

Computing Word of Mouth Trust Relationships in Social Networks from Semantic Web and Web2.0 Data Sources

Tom Heath, Enrico Motta

Knowledge Media Institute, The Open University

Marian Petre

Department of Computing, The Open University

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My Social Network



Information Source and Information Filter

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They All Know Lots of Stuff



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But Who Knows What?



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And Who is the Best Person to Ask?



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In This Presentation

Algorithms to address these issues,
based on Semantic Web and
Web2.0 data sources.

Related Work

- Granovetter (1973)
 - social network as information source
 - Homophily (e.g. McPherson et al, 2001)
 - we are more like our social networks than the rest of the population, and tend to have shared tastes
-
- Collaborative Filtering Recommender Systems
 - e.g. (Konstan et al., 1997; Linden et al., 2003)
 - Limitations
 - Information sources are unknown
 - Little scope for using our own judgement about a source
 - Doesn't help when we need an expert

How can we overcome these limitations?

Build systems powered by a richer model of **information seeking** and **trust** in **social networks**

Who do people ask for information?

- In the workplace it depends on:
 - what they know of the source
 - how they value their knowledge

(O'Reilly, 1982; Borgatti & Cross, 2003)

What about in real life?

- Heath, Motta, and Petre (2006)
 - Extended earlier findings:
 - More detail about the decision-making process
 - Not limited to a workplace setting

5 Trust Factors in Word of Mouth Recommendation Seeking

expertise, experience, impartiality, affinity, track record

- of varied importance depending on the *criticality* and *subjectivity* of the task
- (some) trust is topical, not global

Now what?

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Systems for Social Search

- or *Known Person Recommender Systems*
- Support information-seeking based on...
 - what **your social network** knows
 - who you're most likely to **trust**
(in a given scenario)
- Recommend people not items
(in the first instance)
- Allows information to be verified
(because you know the people!)
- Is useful outside taste domains

How do we work out who trusts whom?

1. Take FOAF-based **social networks**
2. Use **Semantic Web** and **Web2.0 data sources** (Revyu.com, del.icio.us, ...)
 - Tags = Topics
3. Automatically generate **trust metrics**

Algorithms for Generating Trust Metrics

- Based on the 3 most significant factors
 - Expertise
 - Experience
 - Affinity
- Some proxy metrics required
 - Credibility (Expertise)
 - Usage (Experience)

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Credibility (Expertise) Algorithm

Person -> Topic

- For a particular tag, get all items tagged with that tag
- For each item find its mean rating
- For each review of the item calculate how far the rating varies from the mean rating for that item
- Low rating distance = high credibility score for that review
- Sum each reviewer's credibility scores for reviews of items tagged with the tag
- Find each reviewer's mean credibility score for that tag

Usage (Experience) Algorithm

Person -> Topic

- For a particular tag
- Count how many times each reviewer has reviewed an item tagged with that tag (by anyone)
- This gives a reviewer's tag count
- Find the highest of these tag counts across all users of the tag
- Each reviewer's usage score for a tag =
their tag count / highest tag count

Affinity Algorithm

Person -> Person

- Get all reviews by a user A and someone they know B
- Count the number of items reviewed by both
- Calculate *item overlap ratio*:
number of items reviewed by both / total reviews by A
- For each overlapping item
 - Find the distance between the two ratings
 - Low rating distance = High rating overlap
 - Find *mean rating overlap* between Users A and B
- combine the *item overlap ratio* and *mean rating overlap* to produce a measure of the *affinity* User A to User B

Usage (Experience) Scores from del.icio.us Data

- Get a user's most used tags from del.icio.us
- Compare against existing (Revyu-derived) usage scores
- If no previous relationship exists then add new usage topics and nominal scores
- Or raise existing scores to a nominal level
- Could easily be extended to Flickr, Digg, etc.

System Overview

- Metrics stored as triples in triplestore
- Republished for reuse
- Regular search and browse-like interfaces provided over the top
- Varied application of factors based on task profile

Explore film

film Experts in Your Network

1 enrico (Revyu)

[the consequences of love](#)

1 mgaved (Revyu)

[Perfume: The Story of a Murderer](#)

1 slowman (Revyu)

[Pan's Labyrinth \(El Laberinto Del Fauno\)](#)

1 Fin (Revyu)

[Perfume:The Story of a Murderer](#)

0.96 martinp (Revyu)

[The Departed](#)

[The Prestige](#)

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Summary

- A more broadly applicable and more sensitive model of Word of Mouth in social networks
- Algorithms for generating *expertise*, *experience*, and *affinity* trust metrics in social networks
- Systems for social search based on these metrics

Future Work Plans

- Integrate additional data sources
- Support serendipitous discovery of additional (Semantic Web) sources
- Trust decay functions
- Topical trust propagation based on tag co-occurrence

Thankyou – Questions?

<http://kmi.open.ac.uk/people/tom>

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