Understanding Twitter Interaction

Matthew Purver
Interaction, Media and Communication
School of Electronic Engineering and Computer Science
Queen Mary, University of London
• Understanding human interaction:
  • human-human
  • human-computer
  • verbal
  • non-verbal
  • face-to-face
  • online
Video Interaction
Meetings

Wednesday, 27 July
People tweet when it's snowing

QMUL term starts

New Year

Online Interaction
Ben Marsh’s #uksnow map
US Geological Survey
Poll prediction

Twitter election predictions are more accurate than YouGov

A little over six weeks ago, the political internet tool Tweetminster was predicting that Labour was set to win the general election.

If Twitter is right, Labour is set to win

In August 2009, alongside the traditional coverage of Japan's general election, a group of PhD graduates and engineers began analysing online
## Tweets in 24 hours:

<table>
<thead>
<tr>
<th>Company</th>
<th>Tweets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell</td>
<td>16,800</td>
</tr>
<tr>
<td>McDonalds</td>
<td>26,200</td>
</tr>
<tr>
<td>Ikea</td>
<td>4,800</td>
</tr>
<tr>
<td>UPS</td>
<td>45,600</td>
</tr>
<tr>
<td>Burberry</td>
<td>3,200</td>
</tr>
</tbody>
</table>
Twitter Interaction

• Snow, earthquakes, votes:
  • volume of traffic ("buzz")
  • (maybe combined with keyword searches)
• What if we want more than this?
  • Influence in discussions
  • Questions & answers, alternatives
  • Agreements, disagreements, consensus
• ... needs more than buzz or keywords
Meeting Assistant
<table>
<thead>
<tr>
<th>What To Do</th>
<th>When To Do It</th>
<th>Who Should Do It</th>
<th>My Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>organizing committee</td>
<td>the first week of november</td>
<td>Melinda_Gervasio</td>
<td></td>
</tr>
<tr>
<td>we should probably get a report from her so</td>
<td>but the plan is that</td>
<td>Pauline_Berry</td>
<td></td>
</tr>
<tr>
<td>an action item for me would be to try to find and i'm not three to wave you know and</td>
<td>come back to you tomorrow</td>
<td>Thierry_Donneau-Golencer</td>
<td></td>
</tr>
<tr>
<td>set up a meeting</td>
<td>next week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>to look</td>
<td>CALO suggestions (select one):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the hero</td>
<td>be interesting</td>
<td>Tim_Rauenbusch</td>
<td></td>
</tr>
</tbody>
</table>

**Action Item Detection**

Wednesday, 27 July
## Interaction Structure

- **How do we detect decisions / action items?**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAQ</strong></td>
<td>not really. the there was the uh notion of the preliminary patent, that uh</td>
</tr>
<tr>
<td><strong>FDH</strong></td>
<td>yeah, it is a cheap patent.</td>
</tr>
<tr>
<td><strong>SAQ</strong></td>
<td>yeah.</td>
</tr>
<tr>
<td><strong>CYA</strong></td>
<td>okay.</td>
</tr>
<tr>
<td><strong>SAQ</strong></td>
<td>which is</td>
</tr>
<tr>
<td><strong>FDH</strong></td>
<td>so, it is only seventy five dollars.</td>
</tr>
<tr>
<td><strong>SAQ</strong></td>
<td>and it is it is e an e</td>
</tr>
<tr>
<td><strong>CYA</strong></td>
<td>hm, that is good.</td>
</tr>
<tr>
<td><strong>HHI</strong></td>
<td>talk to</td>
</tr>
<tr>
<td><strong>SAQ</strong></td>
<td>yeah and and it is really broad, you don’t really have to define it as w as much as in in a you know, a uh</td>
</tr>
<tr>
<td><strong>FDH</strong></td>
<td>yeah.</td>
</tr>
<tr>
<td><strong>HHI</strong></td>
<td>I actually think we should apply for that right away.</td>
</tr>
<tr>
<td><strong>CYA</strong></td>
<td>yeah, I think that is a good idea.</td>
</tr>
<tr>
<td><strong>HHI</strong></td>
<td>I think you should, I mean, like, this week, s start moving in that direction. just ’cause that is actually good to say, when you present your product to the it gives you some instant credibility.</td>
</tr>
<tr>
<td><strong>SAQ</strong></td>
<td>[Noise]</td>
</tr>
<tr>
<td><strong>SAQ</strong></td>
<td>mhm.</td>
</tr>
<tr>
<td><strong>CYA</strong></td>
<td>right.</td>
</tr>
</tbody>
</table>
Interaction Structure

• How do we discuss tasks?
Interaction Structure

• How do we discuss tasks?
• Describe task

Somebody needs to fill out this report!
Interaction Structure

• How do we discuss tasks?
• Describe task
• Assign owner

I guess I could do that.

Somebody needs to fill out this report!
Interaction Structure

- How do we discuss tasks?
- Describe task
- Assign owner
- Define timeframe

Can you do it by tomorrow?

Wednesday, 27 July
Interaction Structure

• How do we discuss tasks?
• Describe task
• Assign owner
• Define timeframe
• Agree

Sure.

Can you do it by tomorrow?

Wednesday, 27 July
Interaction Structure

• How do we discuss tasks?
• Describe task
• Assign owner
• Define timeframe
• Agree
Interaction Structure

• How do we detect decisions / action items?

SAQ: not really. the there was the uh notion of the preliminary patent, that uh
FDH: yeah, it is a cheap patent.
SAQ: yeah.
CYA: okay.
SAQ: which is
FDH: so, it is only seventy five dollars.
SAQ: and it is it is e an e
CYA: hm, that is good.
HHI: talk to
SAQ: yeah and and it is really broad, you don’t really have to define it as w as much as in in a you know, a uh
FDH: yeah.
HHI: I actually think we should apply for that right away.
CYA: yeah, I think that is a good idea.
HHI: I think you should, I mean, like, this week, s start moving in that direction. just ’cause that is actually good to say, when you present your product to the it gives you some instant credibility.
SAQ: [Noise]
SAQ: mhm.
CYA: right.
Detecting Structure

- Detect the components
  - “dialogue acts”
  - Words, phrases, intonation, gestures, gaze direction ...
  - SVMs, decision trees, ...

- Detect the structure
  - Patterns/sequences of individual components
  - (Dynamic) Bayesian Nets
Twitter Interaction

- Snow, earthquakes, votes:
  - volume of traffic ("buzz")
  - (maybe combined with keyword searches)
- What if we want more than this?
  - Influence in discussions
  - Questions & answers, alternatives
  - Agreements, disagreements, consensus
- ... it's all about the structure again
What are we looking for?

- What are the overall structures?
- The jury’s still out ...
- What are the building blocks (”dialogue acts”)?
  - Question, answer, accept?
  - Publish information, like/dislike?
  - Express opinions, emotions, agree/disagree?
  - (aha! can “sentiment analysis” help?)
What do they look like?

• Twitter interaction structure may be similar to face-to-face ...
• ... but Twitter language certainly isn’t ...
• ... and it changes very fast.

Nyt alexx tweetdreamsh RT @JDBAustralia: Goodnight everyone, i will tweet you all tomorrow <3 #loveisrouder

BIEBER ALERT! #imoldenough to say @justinbieber’s new hair is FUCKING GORGEOUS
How can we detect them?

- Look for lists of keywords?
  - (most “sentiment analyzers” do this)
  - like, good, happy vs hate, bad, sad
- How do we define the list?
- How do we keep it updated?
- How do we transfer it to new languages?
How can we detect them?

• What about these?
  • @justinbieber is bad
  • i love @justinbieber #sarcasm
  • yeah right RT @susie i love @justinbieber

• Language is complicated!
• Need to learn these automatically
• Need to learn relationships between words
How can we detect them?

- Supervised machine learning (support vector machines)
- Give it lots of labelled data
- Learn to predict the labels

#sarcasm

love
Labels

- Problem: we need lots of labelled data
- Labelling is boring, expensive and hard:

  Best day in ages!

  Gets so angry when tutors don’t email back... Do you job idiots!

  Leftover ToeJams with Kettle Salt and Vinegar chips.

- Need people to label the data themselves ...
Labels

- Problem: we need lots of labelled data
- Labelling is boring, expensive and hard:
  
  Best day in ages! #Happy :) 
  
  Gets so #angry when tutors don’t email back… Do you job idiots! :@ 
  
  Leftover ToeJams with Kettle Salt and Vinegar chips. #stress #sadness #comfort 

- Need people to label the data themselves ...
Distant Supervision

- Find reliable conventions as noisy "labels"
  : )  : (  : @  : - P  < 3  (^ _ ^ )  (> _ < )  ...
  # happy  # sad  # fail  # ftw  ...

- Learn accurate models from lots of data
- (> 80% accuracy straight away)
- Easy to adapt, cross-language (ish)
- Uses authors’ own interpretation
Distant Supervision

• Do they tell us what we want to know?
  • Yes: opinions, emotions, sentiment
  • No: the labels are noisy (ambiguous, vague)

  :)  :-P

• Use co-training between independent labels

• Find common meaning (semi-)automatically

  :)  \( \frac{64\%}{69\%} \)  #happy
Tweet with #digitalshoreditch and spin the wheel!

RT @qmulimc The #digitalshoreditch wheel of emotion is working – hooray! :) come and see @qmul open studio

Wheel of Emotion
iPhone app: Sentimental
What’s next?

• Topic analysis:
  • e.g. tweets about a mobile provider
  • liked: deals, HTC Desire, ...
  • disliked: signal, HTC Sensation, ...

Wednesday, 27 July
What's next?

• Conversation Structure!

• understanding influence, (dis)agreement, consensus:

Vodafone said I could pay $344 to keep phone. 6 months left on contract & my receipt said phone was $240 over 12mths & I can pay out early.
@developit I want to terminate my contract with Vodafail - their service has been shocking at best. It's going to cost me $$$$$ 😞
@macbisho lodged complaint with ombudsman on Wednesday, got txt from Vodafone saying they have agreed & cancelled contract.
@developit fantastic. What happens to your phone?
@macbisho keep it I hope. Will let u know once I have the letter
@developit complaint to TIO done :) I love how you can do it online!
@macbisho oh I didn't know about online. We still haven't heard if son has his contract cancelled. Called Vodafone but line was bad. Typical
Thank you

• Me:  [website](http://www.eecs.qmul.ac.uk/~mpurver)
• m.purver@qmul.ac.uk / @mpurver
• IMC:  [website](http://www.eecs.qmul.ac.uk/researchgp/imc)
• @qmulimc
• Chatterbox:  [website](http://www.cbanalytics.co.uk)
• info@cbanalytics.co.uk / @cbanalytics