Contextual Authority Tagging : Expertise Location via Social Labeling

Dissertation Proposal

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Contextual Authority Tagging

- Problem
- Background
- Proposed Research
- Methods
- Evaluation
- Pilot Test Data: Example Evaluation

Problem

Locating the topical expert requires topical knowledge.

The one who seeks the expert does not have the knowledge.

- Knowledge management within organizations has focused on expertise location, among other things, usually through the tracking and mining of created documents and artifacts.
- People within organizations use their networks.
- Source selection is critical.
- Need to tap into the *cognitive authority* of those around us (Wilson1983).

Background

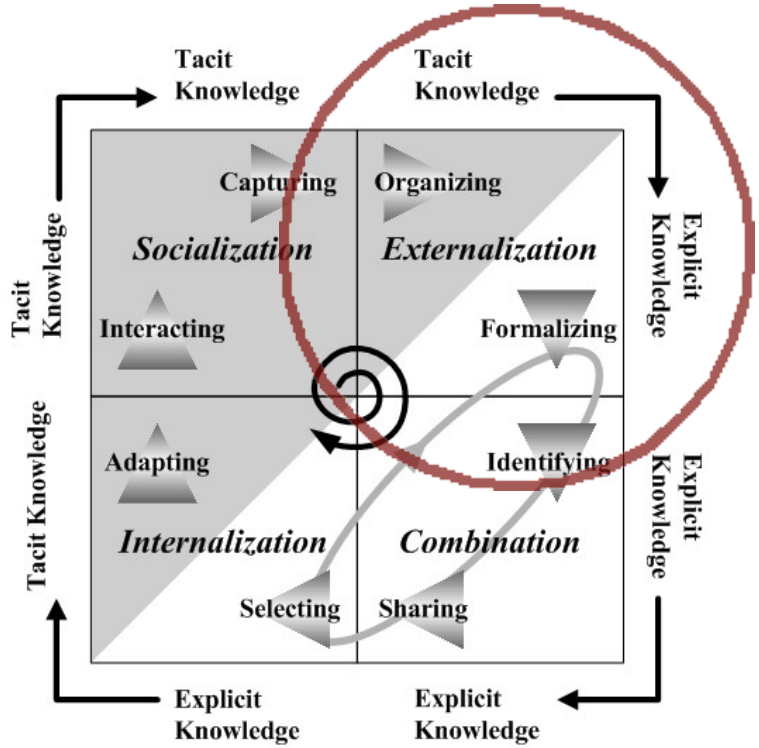
Identity & Reputation

Tagging

Collective Intelligence

Social Epistemology

Expertise



Tacit and Explicit Knowledge

- **Nonaka1991** – Feedback loop, Bringing the tacit into the open is part of the cycle

Background

Knowledge Management

- **Stein1995** – Organizational memory
  - Knowledge acquisition, retention, maintenance, retrieval

- **Dieng1999** – Corporate memory management
  - Detection of needs, knowledge construction, distribution, use, evolution

Background

Source Selection

- **O'Reilly1982** – Quality sources are relevant, timely, specific, and accurate
- **Nilan1988**, **Halpern1988** – Authority, expertise, and trust are the most cited criteria for acceptance/rejection of an information source
- **Rieh2002** – Source credibility depends largely on reliability (reputation, prior work, apparent authenticity)

Background

Expertise Location

- **Abecker1997** – requires multiple sources, integration, little overhead, clear presentation, remaining up-to-date

- **Ehrlich2003** – successful systems must be fast, easy to use, engender trust, scale to entire enterprise, and used by management

Proposed Research

This research will explore the ability of a group to identify the areas of expertise of its members.

- Collective intelligence and distributed cognition of humans
- Visibility of relevant information
- Generation of a positive feedback loop

Proposed Research

Inquiry based on the Delphi Method

- Panel of experts
- Anonymous
- Iterated

Tagging using free-text keywords / labels

Asking a focused, direct question:

- “What are this person's areas of expertise?”
- “What does this person know about?”

Validation through convergence and confidence assessment

Research Question 1

Does CAT work?

- **Similarity** – How similar are a group member's opinion of his/her own areas of expertise and the group's opinion of his/her areas of expertise?

- **Convergence** – How does the similarity behave over time? Do the two opinions converge? If so, how long does it take? If not, is there a persistent gap?

Research Question 2

How acceptable is CAT?

- **Comfort –** How comfortable are group members in participating? What are the main factors influencing their comfort level?
- **Confidence –** How confident are group members in a system like this? What is the quality of the output of this system? Does this system provide a valid credential? Does this system increase users' trust in one another?
- **Usefulness –** What is useful about a system like this? What did participants learn? How would using this system affect participants' decision making?

Proposed Research

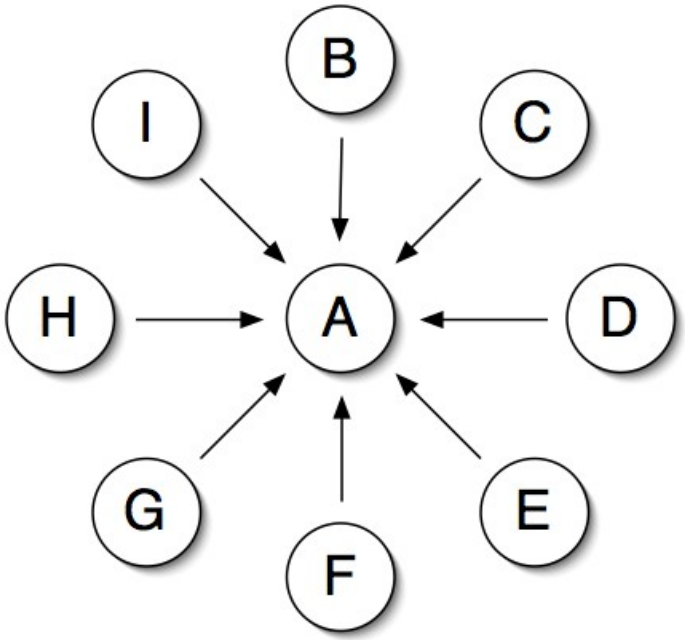
Recruitment → **Experimentation** → **Evaluation**

- 8-10 groups
- 8-10 people each

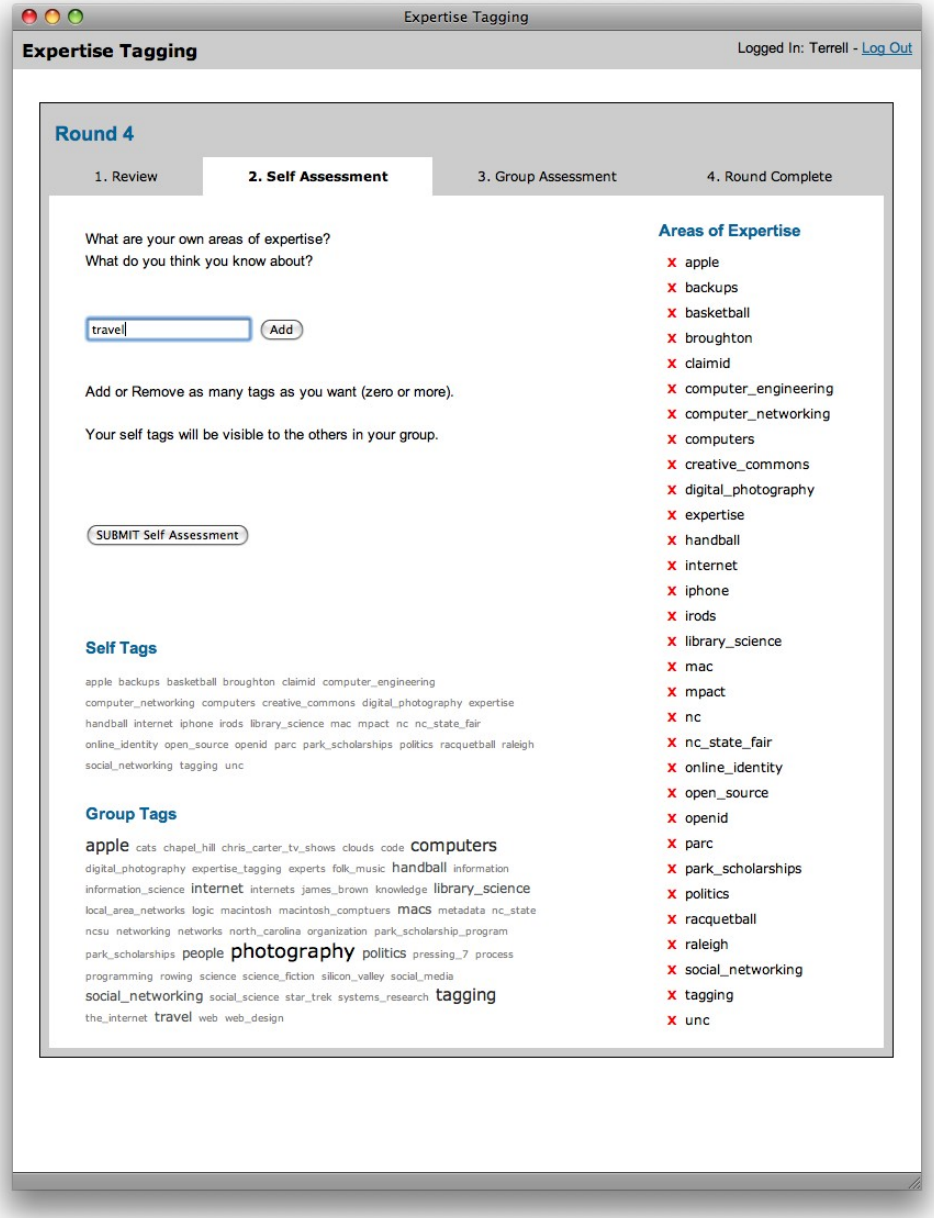
- Survey Pre-Test
- CAT – 5 rounds
- Survey Post-Test
- Follow-up Interview

- Similarity
  - Amazon's Mechanical Turk
  - WordNet Algorithm
- Acceptability
  - Survey
  - Interview

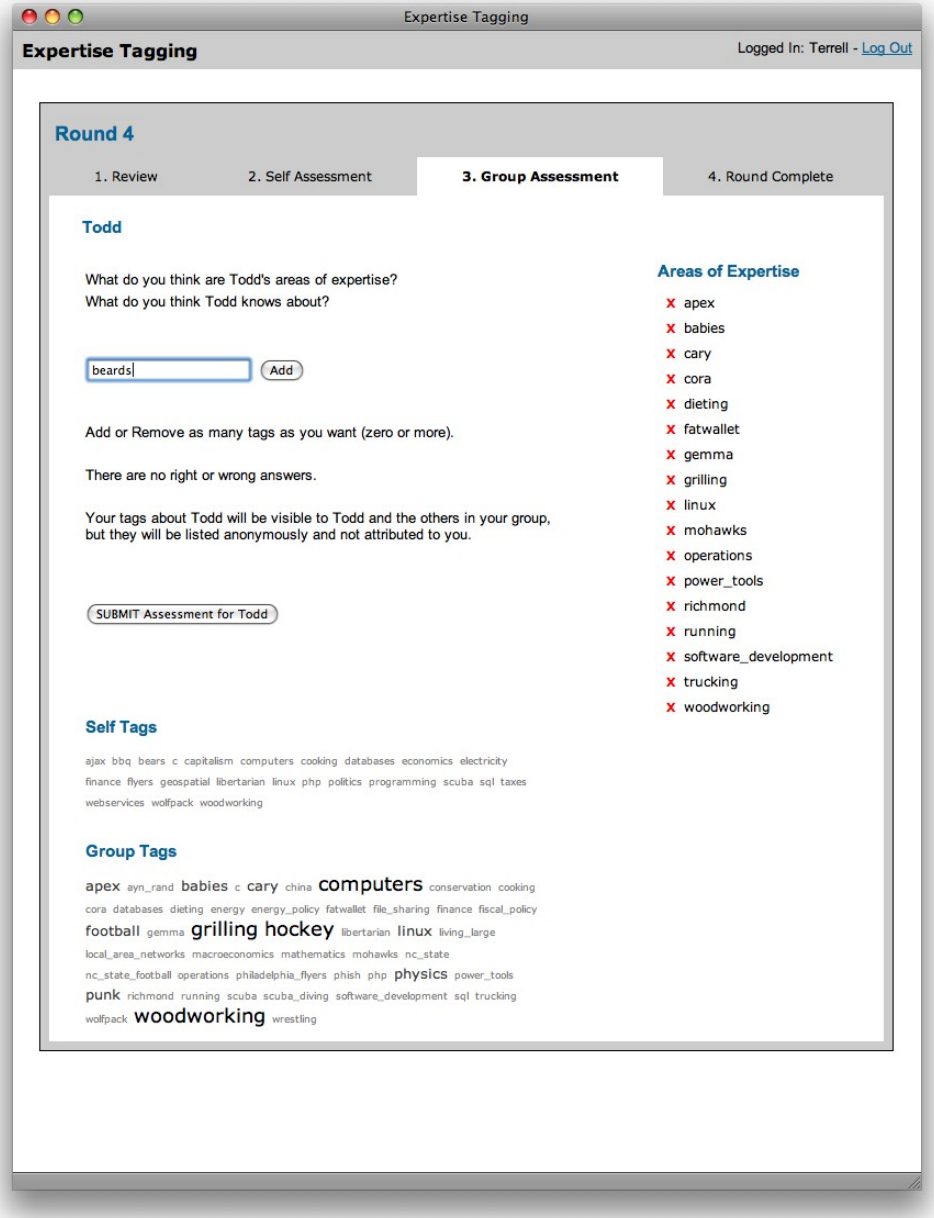
Methods: Contextual Authority Tagging



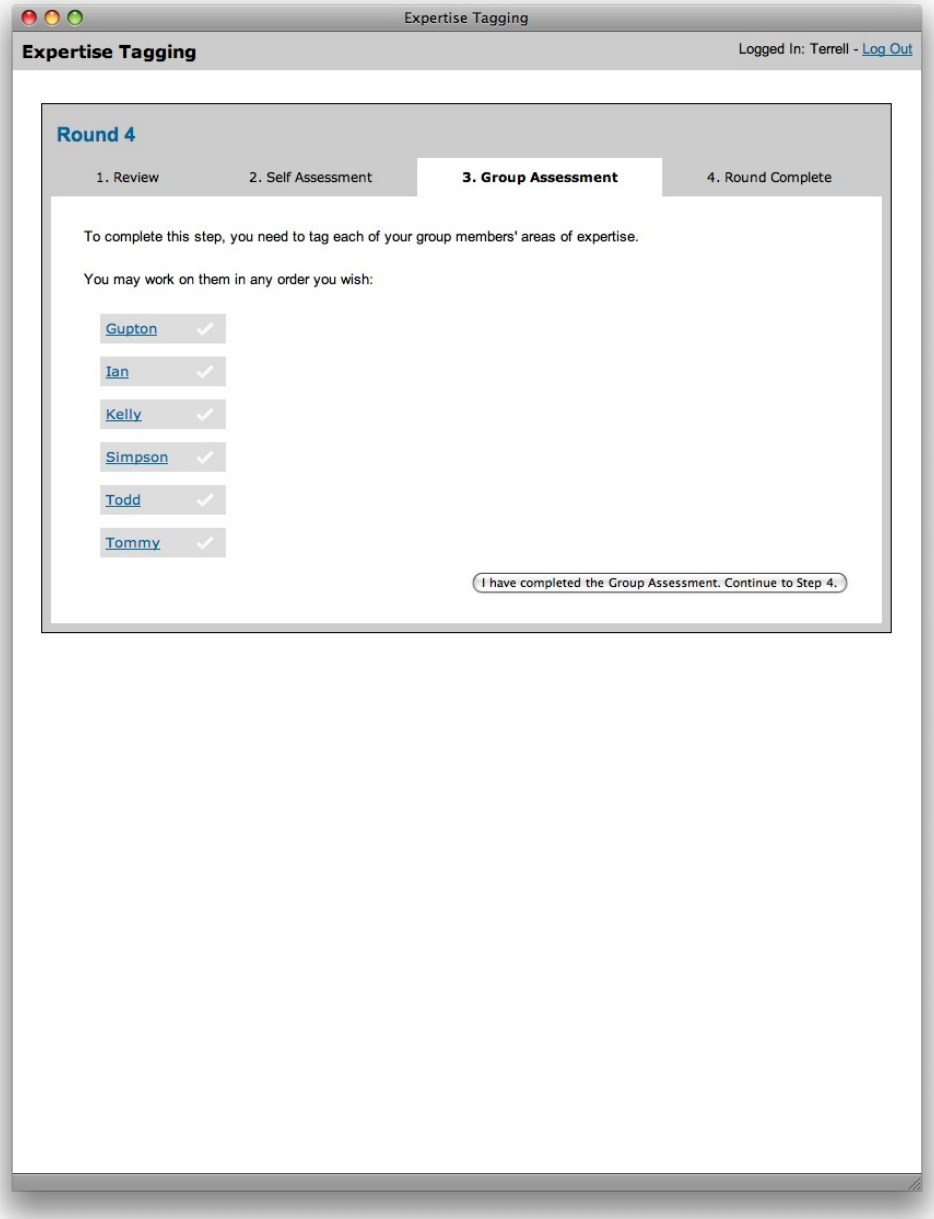
Methods: Contextual Authority Tagging



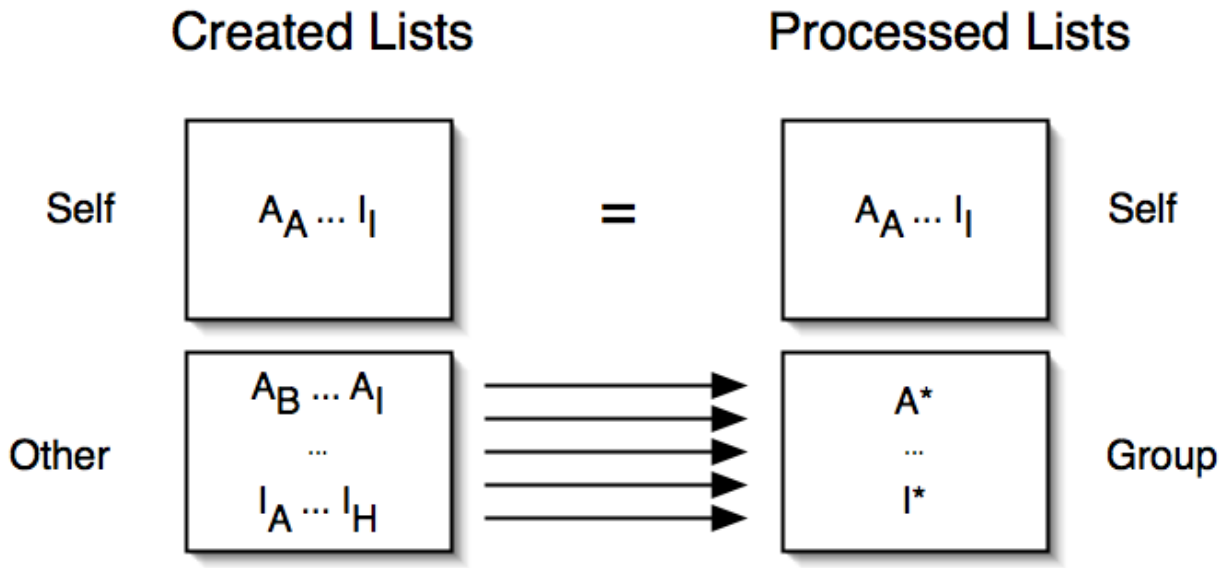
Methods: Contextual Authority Tagging



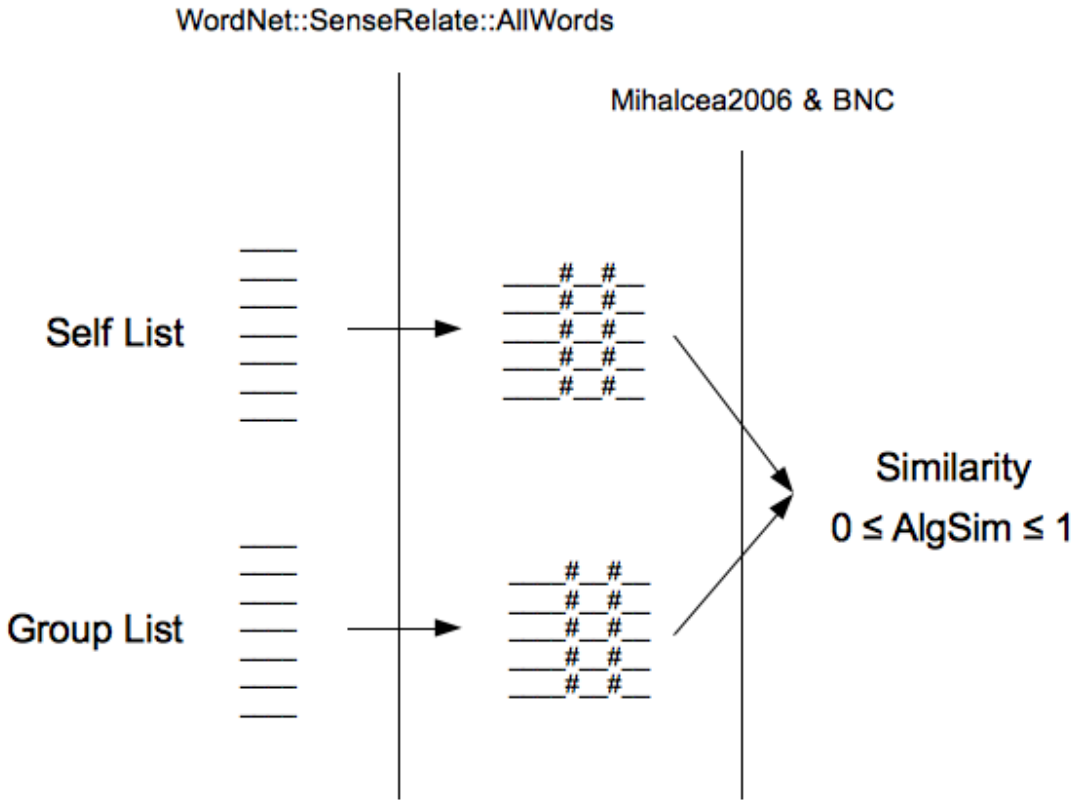
Methods: Contextual Authority Tagging



Methods: Contextual Authority Tagging



Evaluation: Similarity – WordNet



Evaluation: Similarity – WordNet

$$AlgSim(A,B) = \frac{1}{2}\left(\frac{\sum_{w \in \{A\}} (maxSim(w,B) * idf(w))}{\sum_{w \in \{A\}} idf(w)} + \frac{\sum_{w \in \{B\}} (maxSim(w,A) * idf(w))}{\sum_{w \in \{B\}} idf(w)}\right)$$

Mihalcea2006

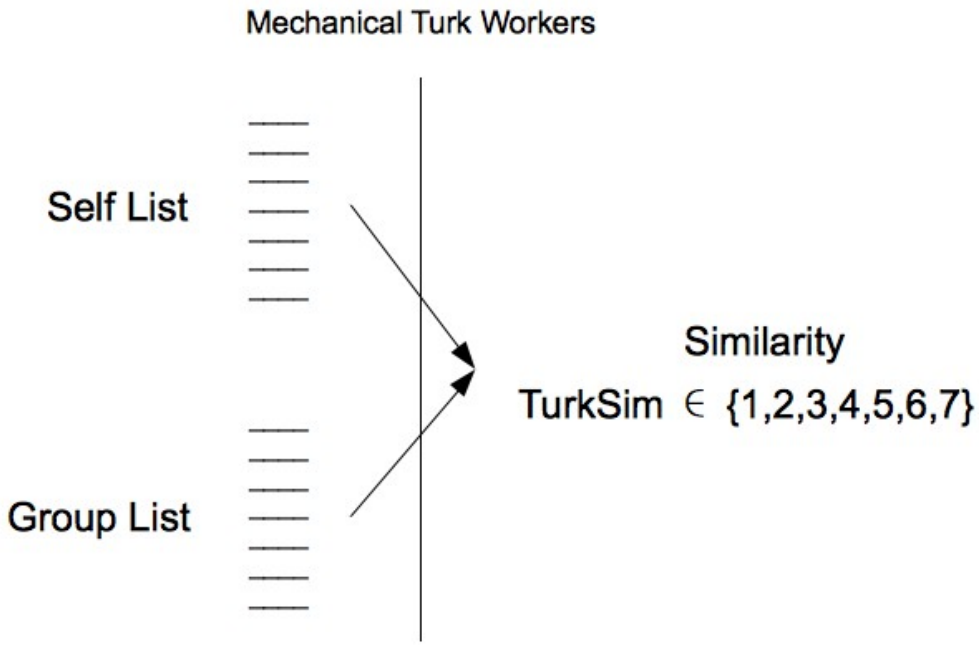
Evaluation: Similarity – WordNet

Comparisons

- self vs group-all
- self vs group-common (2+ occurances)

Each word exists only once in each list.

Evaluation: Similarity – MTurk



"I think these two lists describe similar concepts and ideas."

Evaluation: Similarity – MTurk

7-point Likert

- Extremely Disagree … Extremely Agree

Current Comparisons

- Self-raw vs Group-all-raw
- Self-raw vs Group-common-raw (2+ occurances)
- Self-matching vs Group-all-matching (WordNet identified)
- Self-matching vs Group-common-matching

Possible Comparisons (involving the weighted terms from a Group listing)

- Self-raw vs Group-all-raw-weighted
- Self-raw vs Group-common-raw-weighted
- Self-matching vs Group-all-matching-weighted
- Self-matching vs Group-common-matching-weighted

Evaluation: Similarity & Convergence

XY Plots

- For each user – Similarity graph over time

Box Plots

- For each group – Aggregated similarity graph over time
- For experiment – Aggregated similarity graph over time

ANOVAs to show change between rounds

- Increasing similarity = Convergence

Can also compare and contrast Human vs. Algorithm

Evaluation: Acceptability

Survey

- Likerts are 7-point
- ANOVAs to show differences in Pre-Test/Post-Test
- Existing validated scales will address Research Question 2

Interviews

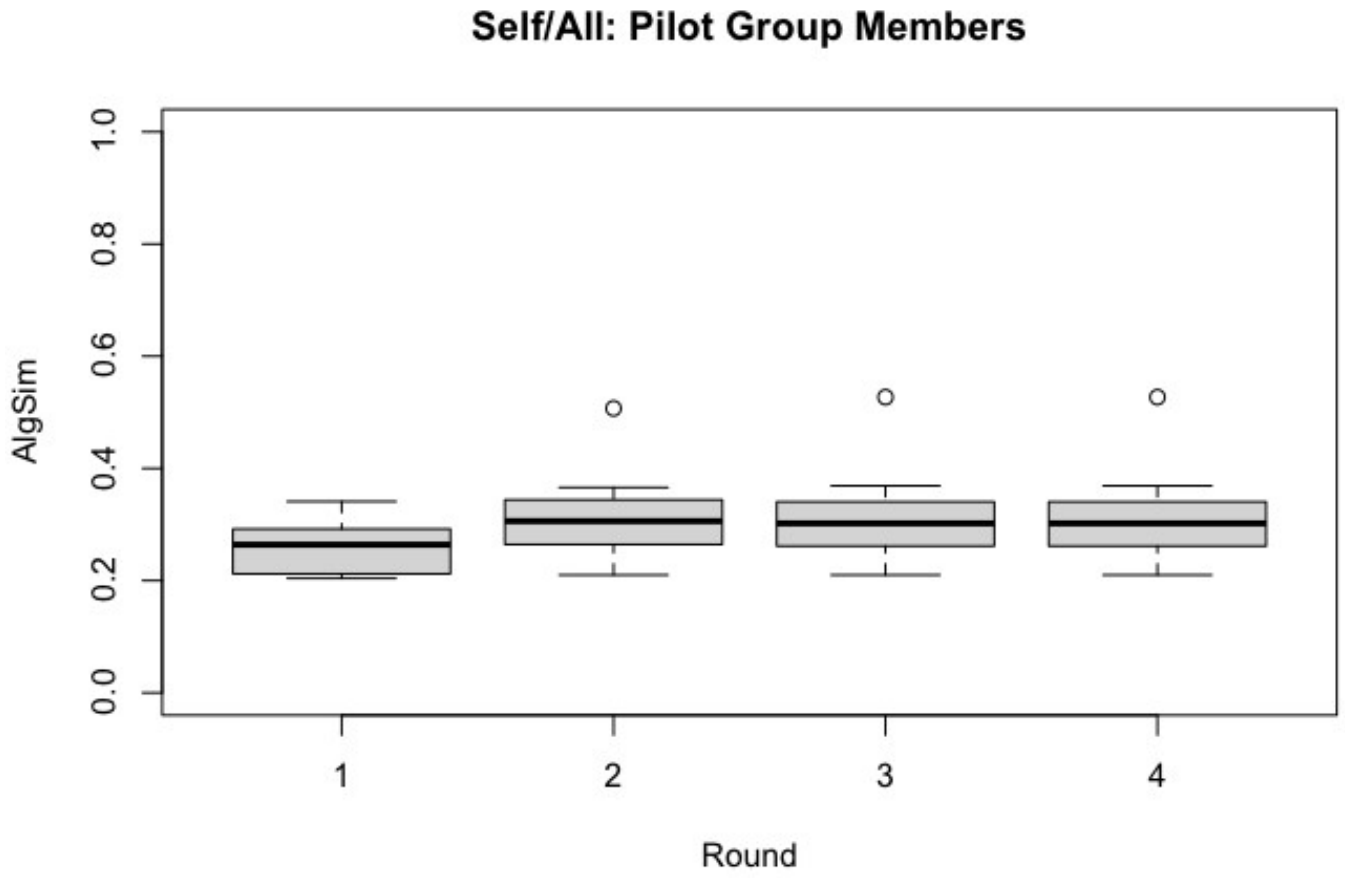
- Selected participants, probably liaisons and others
- Definitely any dropouts, if possible
- Grounded Theory, Open Coding, Inductive
- Will largely address Research Question 2a - Comfort

Pilot Test Data: Example Evaluation

- Friends Dataset
  - 7 friends, 4 rounds
  - Used CAT prototype software

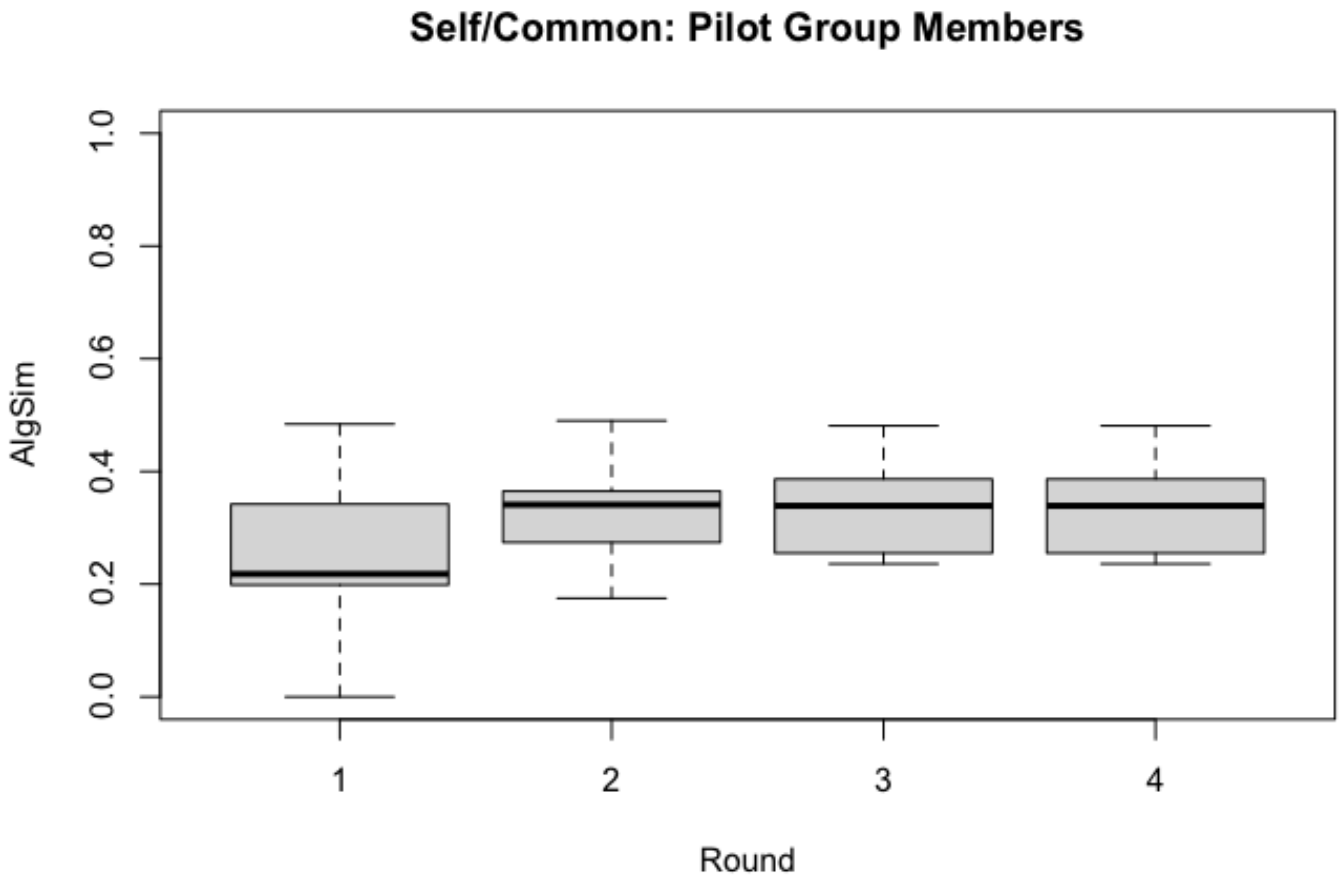
- Evaluation
  - Ran AlgSim
  - Ran TurkSim – Data not complete
  - No Survey or Interviews

Pilot Test Data: AlgSim



N = 7, p = 0.2379

Pilot Test Data: AlgSim



N = 7, p = 0.1971

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New Technique

Loose Credentialing

Tacit Expertise Location

- Visible
- Up-to-date
- Trusted Collective Opinion

References

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