

How Do I Describe Thee? Let me Count the Ways...

Facilitating Image Access
across Diverse Domains

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The semantic gap takes many forms...

Sign at entrance to an art museum:

1st floor: *Big crazy paintings*

2nd floor: *Nice country scenes*

3rd floor: *Kings, queens, etc. Naked statues*

4th floor: *Weird metal, wood and plastic things*

From *The New Yorker*



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The “Semantic Gap”

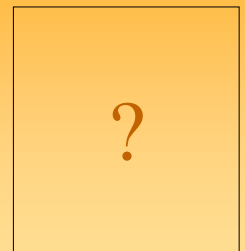
- ❖ The gap between
 - image description context
 - end-user searching context
- ❖ “Experience” vs. Utility



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The problem

“images which
show that science
and the
humanities were
closer in the past
than they are
today



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The “wetware” solution

“images which show that science and the humanities were closer in the past than they are today



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Bridging the Gap

- ❖ Many efforts
 - Content-Based Retrieval
 - Controlled vocabularies
 - Metadata schemas



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Description: 3 Components

- ❖ Data *Value* Tools provide controlled vocabulary
 - *Art & Architecture Thesaurus*
 - *LC Thesaurus for Graphic Materials*
 - *Getty vocabularies*



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Description: 3 Components

- ❖ Data *Structure* tools: carry values
 - Metadata
 - ❖ *CDWA*
 - ❖ *VRA Core*
 - ❖ *Dublin Core*
 - ❖ Succinct - sufficient for retrieval?



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Description: 3 Components

- ❖ Data *Content* Tools provide rules for applying vocabulary
 - AACRxx
 - *Cataloging Cultural Objects*



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Cleveland Museum of Art

↙ Data value,
data content tools

↘ *Hours of Queen
Isabella the
Catholic, Queen of
Spain*

**Alexander Bening and Associates
(Flemish, about 1444-1519)**

↙ Data structure
tools

**About 1495-1500 22.5 x 15.2 cm
Ink, tempera, and gold on vellum**



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Current Indexing Context

- ❖ Experienced indexers
- ❖ Recommended standards
 - Locally established practices
- ❖ User or collection-centered
 - *Focused vocabularies*
 - Pre-coordination
 - Extent of syndetic structure



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Current Indexing Context

- ❖ Influence of culture
 - Australian Picture Thesaurus
- ❖ Index “Of” and “About”
 - But limited subject/content description
- ❖ Varying coverage
- ❖ Cross-collection indexing consistency a challenge



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Today's Searching

- ❖ Unmediated
- ❖ Federated
 - Cross-collection
 - Cross-culture
- ❖ Multiple ways of describing
- ❖ Multiple uses for images



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Wikipedia Commons



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Motivation and Context

- ❖ Image querying vs. "information" querying
 - *Data Pole vs. Object Pole*
- ❖ Experienced searcher vs. general user
 - *Personal vs. professional use*
- ❖ "Collection" vs. "aggregation"
 - *Free text ("tags") vs. indexing terms*



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Where is the User Research?

- ❖ Not yet a comparable body to text searching
 - Few "IPACS" -- the Web
 - Detailed data hard to come by
 - *proprietary search engines*
 - *typical transaction log issues*
 - *observation time-intensive*



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Where is the User Research?

- ❖ Continuing body of research
 - User- described features
 - ❖ *illustrations*
 - ❖ *Fine art*
 - ❖ *diagrams and schematics*
 - Image professionals searching
 - ❖ *Humanities - Art historians, historians*
 - ❖ *Commercial - Journalists & publishing*



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User Research

- ❖ Keister 1994 (NLM)
 - great personalities of the 20th century
 - street scenes from 1850
 - a mysterious picture
 - pictures of diseases that no longer exist
 - imaginary scenes
 - faces in anguish
 - intestines



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User Research

brat	small kid big kid
spoiled	bossy child
kid sticking tongue out	bossy
brat child	bossy brothers
spoiled child	mean brothers
mean child	brat sisters

“Visual Construct”



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User Described Features

- ❖ Tasks
 - Describing
 - ❖ *spontaneous*
 - ❖ *as search to image system*
 - Sorting
 - Memory of descriptions



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Levels of attributes

- ❖ Perceptual
 - ❖ *Shape, color, texture, line*
- ❖ Interpretive
 - ❖ *People, objects, places, events*
- ❖ “Reactive” (Affective)
 - ❖ *Emotions, abstract concepts, the “story,” pertinence*



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Features described most frequently

- ❖ Perceptual / Syntactic
 - Color, other visual elements, spatial location within image ~25.4%
- ❖ Interpretive / Semantic
 - Objects, people, “art historical” ~ 45 %



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Features described most frequently

- ❖ Art Historical 5.7%
 - ❖ Story Elements 9.2%
 - Affective 3.9%
 - Abstract 1.9%
 - Relationship 3.7%
- } 18.7%



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Features described most frequently

- ❖ Personal Reactions / Narrative
 - Events, Story Elements
 - Affective, Relationship
 - Abstract Concepts
- } ~ 19%



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Image Descriptions

- ❖ gives a feeling of triumphance [sic]
- ❖ the kid is having a great time
- ❖ angry looking - ready to fight
- ❖ sinister, violence, threatening
- ❖ seems to have a religious connotation



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User-generated groups

- ❖ National Geographic
- ❖ Lonely
- ❖ Nostalgia
- ❖ Advertisement
- ❖ Scientific
- ❖ Myth
- ❖ Educational
- ❖ Witty
- ❖ By Itself
- ❖ Rough Sketches
- ❖ Strange/Dreamy
- ❖ Politicians/Leaders
- ❖ Impersonal Portrait



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Images are Multivalent

“Apple”

- ❖ color (*red*), shape (*round*), texture (*smooth, shiny, hard*)
- basic object type: *food > fruit > apple > Macintosh*
- ❖ Uses/forms: *juice, pie, applesauce*
- ❖ activities: *eating, cooking, bobbing for*
- ❖ parts: *skin, seeds, stem*
- ❖ meaning: *temptation, poison*



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What can we draw from research?

- ❖ Searchers describe objects at the “*basic level*”
 - Neither the most specific nor the most general
 - ❖ Furniture - *chair* - rocking chair
 - 80-90% of objects described at this level



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What can we draw from research?

- ❖ Searchers will seek *exemplars*
 - “A really good picture of a diner counter and stools”
- ❖ Searchers will seek *prototypes*
 - “A typical businessman”
 - “Businesswoman running with cell phone”



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What can we draw from research?

- ❖ Searchers will describe the “*human element*”
 - ❖ *Two dots and a line on a blue area = “fishermen in a boat”*
- ❖ Searchers describe *anomalies*
 - Unexpected items which do not fit a “schema”



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What can we draw from research?

- ❖ Searchers will create a *story* to go with the image
 - ❖ *And describe things “outside” the picture frame*
- ❖ Searchers will seek images with *affective* qualities
 - ❖ *But only a few human emotions consistently recognized*



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What can we draw from research?

- ❖ Searchers describe *Color*
 - One predominant color
 - Color contrasts, color groups
- ❖ Color terms
 - Few used
 - Are consistent
 - Convey emotions & cultural meanings



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What can we draw from research?

- ❖ More abstract images
 - fewer terms applied
 - Perceptual terms
- ❖ More realistic images
 - More terms
 - More narrative-interpretive terms



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Cataloging

- ❖ Few subject terms:
 - *still life · flowers*
- ❖ More extensive indexing:
 - *still life · flowers · Austrian copper rose · Floribunda rose · Jadis rose · lilac · Ming vase · embroidered tablecloth · Monarch butterfly*



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“Mid-level” for retrieval

- ❖ “Basic level” indexing:
 - *still life · flowers · Austrian copper rose · Floribunda rose · Jadis rose · roses · lilac · Ming Chinese vase · embroidery · tablecloth · Monarch butterfly*



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Vocabulary considerations

- ❖ CCO: cataloging or retrieval?
 - “Correct” vs. “wrong” terms
 - *Spider as an insect...*
 - Specialized vs. popular terms
 - *Slang, jargon*
 - Controlled terms vs. free-text terms: “tags”
 - *50% of tags not in controlled vocabularies*



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What about tagging?

- ❖ How many tags are “useful”?
 - ❖ *Utility, like beauty, in the eye of the beholder*
- ❖ Should we bring some control to tags?
- ❖ Can we?
 - ❖ *Filtering?*
 - ❖ *A “skeleton” visual indexing vocabulary?*



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Maximizing both perspectives

- ❖ For Cataloging
 - Index from experience
- ❖ For Retrieval
 - Forget what you know
 - Trust your intuitions
 - How would this image be used?



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