

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

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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?



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](#)

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0.95 Paddy (Revyu)

[casino royale](#)

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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