Social Media Monitoring: Networked Conversations and Communities

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Social Media is Huge and Growing
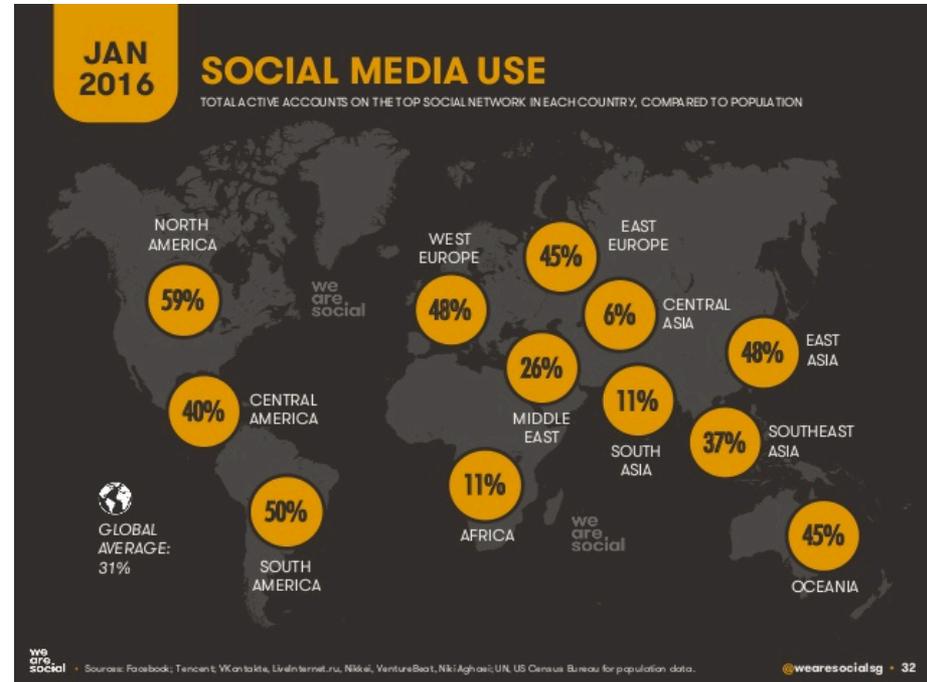
From WeAreSocial.com

Social Media is Huge and Growing
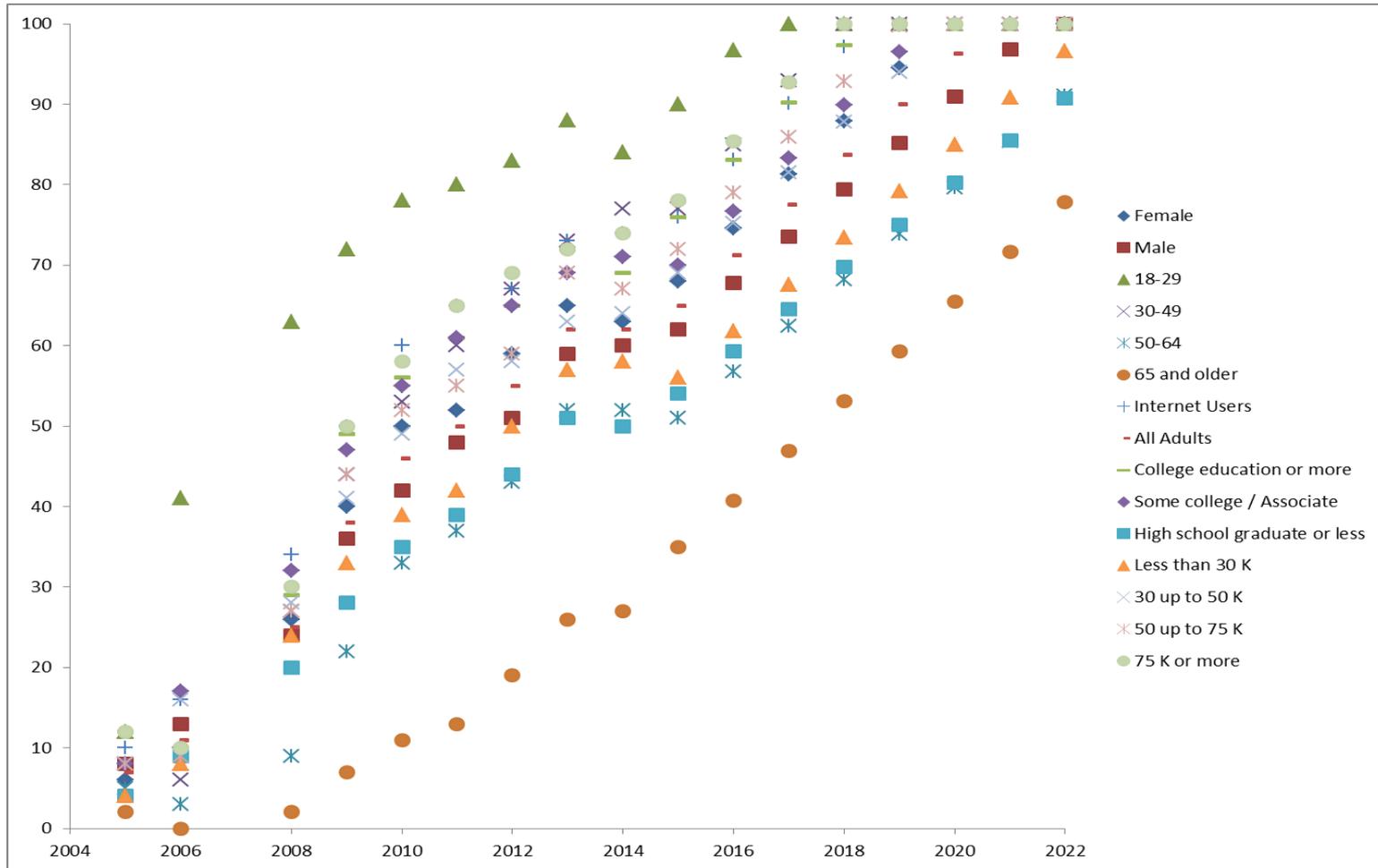
1 million new social mobile users every day
500,000 new Facebook users each day
500 million Tweets sent each day

Fundamental Change in Communication and Culture

- Groups and cultures have always been shaped by shared values and beliefs

- Values and beliefs are exchanged and shared through communication

- Communication is no longer limited by geographic area

- Neither are cohesive groups working in concert to achieve their shared goals

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Military Relevance

- Operational Environment: the aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information


Swedish High School Riot
The Local


Arab Spring
Reuters

"Twitter Revolution"
BBC

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Implications: Nation States & Cultures ➜ Networked Communities & Conversations
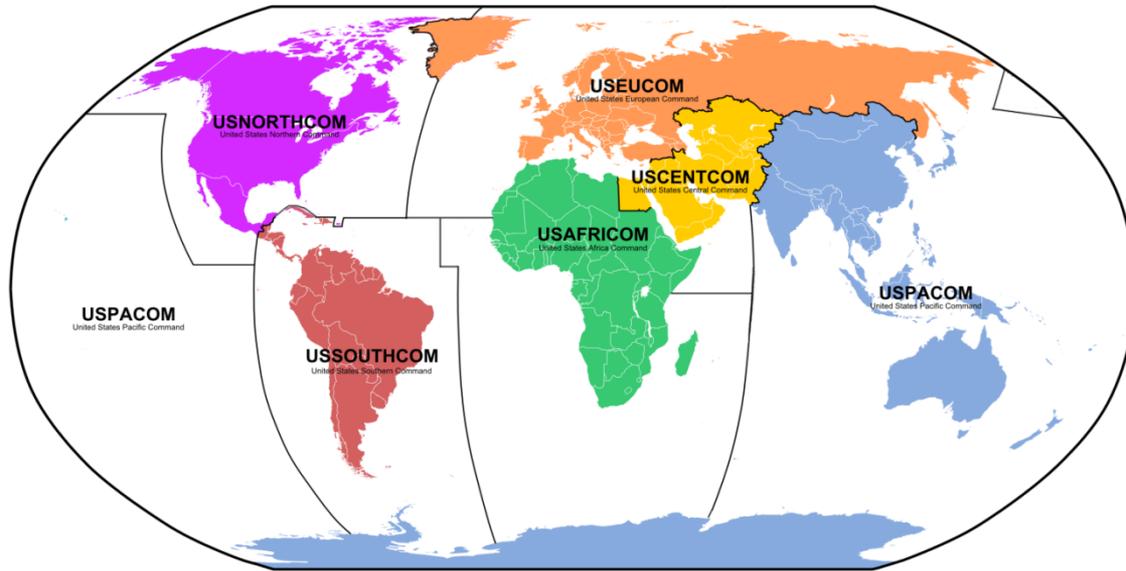
Social Media Monitoring

- Software to collect and analyze social media data
- Leverage unprecedented access to the thoughts and beliefs of people around the world

- Identify and track shifts in population attitudes and cultures
  - Reactions to current events, attitudes toward foreign governments, grievances, etc.,
- Discover relevant conversations and communities that are shaping discussion
- Take the "pulse" of social media space

Understanding Conversations and Communities: Status Quo

① User Constructs Boolean Keyword Expression

② All Matching Data is Retrieved

③ Volume Over Time; Sentiment; Geography

④ Identify Most Common Users

legal
Radiohead ning mislead
embedded
earnings support bridge
arrested
entrapment
Wednesday street close wall
RebuildDream watching
protest brooklyn

Zoom: 1' 5' 1h 1d 5d 1m 3m 6m 1y Max

6 am   8 am   10 am   12 pm   2 pm   4 pm   6 pm   8 pm   10 pm

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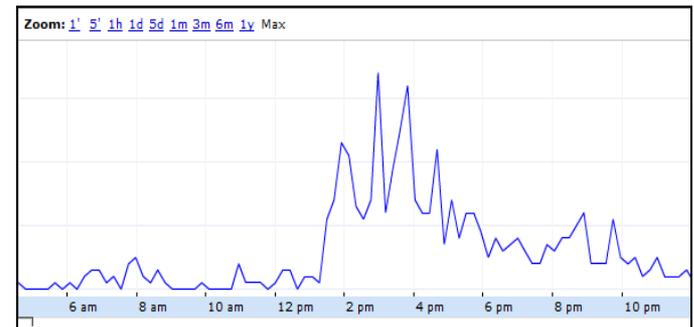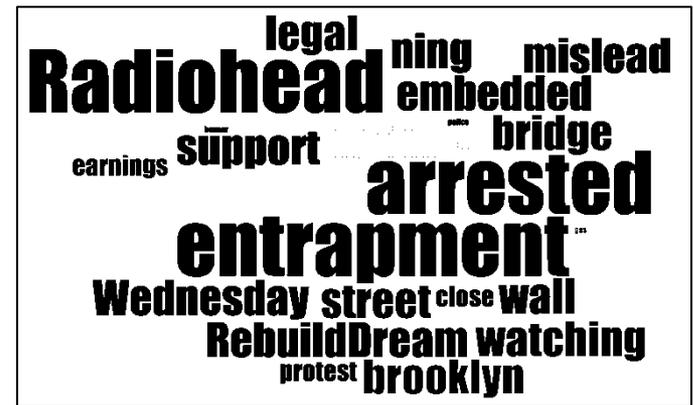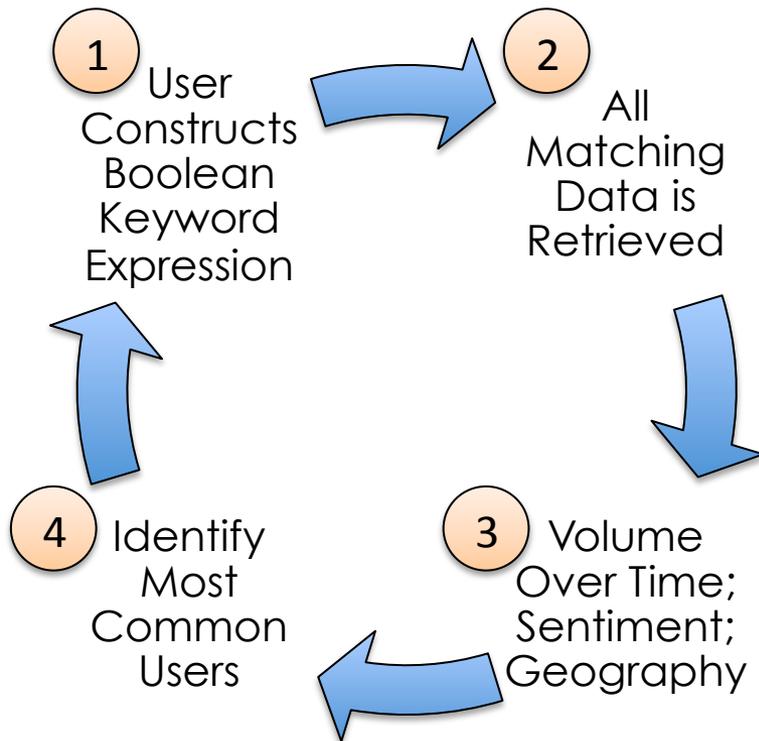
Understanding Conversations and Communities: Status Quo

- Volume
  - Something happened, but what?
- Sentiment analysis
  - Very difficult task to do automatically and accurately
  - Conversations are more nuanced than positive / negative
- Word clouds provide only a hint of meaning

- Trial and error pushes burdens onto user
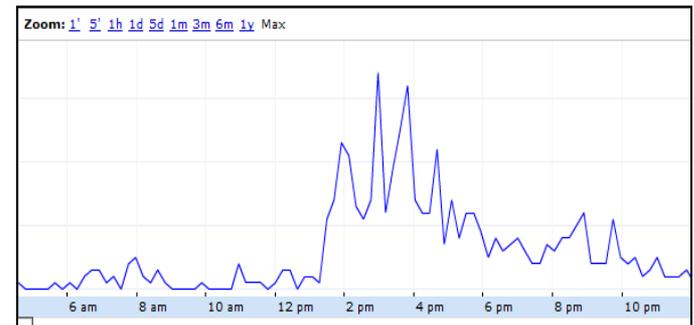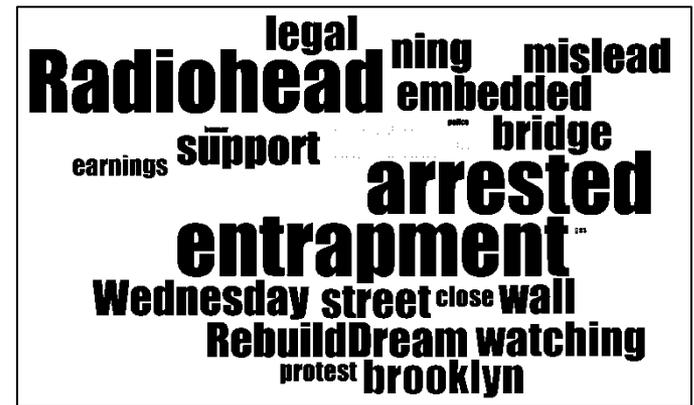
Conversations and Communities

- We need to look beyond
  - Individuals
  - Individual key words
- We need to see the BIG PICTURE of the Network of
  - CONVERSATIONS
  - COMMUNITIES

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Emergent Topic Detection

- Our algorithms: topics **emerge** from the data
  - Similar posts are grouped together into topics
  - Representative posts are identified for each topic
- Benefits
  - Requires little prior knowledge / expectations
  - Provides clear understanding of topics
  - Allows for discovery of unanticipated topics
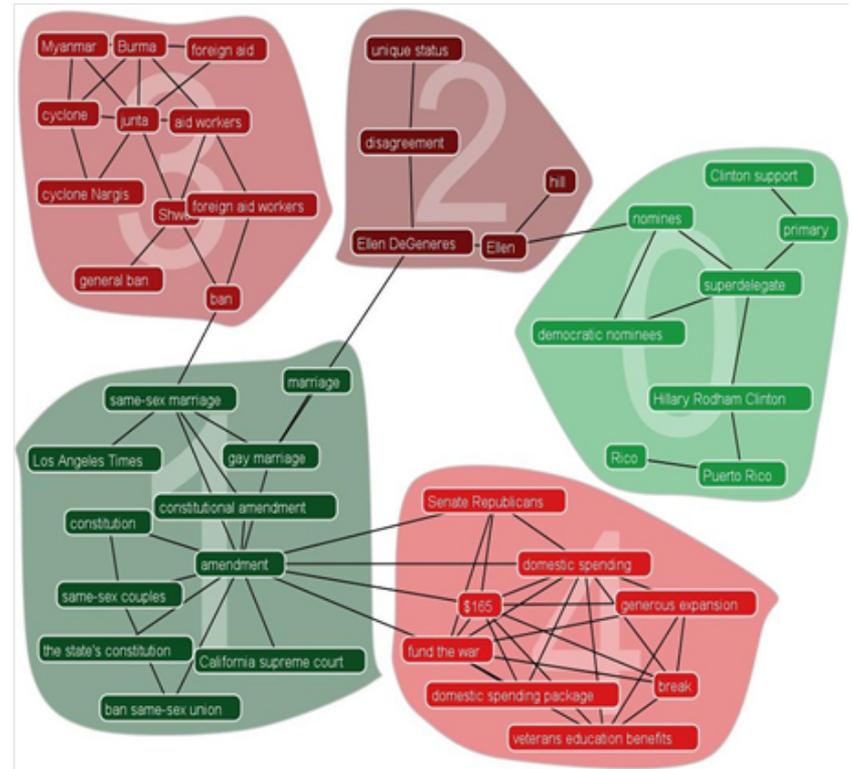
From: H. Sayyadi, L. Raschid. "A Graph Analytical Approach for Topic Detection", ACM Transactions on Internet Technology (TOIT), 2013

OWS Topics

Police trapped people at the brooklyn bridge and mass arresting them #OccupyWallStreet

*(681 similar Tweets)*

Check out this video of the police misleading people down an alley and arresting them. This is entrapment!

(110 similar Tweets)
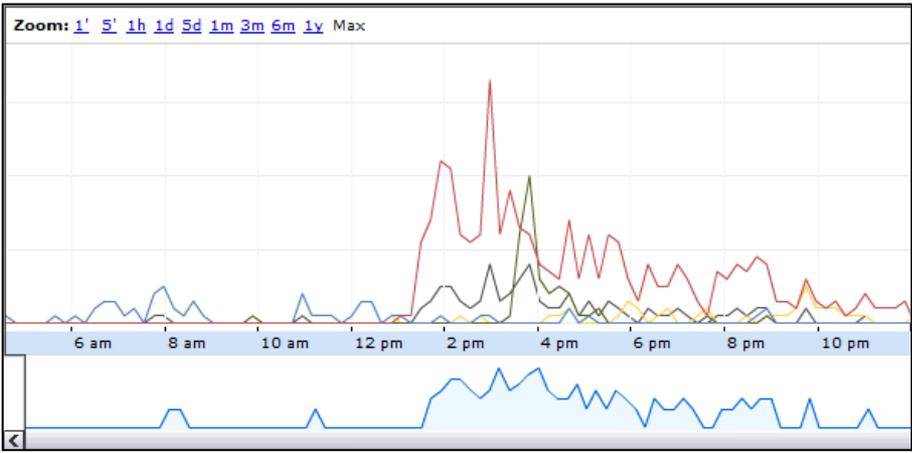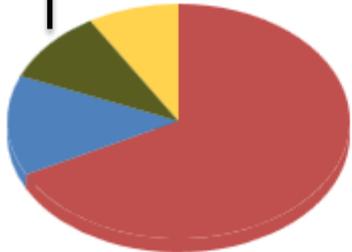
Community Detection

- Topics provide a lot of value in terms of situational awareness **but…**
- Individuals interact in social media much like they do in the real world: in **groups**

- Must **identify groups** and **understand their dynamics**

People are still People

Social Identity Theory

- Social identity theory concerns the perception of identity and the actions that arise from this perception
- People have multiple identities to which they subscribe at any one time
    - Gender, Household, Region, Tribe, Generation, Ethnicity, Religion, Political party, State, Socio-economic status, Educational level, etc.,
- These identities provide meaning / guide-constrain perceptions, opinions, perceptions, actions
    - Tajfel and Turner 1979

Why Choose / Change Identities?

- Improve self esteem
- Increase certainty about world
- Conform to social pressure

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We always look for patterns in human interactions – typically we use poor proxies

Race
Age
Children in Household
Occupation
Religion

Income
Gender
Ethnicity
Business Ownership
Sexual Orientation

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Communities Emerge from Networks of Associated Users
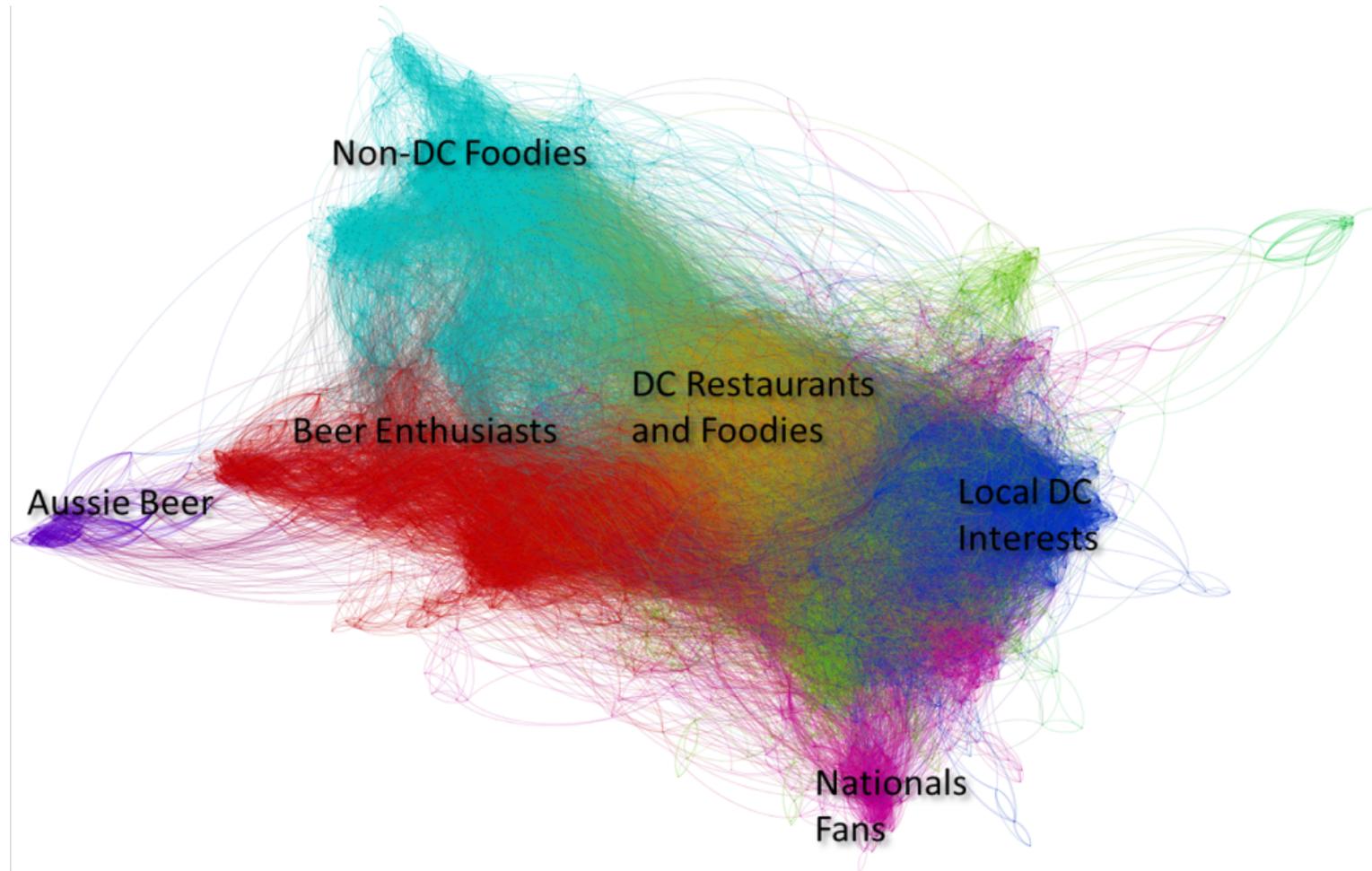
Groups in Real World

- Reflect
- Influence
- Compress

• Re-Tweeting

Groups in Twitter-verse

- Influence
- Reflect

Winning Hearts and Minds: Social Influence Network Theory

$$y_i^t = \alpha_i \sum w_{ij} y_j^{t-1} + (1 - \alpha_i) y_i^0$$

My current opinion equals
1. The opinions of the specific others I am influenced by at the previous moment
   • weighted by how much each specific person influences me
2. plus my opinion at the previous moment
   • weighted by how much I cannot be influenced.

Antecedents of i's initial attitudes

Initial attitude of i toward behavior y_i^t

$(1-a_i)$

Initial attitude of referents toward behavior y_j^t

Interpersonal influences of specific referents j on i, w_{ij}

Subjective norm

$$\sum_{j=1}^{x} w_i y_j^{(t)}$$

Time t+1 attitude of i toward behavior y_i^t

Time t+1 behavior of i

$a_i =$ i's susceptibility to others influence
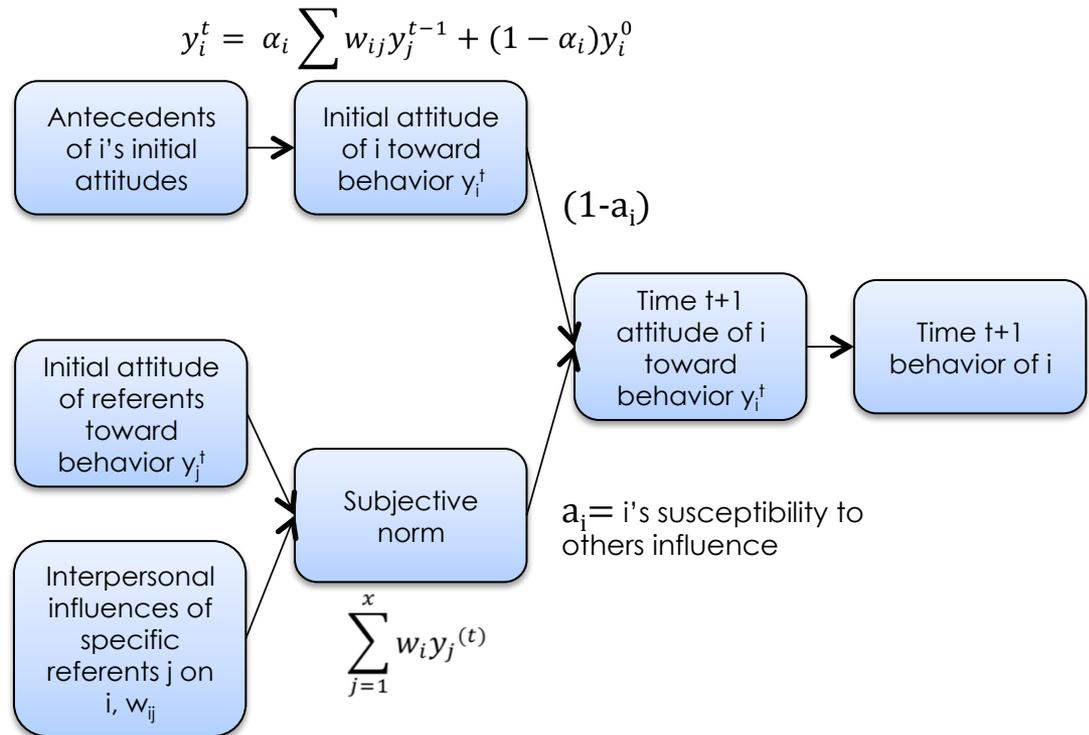
Trends For the Future

- More data in terms of quantity and type
- Interdisciplinary response teams / "war room"
- Increased coordination – automated and volunteer
- Democratization of social media analytics
- Continued blurring of information and combat

"When news breaks in the future, it will be covered by a multitude of eyewitnesses streaming live video. These streams will knit together into a single immersive video, enabling the viewer to virtually experience the event in real time. For better or worse, the world will feel like it's right around the corner."
        -Cory Bergman, BreakingNews Co-Founder
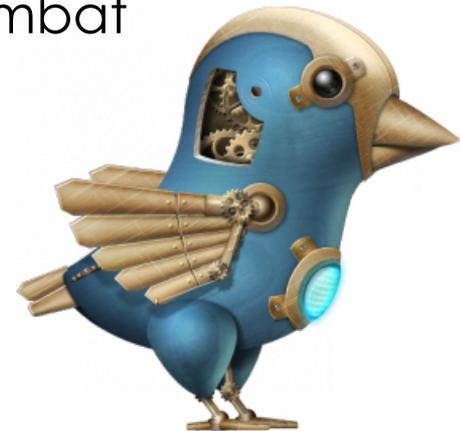
via AdWeek.com

Descriptive → Diagnostic → Predictive → Prescriptive

Gartner categorization of social media analysis capabilities

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- Friedkin 1991, 1997, 1998, 2003, Friedkin and Johnsen 1990, 1997, 1999

DISCUSSION

Start of Topic 1: 1pm – 2pm

Start of Topic 1: 1pm – 2pm

FROM: Bike_at_W4 DATE: Sat Oct 01 13:46:46 EDT 2011 CONTENT: "Police trapped people at Brooklyn bridge and mass arresting #OccupyWallStreet @revbillytalen @OccupyWallStNYC @NYC_GA http://t.co/AtxN9V8C"

Start of Topic 1: 1pm – 2 pm

FROM: jeffrae DATE: Sat Oct 01 13:38:02 EDT 2011 CONTENT: "Okay guys looks like my arrest is looking more imminent on Brooklyn Bridge now. Sigh. #occupywallstreet"

Start of Topic 1: 1pm – 2pm

FROM: DarylLang DATE: Sat Oct 01 13:50:53 EDT 2011 CONTENT: "You have to see this photo. I just watched police arrest a bunch of people on the Brooklyn Bridge. #OccupyWallStreet http://t.co/XOdYYv8H"

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Topic 1: 1pm – 4pm

Topic 1: The next day