

# User intentions in multimedia or “The other end of the camera ...”

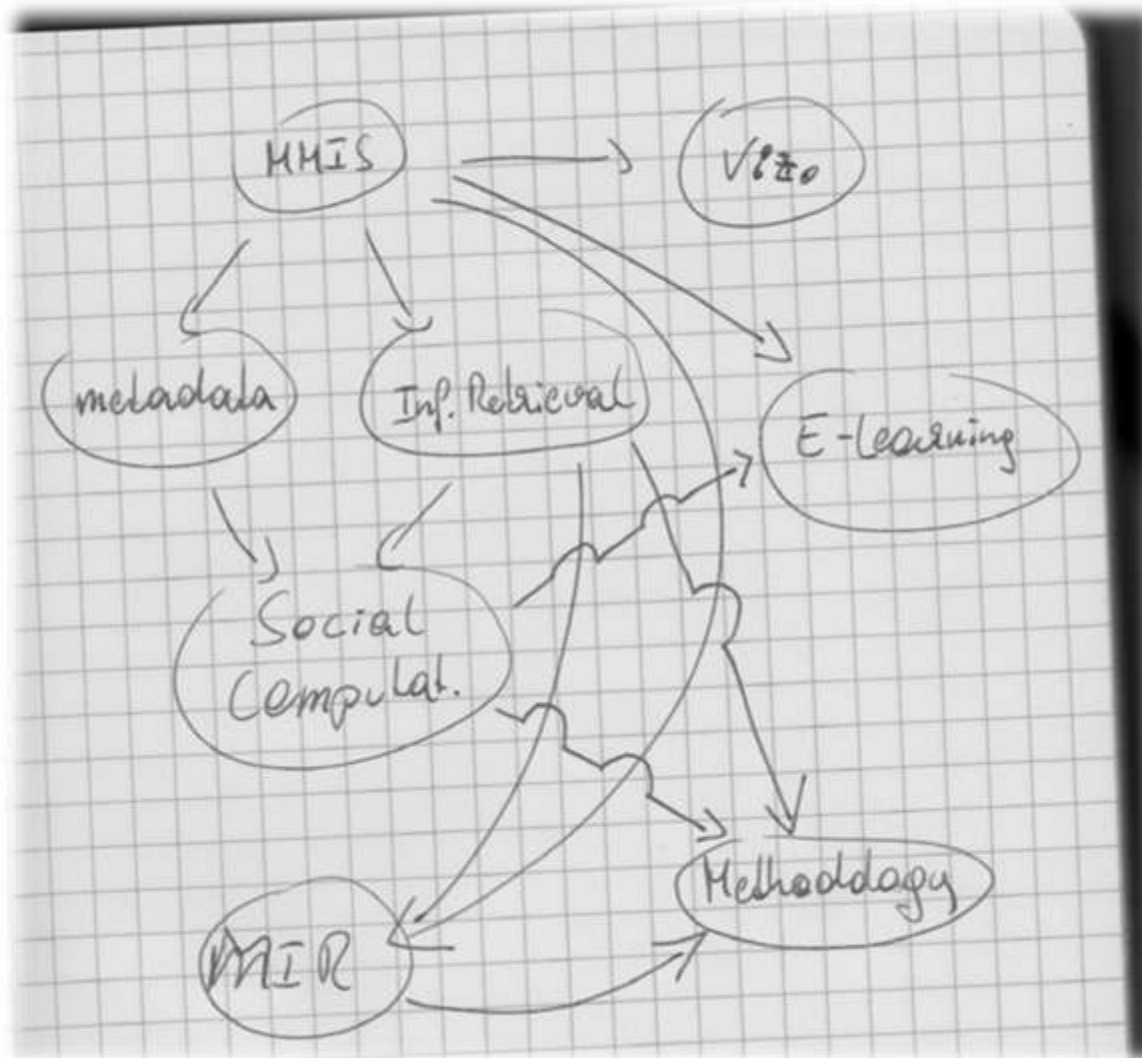


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# Research Areas & Connections



# More & More Questions ...



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All my previous work led into one single direction:

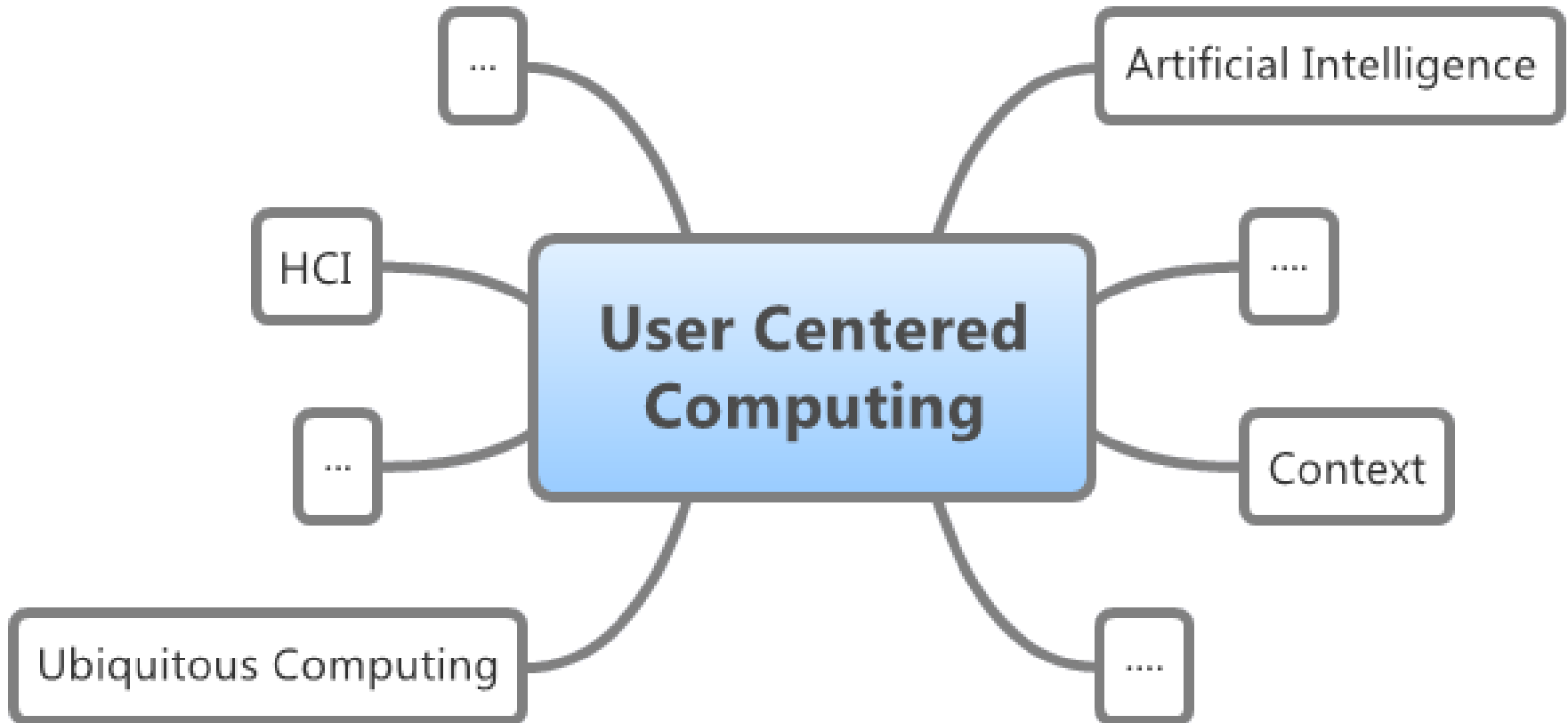
- What does the user actually want and how to support the user in her/his work with the computer?



# User centered computing



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# Context-Awareness



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[...] context-aware software adapts according to the location of use, the collection of nearby people, hosts, and accessible devices, as well as to changes to such things over time [...]

*Src. B. Schilit, N. Adams, and R. Want. (1994). "Context-aware computing applications" (PDF). IEEE Workshop on Mobile Computing Systems and Applications (WMCSA'94), Santa Cruz, CA, US. pp. 89-101.*

# Context ...



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- Is a broad concept
- Can be defined in different ways
  - depending on domain
  - depending on application

*Idea: pick out **most promising piece** of the „context“ and take a look at it!*

# User Intentions



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- Users have certain intentions
  - ... doing something intentional ...

Hypothesis: *If I know the intention of a user beforehand, I can better support her/his actions.*

# User Intentions: Example



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A user wants to buy a car, but there is no pressing need.

- The users intention is “buy a car”
- The actions resulting from the intention might not be directed and planned
  - “Oh, there is a car I like ...”
  - “I’ve heard you’re going to sell your Prius...”



# User Intentions



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- Intentions are fuzzy and vague
  - Hard to measure ...
- Concept of “user goals”
  - .. state of affair that a user wants to achieve ...
  - Can be measured: (not or partially) achieved

# User Goals: Example



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A user wants to buy a car, but there is no pressing need.

- The users intention is “buy a car”
- Possible goal “find car that fits the users needs”
  - Task: Searching for a car with specific characteristics
  - End of the task: Car found

=> Goals are very specific

# Agenda



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- ~~Motivation & Introduction~~
- User goals in text retrieval
- User goals in digital photo retrieval
- User goals & intentions in media production
- Outlook



# A Taxonomy of Web Search



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- Navigational
  - The immediate intent is to reach a particular site
- Informational
  - The intent is to acquire some information assumed to be present on one or more web pages
- Transactional
  - The intent is to perform some web-mediated activity

*Src. A. Broder, A Taxonomy of Web Search, ACM SIGIR Forum Vol 36, Issue 2, Fall 2002*

# Revised Taxonomy



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- Navigational
- Informational
  - Directed, Undirected, Advice, Locate, List
- Resource
  - Download, Entertain, Interact, Obtain

*Src. Rose, D., Levinson, D., Understanding user goals in web search, Proc. WWW 2004, New York, USA (2004).*

# User Goals in Web Search

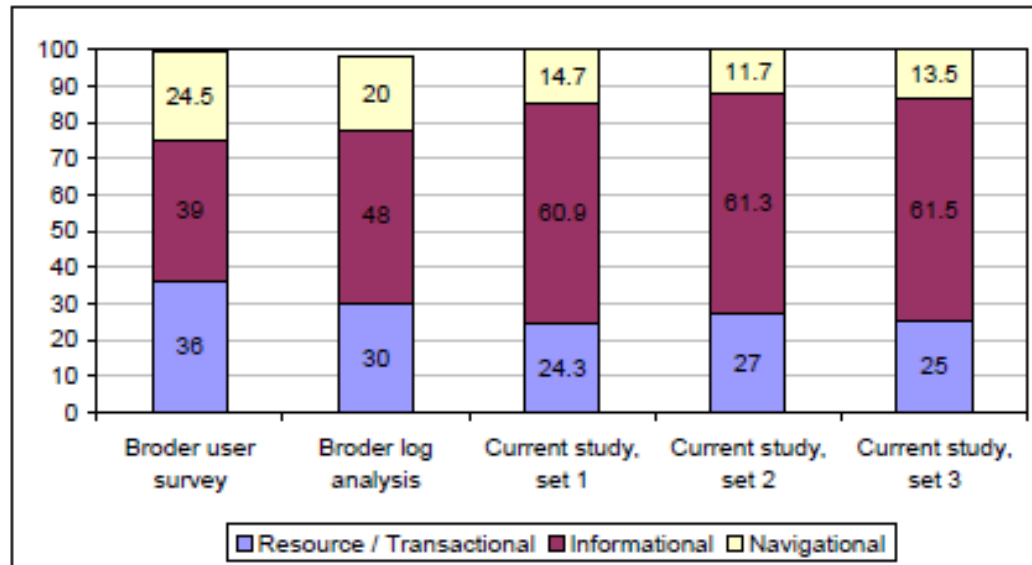


Figure 2: Comparison of Broder's search taxonomy to our top-level goals. Resource and informational results in the first column are Broder's estimates. Results do not total 100% due to rounding error.

Src. Rose, D., Levinson, D., *Understanding user goals in web search*, Proc. WWW 2004, New York, USA (2004).

# How do users express goals?



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| Nr.   | Query   | Frame Annotation   | Time Stamp             | Goal                       |
|---|---|--|------------------------|----------------------------|
| #1  | How to get more wine crop                       | How to<br><b>get more</b><br>[item wine crop]  | 2006-03-30<br>19:29:59 | Formulation                |
| #2  | Fertilizer or insecticide to increase wine crop | [cause Fertilizer] or<br>[cause insecticide] to<br><b>increase</b><br>[item wine crop] | 2006-03-30<br>19:45:28 | Refinement                 |
| #3  | Fertilizer to increase wine crop                | [cause Fertilizer] to<br><b>increase</b><br>[item wine crop]                           | 2006-03-30<br>19:46:11 | Refinement                 |
| <i>[further non-intentional queries, not related to wine crop]</i>  |   |  |                        |                            |
| #4  | Increase wine crop                              | <b>increase</b><br>[item wine crop]  | 2006-03-30<br>19:48:25 | Generalization             |
| #5  | How to get rich wine crop                       | How to<br><b>get rich</b><br>[item wine crop]  | 2006-04-07<br>06:29:19 | Different Goal Formulation |
| <i>[non-intentional query "wine crop"]</i>  |   |  |                        |                            |
| #6  | How to have good wine crop                      | How to<br><b>have good</b><br>[item wine crop]   | 2006-04-07<br>06:40:45 | Re-formulation             |
| <i>[further non-intentional queries and further more complex intentional queries related to "wine crops"]</i> |   |  |                        |                            |

# Degrees of Explicitness in Intentional Artifacts



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- How can we find explicit goals of users?
- How can search queries be classified as explicit intentional queries?
- Explicit goals vs. implicit goals

Example: *car, car Miami, car Miami dealer, buy a car in Miami, buy a used car in Miami, get loan to buy a used car in Miami*

*Src. Strohmaier, Prettenhofer & Lux, Different Degrees of Explicitness in Intentional Artifacts: Studying User Goals in a Large Search Query Log, SKGOI'08 @ IUI'08, Canary Islands, Spain, 2008*



# Degrees of Explicitness in Intentional Artifacts



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- Experimental classification
  - Part of speech tagging on queries
  - Naïve Bayes classifier on
    - 98 instances (59 pos. & 39 neg.)

|   | <b>Entire Dataset</b> | <b>Condensed Dataset</b> |
|---|-----------------------|--------------------------|
| Queries   | 20,494,002            | 279,260                  |
| Explicit Intentional Queries                          | 346,349-616,869       | 138,513-163,089          |
| Implicit Intentional Queries                          | 19,877,133-20,147,653 | 116,172-140,747          |
| Explicit Intentional Queries, 95% confidence interval | 1.69% - 3.01%         | 49.6% - 58.4%            |
| Users   | 657,426               | 94,487                   |

# Classifier results ...



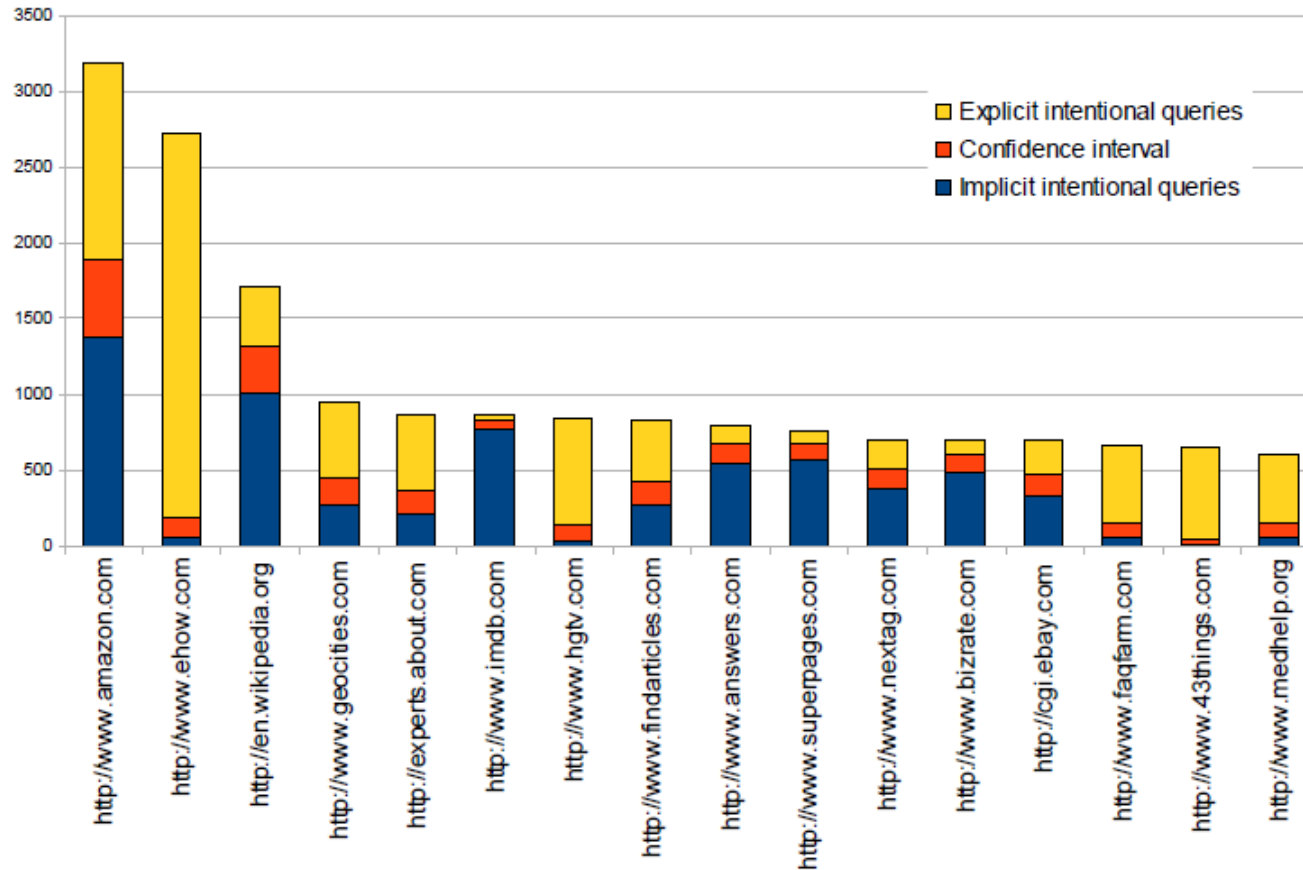
| Correctly Classified Intentional Queries              |
|---|
| "buying groceries online"                             |
| "how to get revenge on neighbor within limits of law" |
| "helping children handle death of a loved one"        |
| "cleaning the ak-47"                                  |
| "coughing up blood"                                   |
| "dealing with the guilt of cheating"                  |

| Incorrectly Classified Intentional Queries |
|--|
| "saving privat ryan"                       |
| "driving school Illinois"                  |
| "stem cell transplant"                     |
| "founding fathers temple"                  |
| "recovering the satellites lyrics"         |

# Website Shares in Condensed Data Set



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Powered by *demand media*:

- Mining questions from queries
- Pay people for answers
  - 20\$ per video,
  - 2 ½ \$ copy-edit,
  - 1\$ fact-check ...



see also [http://www.wired.com/magazine/2009/10/ff\\_demandmedia/](http://www.wired.com/magazine/2009/10/ff_demandmedia/)

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# How do users express their goals on ... say Flickr ;)



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- Queries for photo search are short
  - “dog dachshund bark” rather than
  - “image showing a small dog, preferably a dachshund, barking for use in a brochure”
- Hypothesis: User goals affect the search and browsing behavior of users
  - Click-through rate, session time, medium click interval, etc.





## Exploratory study on user goal classification

- Definition of tasks reflecting different types of goals
  - Interviews with experts using image search
  - Note: Verification of relevance of tasks needed
- Presentation of goals to users in a study
  - Recording of search behavior
  - Analysis of possible features for classification

# Study setup



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- Taxonomy of Broder / Rose & Levinson
- 10 tasks from different classes
  - Find picture expressing joy
  - Find picture of the Eiffel Tower
  - Find picture taken with a Canon IXUS 980 IS
  - Find out how to tie a tie
  - ...



- Revised taxonomy needed
- Classification difficult ...
  - where do session start and end?
  - fuzzy transition between goals?
  - Dependencies between goals, subgoals etc.?
- Classification prototype
  - Rule based
  - Adapting results view

# Taxonomy development



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- Several additional studies
  - Expert & non expert users
- Revised taxonomy
- Feature selection for classification

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# Intentions in Media Production



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- Annotation tool for digital photos
  - done by two amateur photographers
- Two different roles
  - Creator
  - Consumer
- Study:
  1. How do users get along with the UI
  2. How do users get along with intentions for annotation

# iPan: Intention-based Photo Annotation



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# iPan preliminary Results



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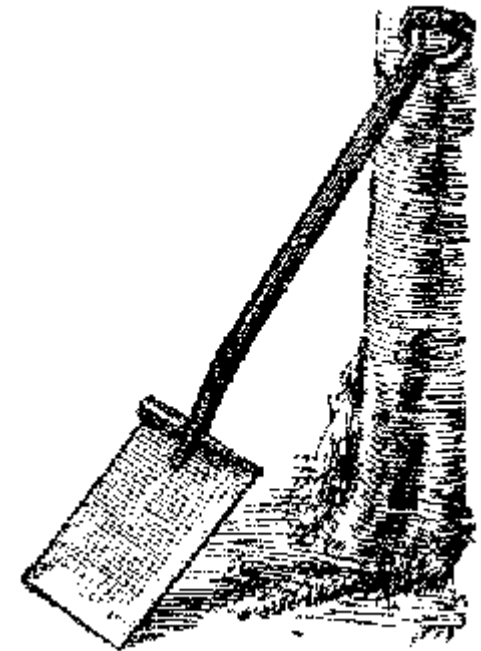
- Tool tested in photographers user group
  - 2 extreme types: intentional photos and non-intentional photos
  - Maybe artists, who want to hide intentions?
- Interviews have been rather discouraging
  - Mainly no intention to use such a tool
  - No understanding for “intentional photography”
  - One possible user => more like storytelling

# Ongoing work ...



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- Annotation tool based on intentions
- Taxonomy of goals in media production
- Investigation for other media



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# Users in a “near time” MMIS



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- Assume there is a big “Ironman” event
  - sequence of
    - 3.86 km of swimming,
    - 180.2 km of biking and
    - 42.195 km of running
  - like Klagenfurt in 2007:
    - 2,400 participants with support team (3-4 people)
    - 2,000 volunteers
    - 100,000 visitors
    - 6 moderators & DJs / 3 video walls
    - event lasted end to end about 17 hours



# Users in a “near time” MMIS



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- Users have different roles
  - Participants, support, guards, journalists ...
- Users have different intentions
  - I want to track athlete XY
  - I want to track the lead
  - I want to follow events
- User participate in a “social MMIS”

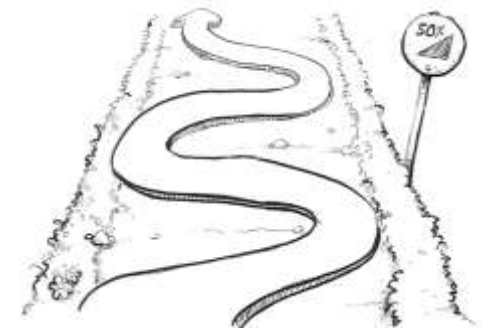


# Intentions in a “near time” MMIS



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- User intentions can be made explicit
  - Classification, user feedback, context, etc.
- Intentions & goals can be leveraged to enhance retrieval and visualization of content
  - Relevance function (cp. popularity, 80:20)
  - Abstraction & summarization
  - Pro-active distribution



# Summary & Conclusion



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## User intentions

- ... have not yet been explored in MIR & MMIS
- ... may help bridging the semantic gap (from the other side)
- ... may help dealing with the “long tail”

# Thanks ...



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... for your time

and: I'd be happy to discuss  
the whole thing

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