Establishing the Value of Socially Created Metadata for Image Indexing

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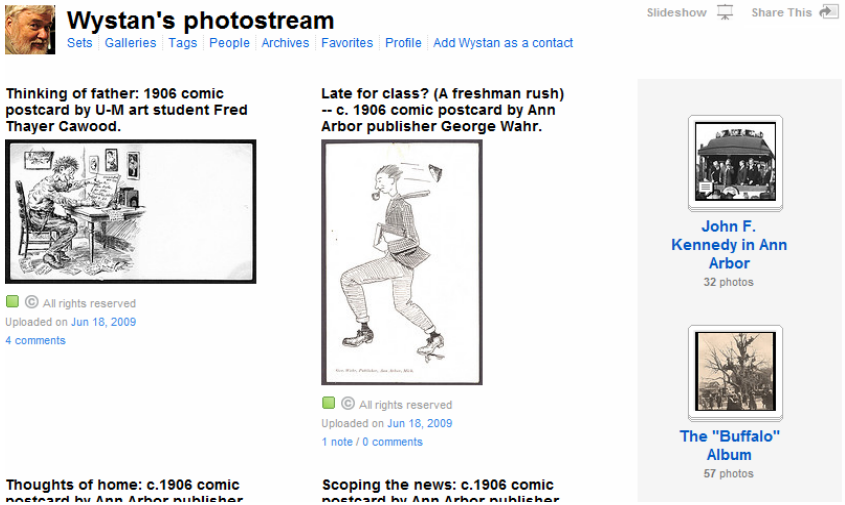
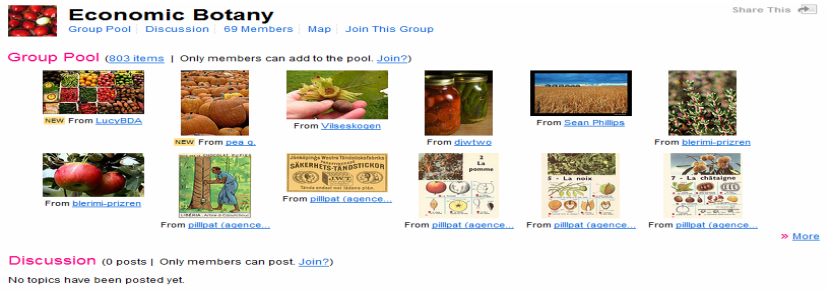
Networked collections, many subjects

- Many roles for users:
  - Providers
  - Indexers
  - Annotators
  - Aggregators
  - Quality control agents





- Need support for:
  - Multiple user activities
  - Not just search/retrieve

2010 Study: Value Added by “Tags”?

- What are the relationships among socially-generated metadata, controlled vocabularies, and user characteristics?
  - Can “tags” add value to controlled vocabularies?
  - Can useful relationships be extracted from metadata sources?
  - Are metadata concepts medium-specific?
  - Can combining collection- and item-level metadata results in a better quality folksonomy?
  - Are there relationships between user demographics and their valuations of social terms?
  - What are the demographic characteristics of productive and quality contributors of index terms?

Overall approach taken

- Extract concepts, terms, and relations (thesaurus elements) from Flickr and Wikipedia metadata
- Integrate these with metadata from controlled vocabularies
  - Thesaurus for Graphic Materials (TGM)
  - Library of Congress Subject Headings (LCSH)
- Explore if value is added to the controlled vocabularies

Methodology

- Guided by an earlier proposed metadata value measurement model (Stvilia & Gasser, 2008)
- Adapted the experimental design used by Jörgensen (1998) and Chen et al. (1995)
- A combination of methods, including controlled experiments, auto-ethnographies (“diaries”), semi-structured interviews, content and statistical analysis
- Evaluating added value of social metadata along two facets: *perceived* and *objective*

Experiment Procedure

- 35 participants – students and staff @ CCI
- Experimental System: modified Steve Tagger
- Experiment Tasks
  - Describe each photograph spontaneously by assigning tags
  - Rate pre-assigned index terms on usefulness to description task on a five-level Likert scale
  - Write queries to locate the photographs with a search engine

Data

- 10 photographs selected from the set of 7,192 photographs of the LoC Flickr photostream
  - on different subjects
  - with moderate number of tags to allow for task completion

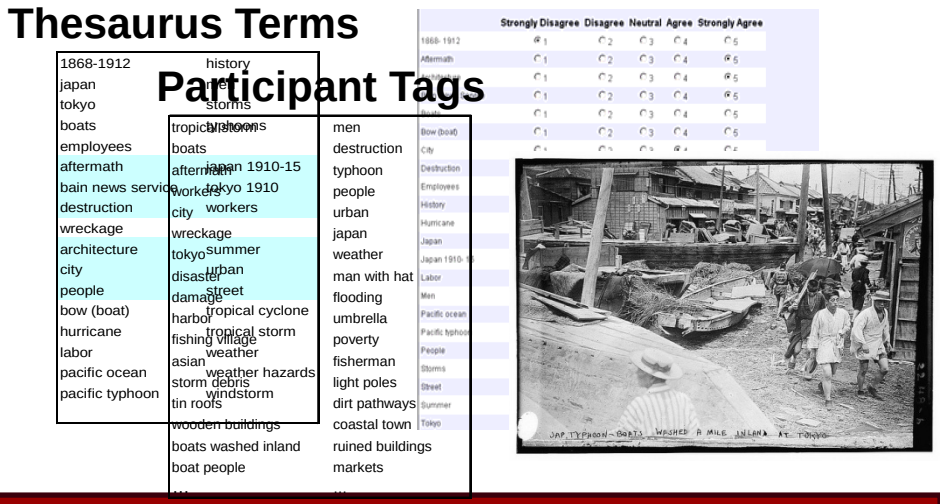
- Index terms selected from TGM, LCSH and Flickr tags, supplemented with related terms from the LoC Flickr folksonomy, Flickr relatedTags API, and English Wikipedia
- Sets of terms used by participants in description and search tasks

Descriptive Statistics

- Undergraduate students - 46%
- Doctoral students - 28%
- Master's students - 20%
- Master's degree holders - 6%
- Age ranged from 19 to 59 years old
- Female - 43%
- Male - 57%
- Tagging experience - 34%
- Intermediary knowledge of indexing - 11%
- Non-native speakers of English - 29%
- Median number of tags used in description task – 5
- Median number of query terms - 4

Facet One – Perceived Value

- Ratings of social terms were significantly higher than the baseline rating score – 3 (‘neutral’)
- But significantly lower than TGM & LCSH term ratings (mean=3.7; median=4)



Facet Two – Degree of Coverage

- Degree of added coverage provided by the social terms
  - Median percentage of added coverage provided by the social metadata was above 100%
    - 127% for description task terms (i.e., tags)
    - 108% for search task terms (i.e., query terms)

$$addedCoverage = \frac{\#\,of\ \_Tags\ \_Covered\ \_by\ \_Social\ \_Index\ \_Terms}{\#\,of\ \_Tags\ \_Covered\ \_by\ \_TGM\ \&\ LCSH\ \_Terms} \times 100$$

Facet Two – Degree of Coverage

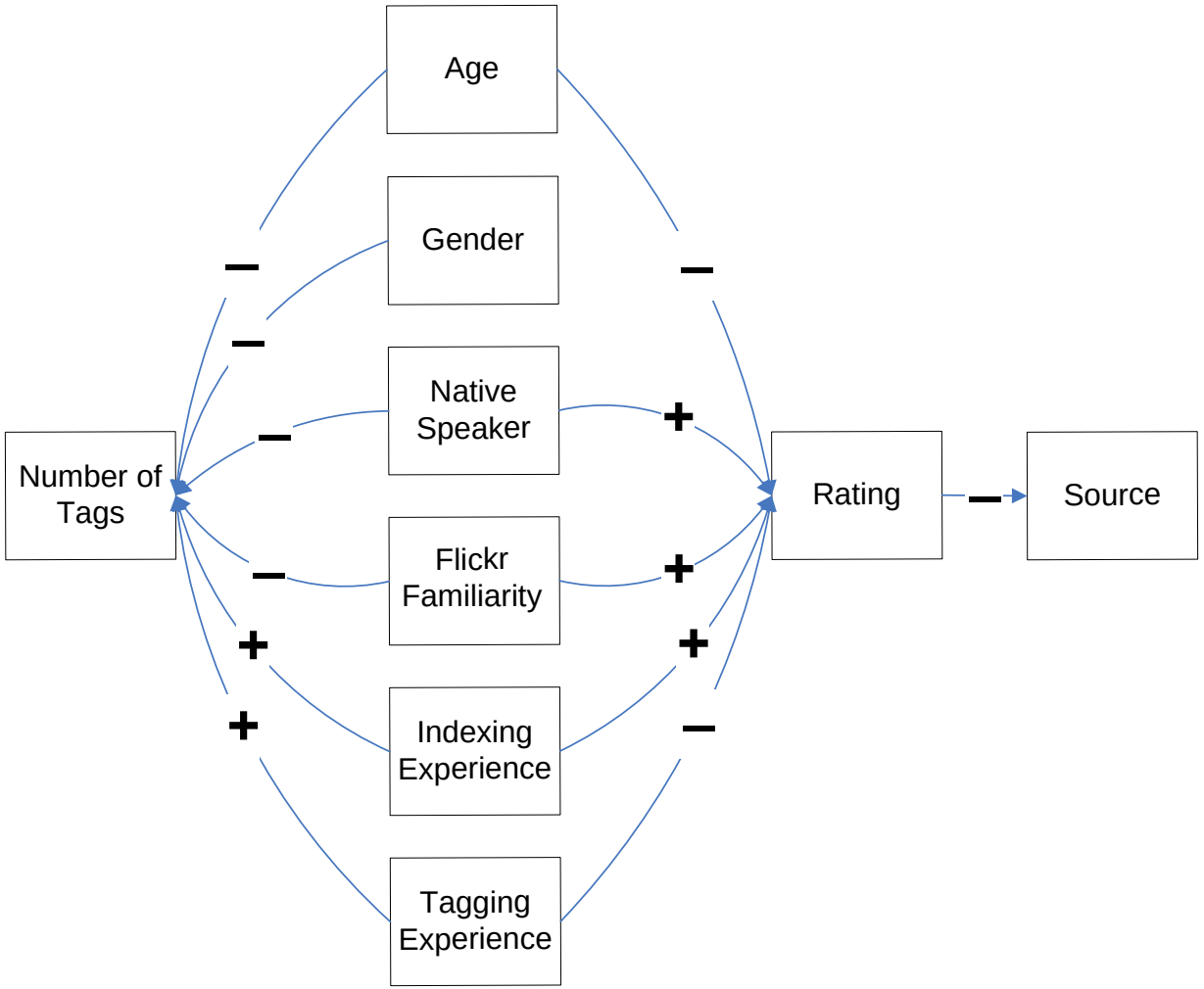
- The median set overlaps with the complete set of pre-assigned index terms, and with TGM & LCSH terms alone were:
  - for Tag terms from Description Task: 0.1 vs. 0.05
  - for Query terms from Search Task: 0.19 vs. 0.12

- The median set overlap of query terms from Search Task with tag terms from Description Task was even higher – 0.23

The degrees of the overlap were calculated as Dice coefficients

$$c = \frac{2|A \cap B|}{|A| + |B|}$$

Demographics, Ratings, & Productivity



Discussion

- Social terms provide an added value to the controlled vocabularies and the activity of image indexing in general
  - Social terms were perceived mostly useful
  - Median rating for the social terms was significantly higher than the baseline – the neutral rating.
  - Addition of social terms provided twice higher coverage of participant terms on average than controlled vocabulary terms alone

Discussion

- The sets of descriptors assigned by participants provided best coverage of query terms
    - The overlap between query terms and descriptors used by participants was the highest – 0.23

Discussion

- The TGM and LCSH captured most important and preferred terms
  - Participants valued controlled vocabulary terms higher than the social terms
  - The value of folksonomies are in extending and enhancing expert created KOS by providing additional descriptors and access points, not in substituting KOS.

Discussion

- The relationships between participant demographics and term ratings
    - The participants with greater tagging experience evaluated terms less favorably than the participants with indexing experience

Discussion

- The relationships between participant demographics and the number of terms used in description task
    - Positive interaction with indexing and tagging experiences
    - Older, male, native speakers, and participants with higher Flickr familiarity assigned lower numbers of tags

Next Steps & Limitations

- Next Steps
  - Complete the analysis of the exit interviews and search diaries to gain an additional insight into the user's value structure for index terms and image seeking behavior
  - Investigate the relationship between user demographics and term quality

- Limitations
  - Replicating the experiments with a more representative and diverse sample of participants would be desirable

Thanks!