

# The Influence of Feedback with Different Opinions on Continued User Participation in Online Newsgroups

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Davis Social Links



# Introduction

- Online Groups
  - Popularity
    - Over 50% of online users stay in contact with an online group regularly.
    - Up to Feb. 2010, 620 million groups on Facebook. (Nick, 2010)
  - Impact on people lifestyle
    - Information retrieval
    - Communication



# Introduction

## ● Online Newsgroups – a special case

**Occupy Los Angeles**  
Community Page about Activism

The Official Occupy LA Facebook page for Occupy Participants in Los Angeles  
Click "Share" on posts helps spread ideas/messages to more people. We encourage everyone to "Share". Educating the

About · Suggest an Edit

Photos · Events · Notes 21 · Likes

58,107

**Occupy Los Angeles** shared a link.  
6 hours ago · 17

#thiscouldbeyoul

\*\*America is descending into madness. The stories it now tells are filled with cruelty, deceit, lies, and legitimate all manner of corruption and mayhem. The mainstream media spins stories that are largely racist, violent, and irresponsible —stories that celebrate power and demonize victims, all the while camouflaging its pedagogical influence under the cheap veneer of entertainment\*\*

-Bib000

**America's Descent Into Madness**  
www.truthdig.com  
A predatory culture celebrates narcissistic hyper-individualism that radiates a near sociopathic lack of compassion for others, while anti-public intellectuals dominate the screen and aural cultures urging us to shop more, indulge more, and make a virtue out of the pursuit of personal gain. -2013/0...

Like · Comment · Share

32 people like this.

Write a comment...

**Mark Ortiz** Selfishness will make you blind.  
Like · Reply · 2 · about an hour ago

**Vic Demise Greed** is a mental illness- and I sent a letter to the American Psychiatric Association begging then to declare it as such.  
Like · Reply · 1 · about an hour ago

**Crystal Starheart** The Democratic and Republican Parties are Corrupted by Corporate Interests. The only Way to Change this is to OCCUPY the Democratic and Republican Parties and kick the Political Prostitutes out. The media only focuses on the two parties and people... See More  
Like · Reply · 3 · 3 hours ago via mobile

**Occupy Los Angeles**  
8 hours ago · 17

We hear a lot of "postracial" talk about race being a social construct. This is true, but a responsible activist and person must realize that social constructs are historical (and real) too. These constructs have a basis in historical power... See More

**class line**

**color line**

**WHITE**

**NOT-WHITE**

**capitalist class**

**working class**

Like · Comment · Share

21

**Occupy Los Angeles** · 58,107 like this  
6 hours ago · 17

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Like · Reply · 1 · about an hour ago

**Barry Schier** Whenever one reads that "The American public needs more than a show of outrage or endless demonstrations," it is a safe bet that the author of those lines wants a show of voters for the Democratic Party and/or diversion of efforts into starting counter... See More  
Like · Reply · 1 · 5 hours ago

**Cindy Newman** did you read the article , i know its long but try. It does not say what you claim

# Introduction

- Online Newsgroups – a special case
  - Threaded discussion on different topics
  - Group membership is fairly loose.
    - Less of social component
    - Members are relative strangers with few offline communication



These characteristics make online newsgroups ideal resources for researchers to examine user influence.

# Introduction

- One Important issue – Member retention and continued participation
  - The success of online newsgroups depends on user contribution to provide value to their services.

In a sample of 578 Usenet newsgroups, only 11.5% of people who posted in one month returned to post in a second month.  
(Jones et al. 2004)

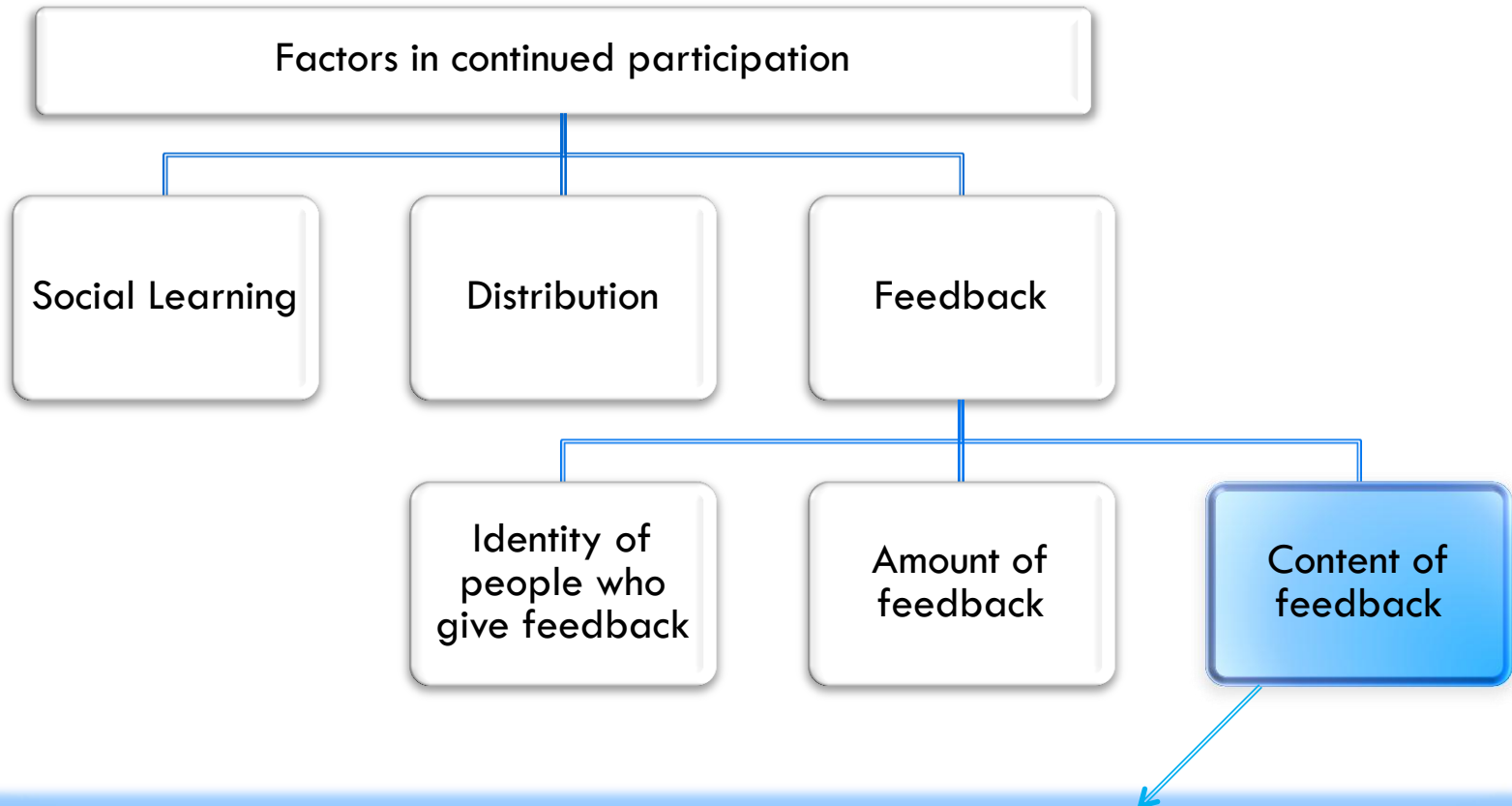
- Research Topic

Examine factors that influence user continued participation in online newsgroups.

# Outline

- ~~Introduction~~
- Research Background
- Classify Different Opinions
- Influence of Feedback with Different Opinions on User Continued Participation

# Research Background



Analyze the influence of **feedback with different opinions** on user continued participation in online newsgroups

# Challenges

Analyze the influence of **feedback with different opinions** on user continued participation in online newsgroups

- Classify the content of feedback into different opinions.
  - Graph partition
  - Linguistic Analysis
- Analyze the influence of different opinions on user continued participation.
  - Multiple regression analysis



# Outline

- ~~● Introduction~~
- ~~● Research Background~~
- Classify Different Opinions
- Influence of Feedback with Different Opinions on User Continued Participation

# Classify Different Opinions

Opinion Classification Method  
Based on User-Like graph

Evaluation from Linguistic  
Features

# Posts in Facebook Public newsgroups


**Occupy Los Angeles** · 55,542 like this  
 October 10, 2011 at 1:42pm ·

Like

Heard some of the LAPD dropped off 3 crates of supplies: hygienic products, snacks, sunscreen, etc. for Occupiers! -M.K.

Like · Comment · Share 99

676 people like this.

View previous comments 43 of 103


**Simone Maritza Missirian** Very cautiously optimistic...in the end, we need to win their hearts and minds...cause they have guns and our movement will grow stronger faster if they don't use them against us.  
 October 10, 2011 at 2:14pm via mobile · Like · 3


**David Sweet** awesome - send that tweet out ask to be re-tweeted...!!  
 October 10, 2011 at 2:16pm via mobile · Like


**Paradox Pollack** They are looking for photo opps. Unlike the NYPD who have a vested interest in not pissing off Wall Street, the LAPD and M... Villaraigosa want to support this because it is good press and our #'s are... on our goo side and not have to pay cop... It's...  
 October 10, 2011 at 2:18pm via mobile · Like · 3


**Daniel Rivas** Thank you LAPD, we needed that  
 October 10, 2011 at 2:19pm via mobile · Like · 4



**Paulina Selene Jones** love ❤ let us hope they change their attitudes towards the people in all of LA. it is awesome and a beautiful thing that they are giving so much support to OLA. But we can't forget the cruel and unusual crimes against our brothers in sisters on the streets of LA, when no one is looking and their word stands higher than the oppressed.  
 October 10, 2011 at 2:20pm via mobile · Like · 3


**Laurel Sylvanus** The police are 99% too- and a labor union also. They have as much to lose from this economic power shift in America as we do, and they are all feeling the pinch in lack of staff and lack of resources due to constant cuts to feed the State's overspendi... See More  
 October 10, 2011 at 2:21pm via mobile · Like · 3



**Occupy Los Angeles** Ivan we didn't ask them for anything, but we appreciate the kind gesture. If it's from our tax money, then that means it's also money from out of their own pockets from their salaries that they're using. -M.K.  
 October 10, 2011 at 2:27pm · Like · 6



**Jessie Sanchez** very cool  
 October 10, 2011 at 2:33pm via mobile · Like · 1

People who like this


**Michelle Hernandez**

Add Friend


**Cali Gramma**


**Aliya Kalypso Choudhery**  
 Owner/Creator at GARB by Kalypso

Close

# User-Like Graph

- Undirected Graph  $G = (V, E)$ 
  - $V$  is a set of nodes which stand for users who have clicked like button on any comments or whose comments were liked by others
  - $E$  is a set of edges among  $V$ . An edge  $e$  stands for a connection between the author of a comment and the people who clicked *like* on it.



# User-Like Graph


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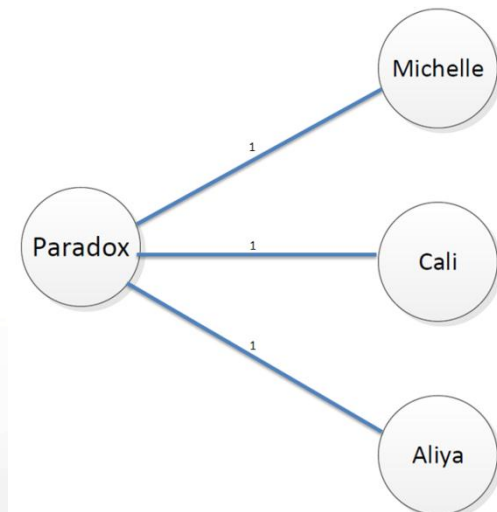

[Michelle Hernandez](#)


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[Aliya Kalypso Choudhery](#)  
 Owner/Creator at GARB by Kalypso

Add Friend

Close



# Examples of User-Like Graph



**Occupy Los Angeles** · 55,553 like this  
February 13, 2012 at 2:31pm ·

Like

This is worth watching more than once, and deserves to go viral. Pass it on! (GT)

**Judge Napolitano - How to get fired from Fox Business in under 5 mins**  
www.youtube.com  
What if?

Like · Comment · Share



237 people like this.

View previous comments

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**Jarrod Burris** There's only one person who is talking about ending our empire. And I'm supporting him.

Ron Paul, baby.

Before we clean up our country we need to come to grips with what we're doing to the world through our aggression and put an end to it.... [See More](#)

February 13, 2012 at 9:47pm · Like · 16



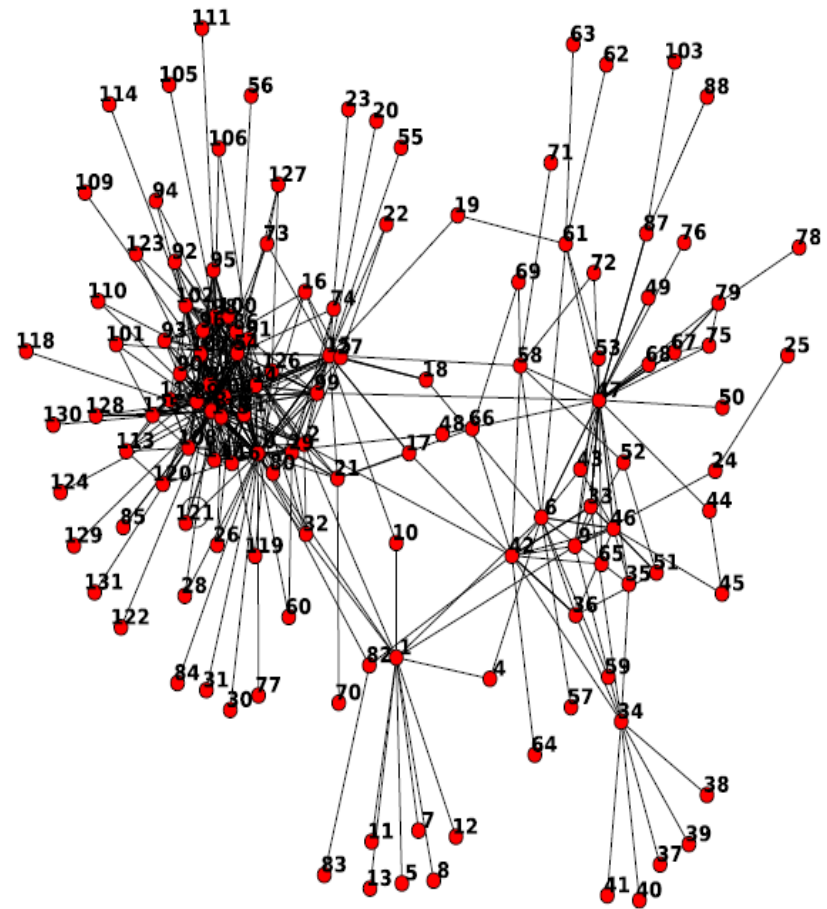
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February 13, 2012 at 9:47pm · Like · 5



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February 13, 2012 at 9:49pm · Like · 11



<http://www.facebook.com/occupyLA/posts/349187595101578>

# Examples of User-Like Graph

**Occupy Los Angeles** · 55,553 like this  
November 9, 2011 at 7:37pm · 🌐

**MUST BE SEEN:** In what world is this an acceptable response to peaceful protest? Berkeley Police clearly on the offensive against unarmed students protesting at Sproul Plaza. At least one instructor in urgent care. ~HSL

**Occupy Cal 11/9/11**  
www.youtube.com  
Berkeley police beating Cal students before retreating;)

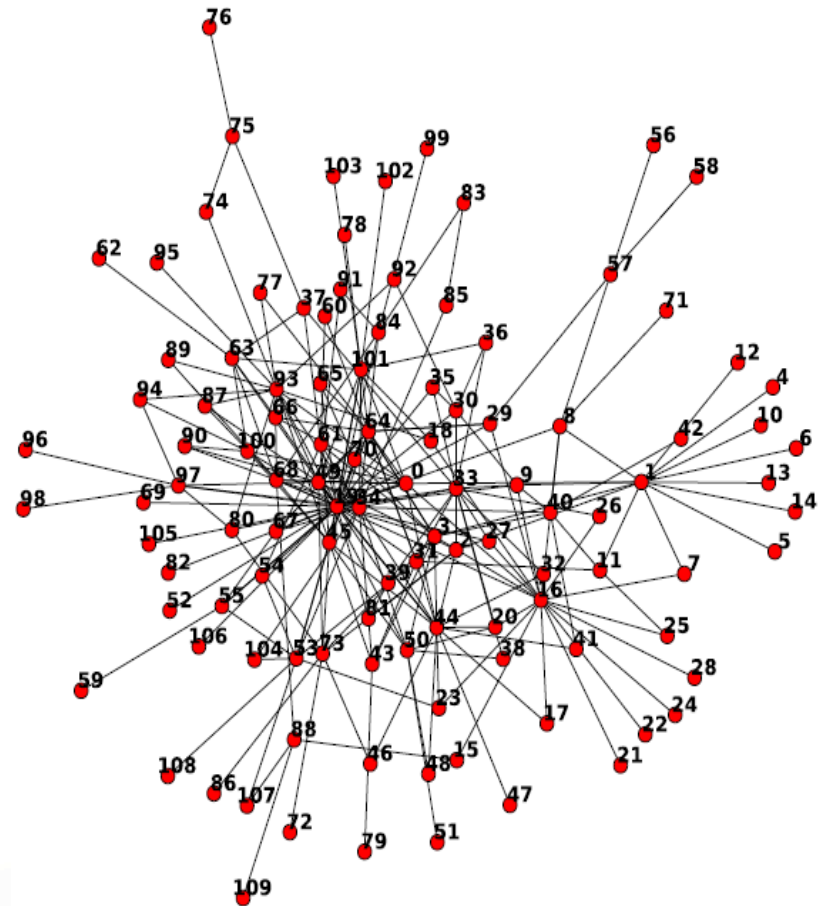
Like · Comment · Share 234

167 people like this.

View previous comments 38 of 126

**Protester Alpha** This is disgusting. I am posting an article on this at TheWallStreetProtest.com. This site gets thousands of visitors, so I'll help this video go viral. This is bullshit.  
November 9, 2011 at 9:46pm · Like · 1

**Chris Arroyo** Honestly someone needs to die in order for there to be change. In History every revolution has had bloodshed occur. Peaceful protesting although it is taking the higher road and showing how calm and collect you are compared to them obviously does not g... [See More](#)  
November 9, 2011 at 9:50pm · Like · 1



<http://www.facebook.com/occupyLA/posts/137019263068274>

# Opinion Classification Method

- Objective:

Find a partition of the graph  $G = (V, E)$  such that edges between groups have a very low weight and edges within one group have high weight.

- Spectral Clustering Algorithm (Andrew Y. Ng et al., 2002)


For a given number  $k$  of subset, we use spectral clustering algorithm to solve this RatioCut problem.



# Choosing Cluster Number

- For simplicity, we only choose the cluster number from 1 to 2.
- General steps
  - Cluster the user-like graph with  $k = 2$  by spectral clustering algorithm.
  - Use Newman Modularity Value  $Q$  (M.E.J. Newman et al., 2004) to check the quality of our partitioning result.
  - Decide the number of clusters

# Classification Results



**Occupy Los Angeles** · 55,596 like this  
 December 31, 2011 at 6:20pm ·

Like

Obama signs NDAA 2012, but says,

"I have signed this bill despite having serious reservations with certain provisions that regulate the detention, interrogation, and prosecution of suspected terrorists," Obama said. "I want to clarify that my Administration will not authorize the indefinite military detention without trial of American citizens. Indeed, I believe that doing so would break with our most important traditions and values as a Nation."


Also notable:

"The Obama administration had expressed concerns about the Iran sanctions, which the White House feared could backfire and limit its ability to persuade other countries to join the United States in multilateral sanctions by forcing Iran to drive up oil prices.

Congress revised the bill to give the administration six months to apply the sanctions if the White House determines they could disrupt the oil markets."

What road will this take us down?

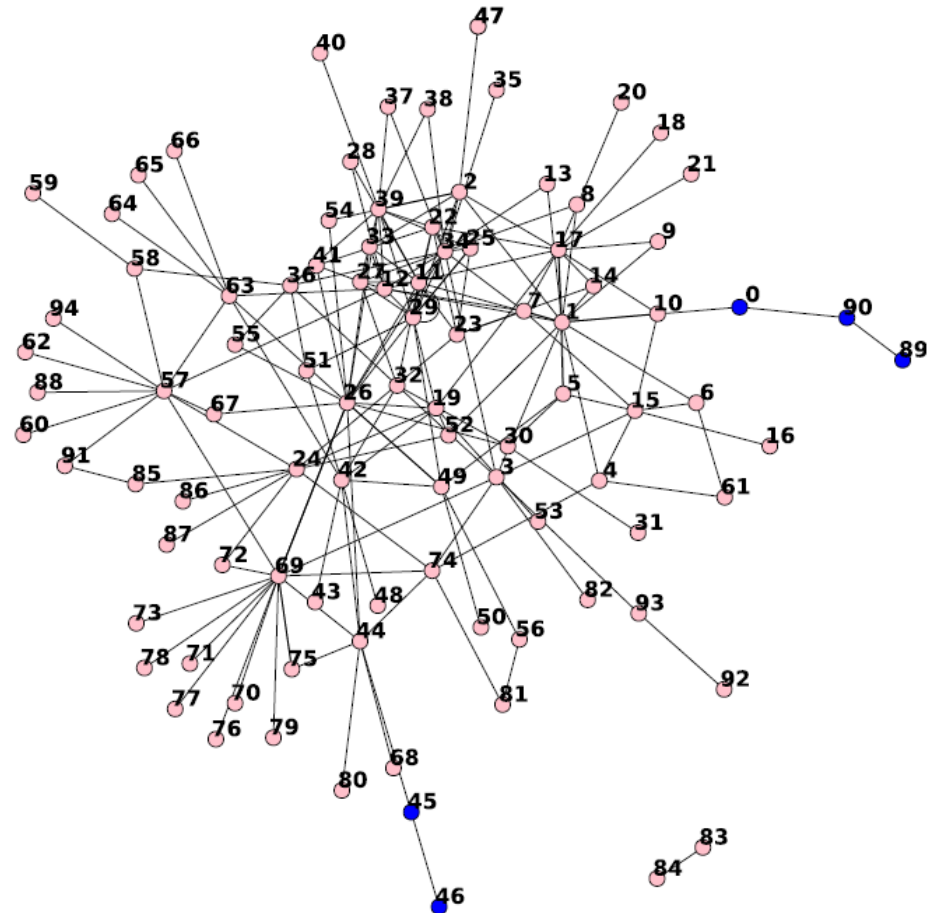
~nb



**Obama signs defense bill, pledges to maintain legal rights of U.S. citizens**  
[www.washingtonpost.com](http://www.washingtonpost.com)  
 President signs legislation but expresses misgivings about several provisions.

Like · Comment · Share

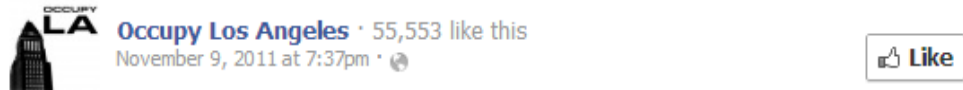
37 people like this.



(a)  $Q = 0.03$ . Consider it as one cluster

<http://www.facebook.com/occupyLA/posts/336031626407405>

# Classification Results



MUST BE SEEN: In what world is this an acceptable response to peaceful protest? Berkeley Police clearly on the offensive against unarmed students protesting at Sproul Plaza. At least one instructor in urgent care. ~HSL



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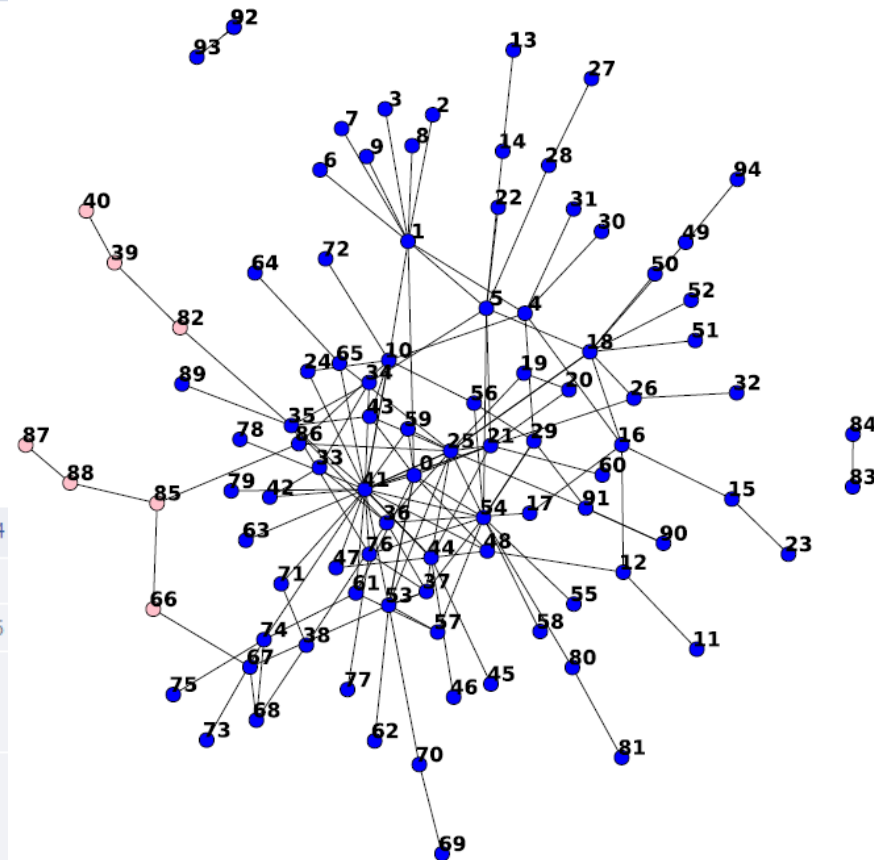
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November 9, 2011 at 9:50pm · Like · 1



(b)  $Q = 0.06$ . Consider it as one cluster

<http://www.facebook.com/occupyLA/posts/137019263068274>

# Classification Results



This is worth watching more than once, and deserves to go viral. Pass it on! (GT)

**Judge Napolitano - How to get fired from Fox Business in under 5 mins**

www.youtube.com

What if?

Like · Comment · Share

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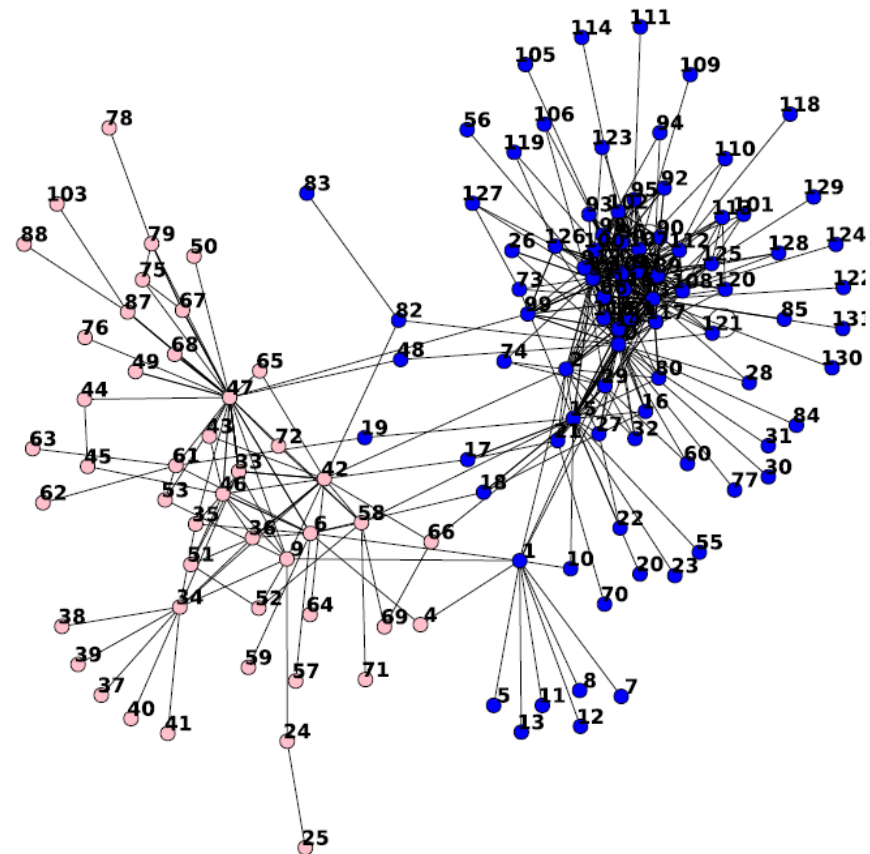
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February 13, 2012 at 9:49pm · Like · 11



(c)  $Q = 0.27$ . Consider it as two clusters

<http://www.facebook.com/occupyLA/posts/349187595101578>

# Classification Results



**Occupy Los Angeles** · 55,596 like this  
October 10, 2011 at 1:42pm · 🌐

Like

Heard some of the LAPD dropped off 3 crates of supplies: hygienic products, snacks, sunscreen, etc. for Occupiers! -M.K.

Like · Comment · Share

99

676 people like this.

View previous comments

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**Simone Maritza Missirian** Very cautiously optimistic...in the end, we need to win their hearts and minds... 'cause they have guns and our movement will grow stronger faster if they don't use them against us.

October 10, 2011 at 2:14pm via mobile · Like · 3



**David Sweet** awesome - send that tweet out ask to be re-tweeted...!!

October 10, 2011 at 2:16pm via mobile · Like



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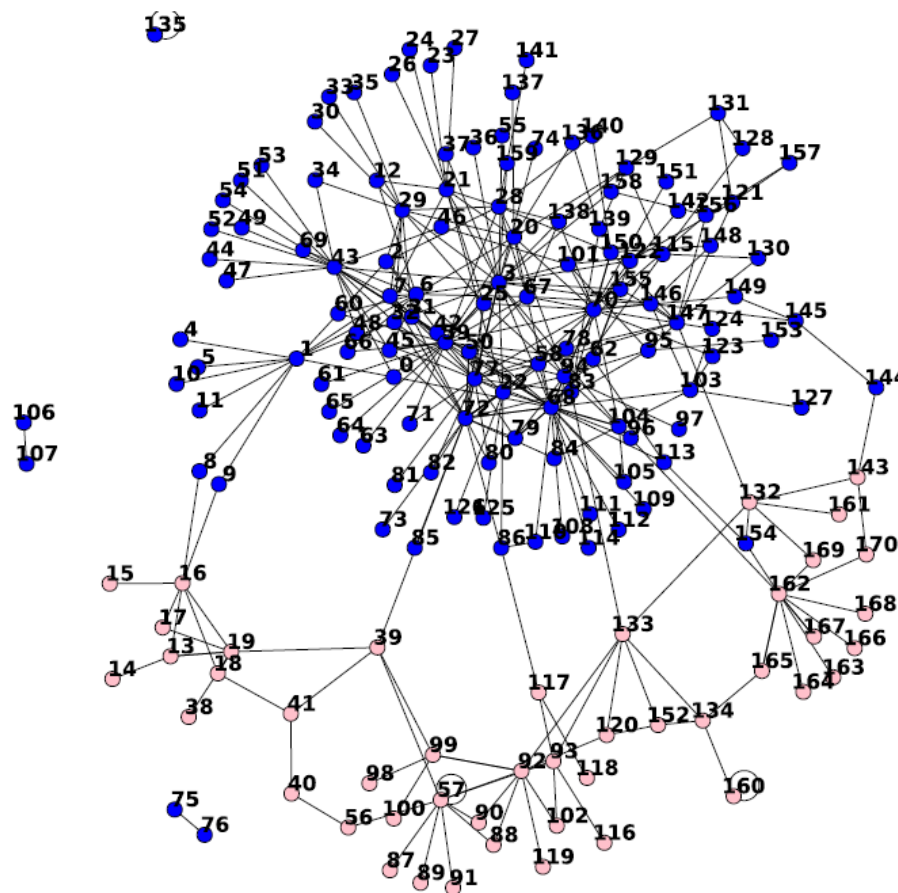
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October 10, 2011 at 2:20pm via mobile · Like · 4



(d)  $Q = 0.31$ . Consider it as two clusters

<http://www.facebook.com/occupyLA/posts/291368864209238>

# Evaluation

- Dataset
  - Official Occupy LA Facebook page.
  - All the posts, comments and like information in this group from Sep. 2011 to April 2012.
  - 20569 unique users, 88442 comments, 32216 posts, 66758 likes





# Evaluation

- Dataset
  - The comments number of posts we examine should not be too small.
  - We select all the posts which contain more than 35 comments. Finally, we get 23372 comments belonging to 401 posts in this Occupy LA group.

# Evaluation from Linguistic Features

- Our Theoretical Basis:

Comments on different opinions have different characteristics on their linguistic features. (R. Abbott et al., 2011)

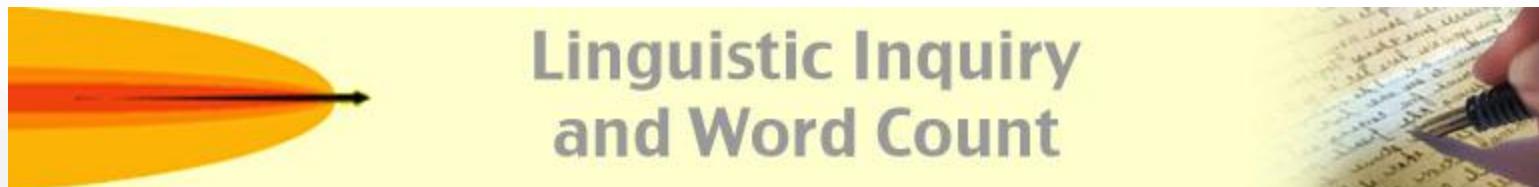
- General Idea:

As to each opinion classification result, if there are significant different ( $p < 0.05$ ) between their linguistic features, we regard it as an acceptable result.



# Linguistic Features

- Linguistic Inquiry and Word Count tool (Y.R. Tausczik et al., 2010)
  - It offers 63 linguistic categories based on its dictionary which consists of 3000+ words.
  - For every word in a text, it calculates the frequency with which it matches each of these 63 categories.
  - We select 39 categories from all the features. 32 of them belong to psychological processes and 7 of them belong to personal concern area.



# Linguistic Features

Areas	Categories	Examples
Social processes <sup>1</sup>		Mate, talk, they, child
	Family Friends Humans	Daughter, husband, aunt Buddy, friend, neighbor Adult, baby, boy
Affective processes <sup>1</sup>		Happy, cried, abandon
	Positive emotion Negative emotion Anxiety Anger Sadness	Love, nice, sweet Hurt, ugly, nasty Worried, fearful, nervous Hate, kill, annoyed Crying, grief, sad
Cognitive processes <sup>1</sup>		cause, know, ought
	Insight Causation Discrepancy Tentative Certainty Inhibition Inclusive Exclusive	think, know, consider because, effect, hence should, would, could maybe, perhaps, guess always, never block, constrain, stop And, with, include But, without, exclude

Table 3.1: The 39 textual Categories in 13 areas used in our linguistic evaluation. Areas marked with 1 are psychological processes, and areas marked with 2 are personal concerns

# Linguistic Features

Perceptual processes <sup>1</sup>		Observing, heard, feeling
	See Hear Feel	View, saw, seen Listen, hearing Feels, touch
Biological processes <sup>1</sup>		Eat, blood, pain
	Body Health Sexual Ingestion	Cheek, hands, spit Clinic, flu, pill Horny, love, incest Dish, eat, pizza
Relativity <sup>1</sup>		Area, bend, exit, stop
	Motion Space Time	Arrive, car, go Down, in, thin End, until, season
Work <sup>2</sup>		Job, majors, xerox
Achievement <sup>2</sup>		Earn, hero, win
Leisure <sup>2</sup>		Cook, chat, movie
Home <sup>2</sup>		Apartment, kitchen, family
Money <sup>2</sup>		Audit, cash, owe
Religion <sup>2</sup>		Altar, church, mosque
Death <sup>2</sup>		Bury, coffin, kill

Table 3.1: The 39 textual Categories in 13 areas used in our linguistic evaluation. Areas marked with 1 are psychological processes, and areas marked with 2 are personal concerns

# Evaluation from Linguistic Features

- Methods

For each of the posts which are considered including two different opinions inside, we use T-Test to check whether the LIWC scores of its two groups of comments are significant different ( $p < 0.05$ ) from each other.

	C1	C2	...	C39
Com_1	0.45	0.89	...	0.83
Com_2	0.36	0.75	...	0.74
...	...	...	...	...
Com_M	0.43	0.83	...	0.67

	C1	C2	...	C39
Com_1	0.52	0.23	...	0.72
Com_2	0.47	0.16	...	0.81
...	...	...	...	...
Com_N	0.43	0.31	...	0.76

	Category1	Category2	...	Category39
Sig value	0.43	0.02	...	0.37

# Evaluation from Linguistic Features

- Results
  - Among all the 401 posts in Occupy LA group, 336 of them are selected as posts with two different opinions inside.
  - 240 of these 336 posts reveal different characteristics on their linguistic features, which achieves an accuracy of 71.4%

# System Development

- Social Interactive Networking and Conversation Entropy Ranking Engine (SINCERE)
  - SINCERE is a diversified search engine based on user social informatics. Up to Aug. 20, 2013, its database stores all the information of 1542 Facebook public groups.
  - We implemented this opinion classification method into SINCERE as a real-time service.

# System Development



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October 10, 2011 at 1:42pm · 🌐

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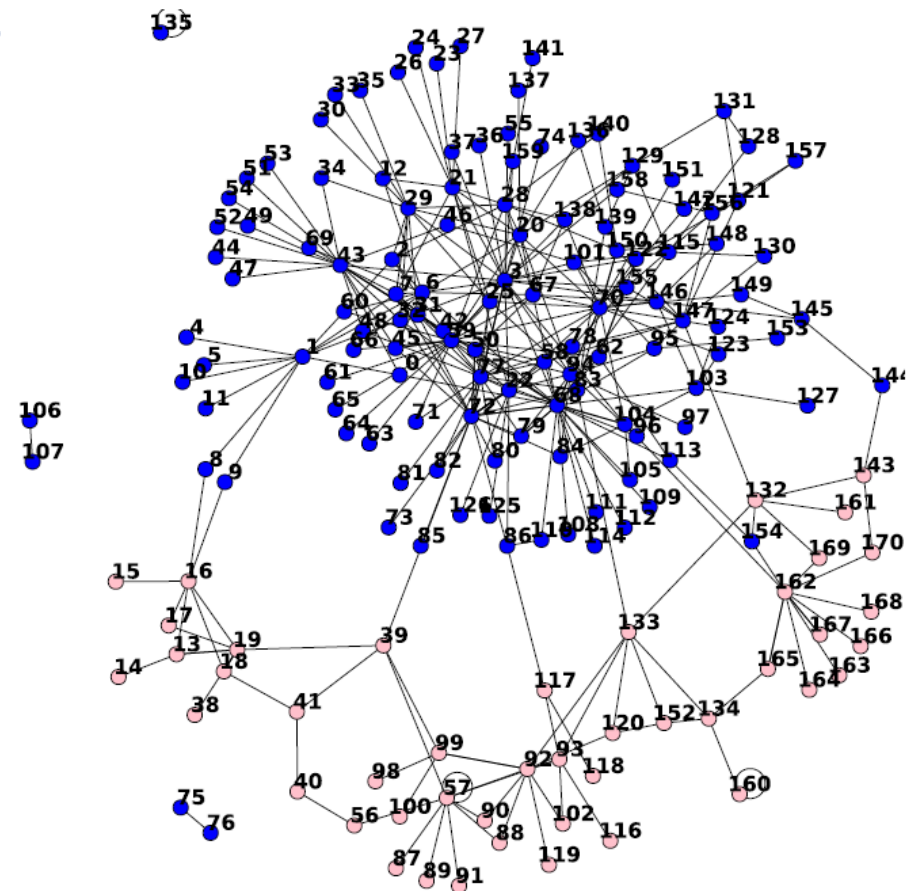
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# System Development



## SINCERE

Social Interactive Networking and Conversation Entropy Ranking Engine

Heard some of the LAPD

Search



Include  words

Rank by

Return top  results

☐ [Occupy Los Angeles](#) 2011-10-10 20:42:24

682 Likes · 101 Shares · 103 Comments · 0.804879 User Entropy · 0.725265 Post Entropy ·

Heard some of the LAPD dropped off 3 crates of supplies: hygienic products, snacks, sunscreen, etc. for Occupiers! -M.K.

For all of you morons writing 'fuck the police', 'the snacks are tainted', and that it's just a 'tactical move': Shut up. This is a peaceful movement and they have been completely peaceful in return, especially when compared to their counterparts at the NYPD. The city of LA has been very supportive and morons like you give the rest of us a bad name. If your morals and beliefs won't allow you to accept these offerings, fine, don't take them, but please don't try to spread your immature hatred here.

Most angelenos know LAPD can be awesome when it really matters and we would be screwed without em. Its just a few bad apples that really screw up their image.

Their\*

Way too much excitement over this. You realize they drop supplies all over the middle east to bolster support for the US presence. A war for hearts and minds. etc. etc. This is not support, this is not love or appreciation. This is strictly propaganda of the highest order. Don't fall for it.

The cops are on our side that's why they terrorize us in our neighborhoods and profile us walking down the street while upholding the state and capitalism all together. Yup how mighty kind of them ;)

Nazi officers were people just doing their jobs. Just saying.

I wouldn't eat the snacks.

Sounds fishy to me..

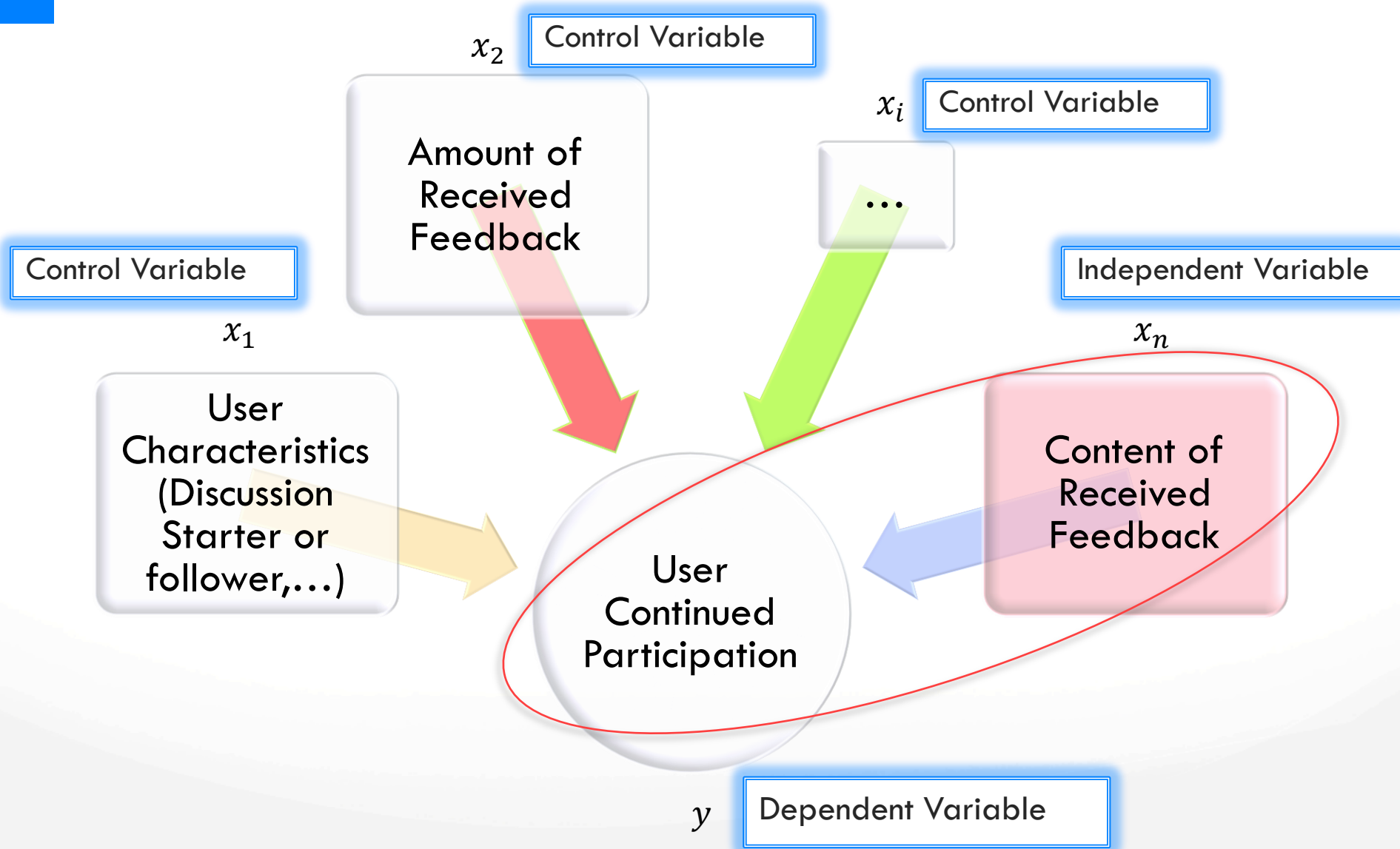
<http://sincere.se>



# Outline

- ~~• Introduction~~
- ~~• Research Background~~
- ~~• Classify Different Opinions~~
- Influence of Feedback with Different Opinions on User Continued Participation

# Problem Description



# Cox Regression Model

- Mathematical Formulation

$$h_i(t) = h_0(t)\exp(\beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_k x_{ik})$$

- $x_i$  denotes the covariates and  $\beta_i$  denotes the estimated coefficients.
- $h_i(t)$  denotes the instantaneous probability for user to leave this online group at time  $t$ .

# Results Analysis

Control/Indepedent Variable	coef	exp(coef)	$Pr(<  z )$	Std. Err.
OriginalPostWriter	-0.444	0.641	$< 0.001^{***}$	0.119
NonDiscussionPostsInvolved	-0.325	0.723	$0.002^{**}$	0.104
ComPerActivity	-0.274	0.760	$0.020^*$	0.118
SamePercent	-0.194	0.823	$0.007^{**}$	0.072
DifferentPercent	-0.154	0.857	$0.005^{**}$	0.055
SamePercent * DifferentPercent	-0.267	0.766	$0.002^{**}$	0.085
ComPerActivity * SamePercent	0.284	1.328	$< 0.001^{***}$	0.070
ComPerActivity * DifferentPercent	0.130	1.139	$0.043^*$	0.064

Table 4.2: Results of Cox Regression Model

# Discussion and Conclusion

- Members who started more original posts revealed a longer lifetime in this social newsgroup

Website designer can motivate users longtime participation by offering more opportunities for normal users to post their own news and become a discussion starter.

- The more feedback one individual receives after his/her comment, the more likely he/she will remain in this newsgroup.
  - This result is also proved in E. Joyce's work about newcomers in newsgroup (E. Joyce et al., 2006) and Yi-Chia's work about all members in online health support group (Yi-Chia et al, 2011).
  - Our result broads this conclusion to the behavior of all the members in online newsgroup.

# Discussion and Conclusion

- The content of replies has a significant influence on user's commitment to online newsgroup.
  - Both the feedback comments from the same and different opinions can motivate user longtime participation in online newsgroup.
  - Furthermore, **an interaction of feedback** from both the same and different opinions during discussion can boost user future participation.

Control/Indepedent Variable	coef	exp(coef)	$Pr(<  z )$	Std. Err.
SamePercent	-0.194	0.823	0.007**	0.072
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SamePercent * DifferentPercent	-0.267	0.766	0.002**	0.085

# Discussion and Conclusion

- Our result proves and broadens the conclusion of Jennifer's research in political communications. (J. Stromer-Galley et al., 2009)
  - Statistical analysis on a much larger dataset.
  - We offer a new opinion classification algorithm to partition feedback comments into different opinions automatically. (SINCERE system)
  - Instead of only focusing on political topics where people's stances are always sharp and in opposition to each other, our experiment broadens user interaction data to general discussion topics.

