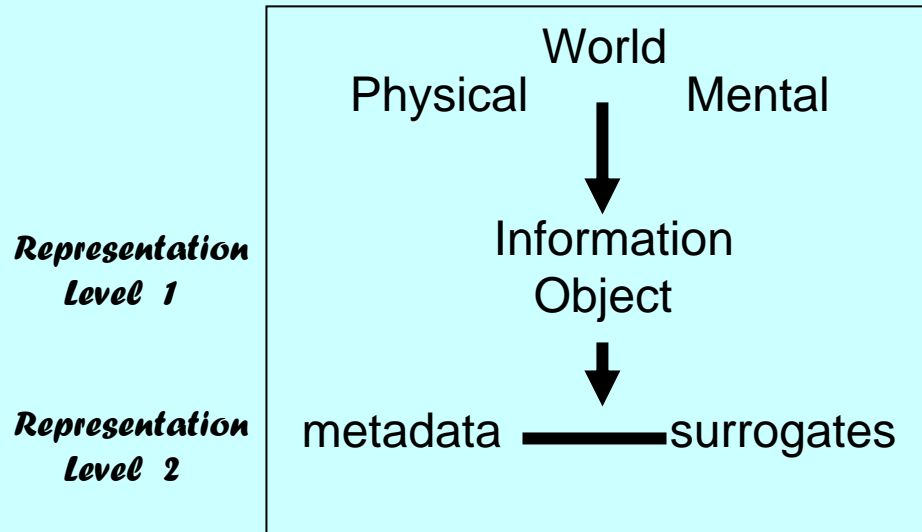
What is (was) a Surrogate?

- 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: 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

**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):** 193Preview
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**OLGA - A Multimodal Interactive Information Assistant (1998)**

Video demonstration from the 1998 CHI conference.

Genre: Educational**Keywords:** OLGA; Interactive; Information; Assistant; CHI;

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


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 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

Searchex. "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**

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

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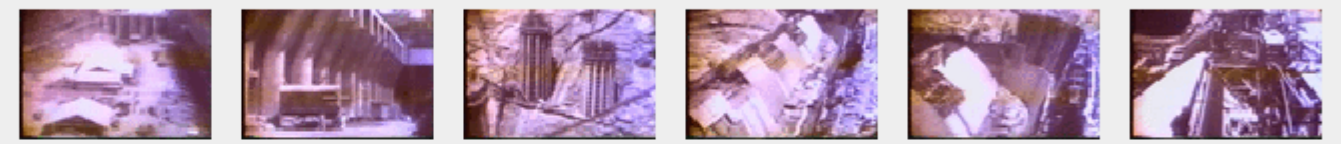


7-sec excerpt

Storyboard

FastForward

dam



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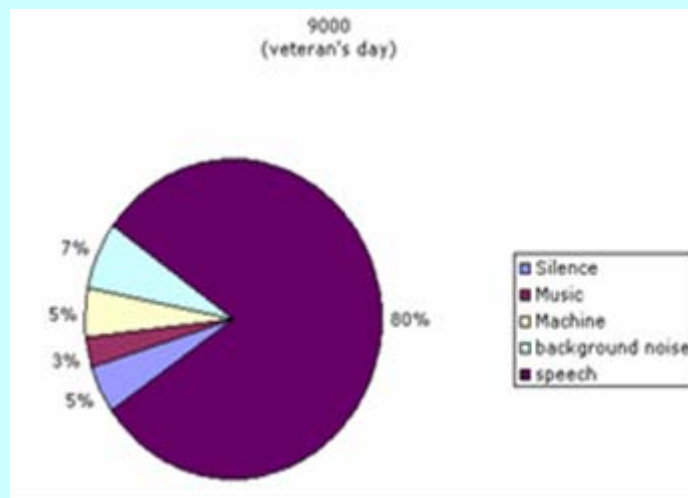
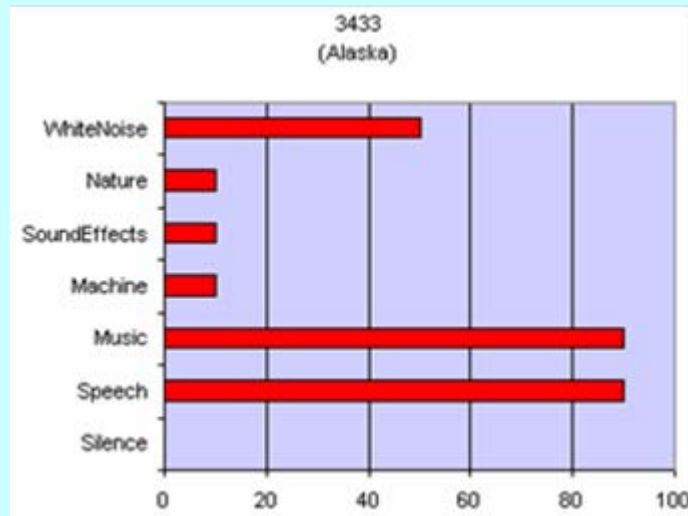
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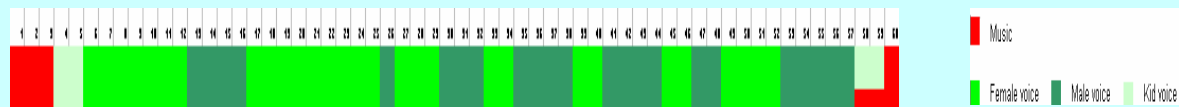
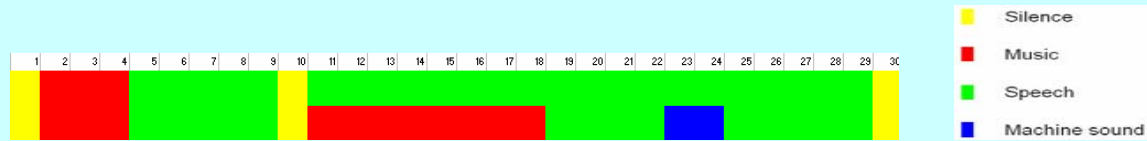
Digitization Information

Digitization Date:	1996
Digitizing Organization:	Carnegie Mellon University Informedia Project

Audio Surrogates

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





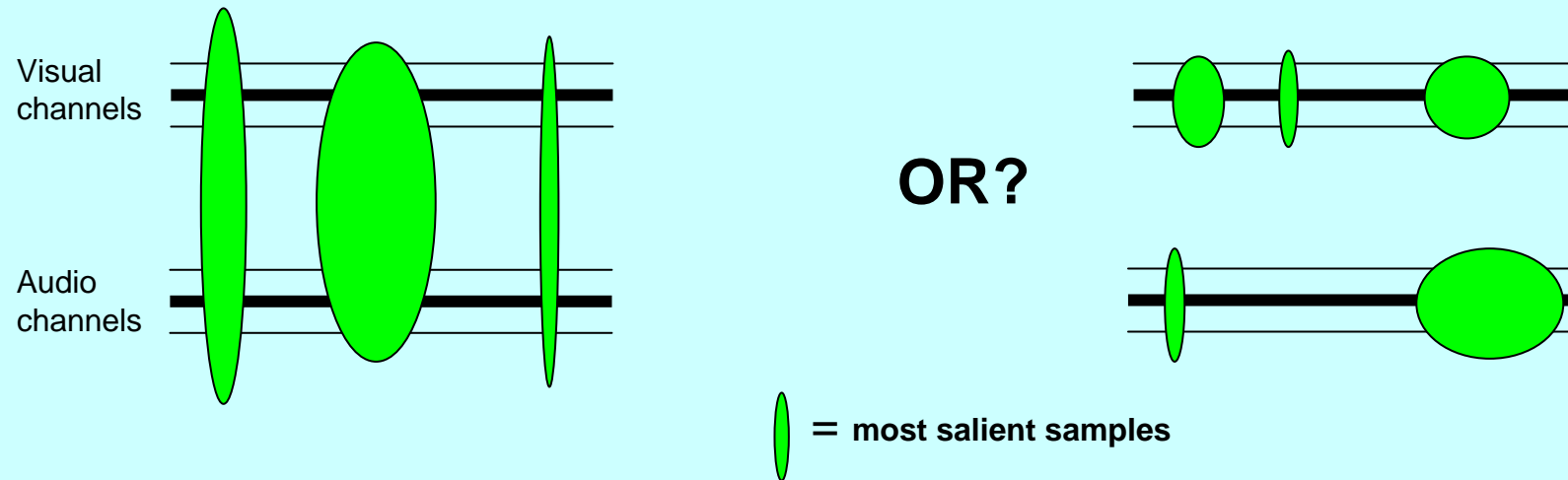
Recent Study (CHI 07)

- 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 Surrogate for You?

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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
- Response: The Twins Watch "Ninja Assessment"
http://youtube.com/watch?v=39rEBkyGGi0&watch_response
- Response (spam?) Verizon commercial
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)

What does YOUR avatar say about you?



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,
IBM, and Google for partial support of this work