Ranking Twitter Discussion Groups

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COSN 2014

Outline

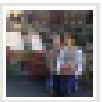
- Twitter discussion groups
- Our algorithm
- Theoretical results
- Evaluation

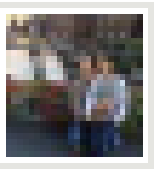
AlzChat

Group Chats on Twitter

[C, Kenthapadi, Mishra 2013]

#MTOS


raghavmodi Raghav
#MTOS hosted by @NitrateDiva in one hour. the topic is suspense http://t.co/8bvRl6wd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http://nitratediva.wordpress.com

The Suspense Is Killing Me

1. How do you define suspense in the cinema? As a viewer, do you consider suspense a desirable trait in a film?

2A. What is the greatest “suspense film” you’ve ever seen? Why?

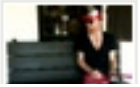
2B. What’s the best, most suspenseful movie scene or sequence you can think of?

nitratediva The Nitrate Diva

2A. What is the greatest "suspense film" you've ever seen? Why? **#MTOS**

jimsfilmmodules James Aston

2A:Harakiri (Kobayashi's version)-an ending that ranks amongst 1 of best made all the more memorable by the growing tension throughout **#MTOS**



kevrockcity Kevin Koehler

Vertigo because it's perfect. RT @NitrateDiva **2A**. What is the greatest "suspense film" you've ever seen? Why? **#MTOS**

movietos #MTOS

Thank you everyone. **Next week**'s **#MTOS** will have host @Thompson_film with the topic Film Noir. Do follow him and spread the word. Cheers!

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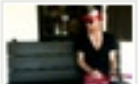

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StephenS
@StephenSType1

It's that time for me. Closing: I'd be a vey unhappy person without this hour every week, topic or not. Thanks @SweeterCherise #dsma

Elaine Cook
@vivizaraz

Social media enables me to access a support network, both those I know in RL and online contacts. Having child with ASD v isolating #mhchat

Find group discussions about: movies 

1. #MTOS
2. #FilmCurious
3. #DriveInMob

Sort by...

tweets with “movie”?

Fraction of tweets with “movie”?

users who tweet “movie”?

Related Work

- Group Chats on Twitter

  [CKM 2013]

  Algorithms for finding group chats

  This work: *Ranking*

Related Work

- Group Chats on Twitter

  [CKM 2013]

- Search in Online Forums

  [Elsas, Carbonell 2009] [Cong et al. 2008]

  Finding forum threads

  This work: *Finding discussion groups.*

Related Work

- Group Chats on Twitter

  [CKM 2013]

- Search in Online Forums

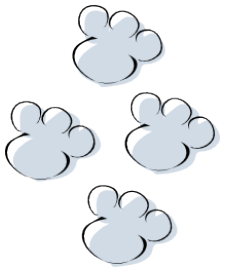
  [Elsas, Carbonell 2009] [Cong et al. 2008]

- PageRank [Brin, Page 1998], HITS [Kleinberg 1998]

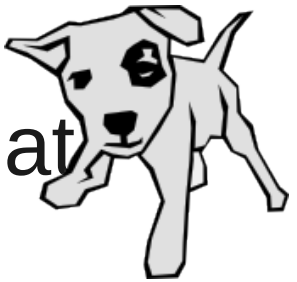
Sprockets

talkSprockets

sprockz



sprocketChat



@ alice

@ bob

@ carol

Sprockets

Stationary Distribution:

Pr[#talkSprockets] = 0.3

Pr[#sprockz] = 0.2

Pr[#sprocketChat] = 0.5

Final Ranking:

#sprocketChat

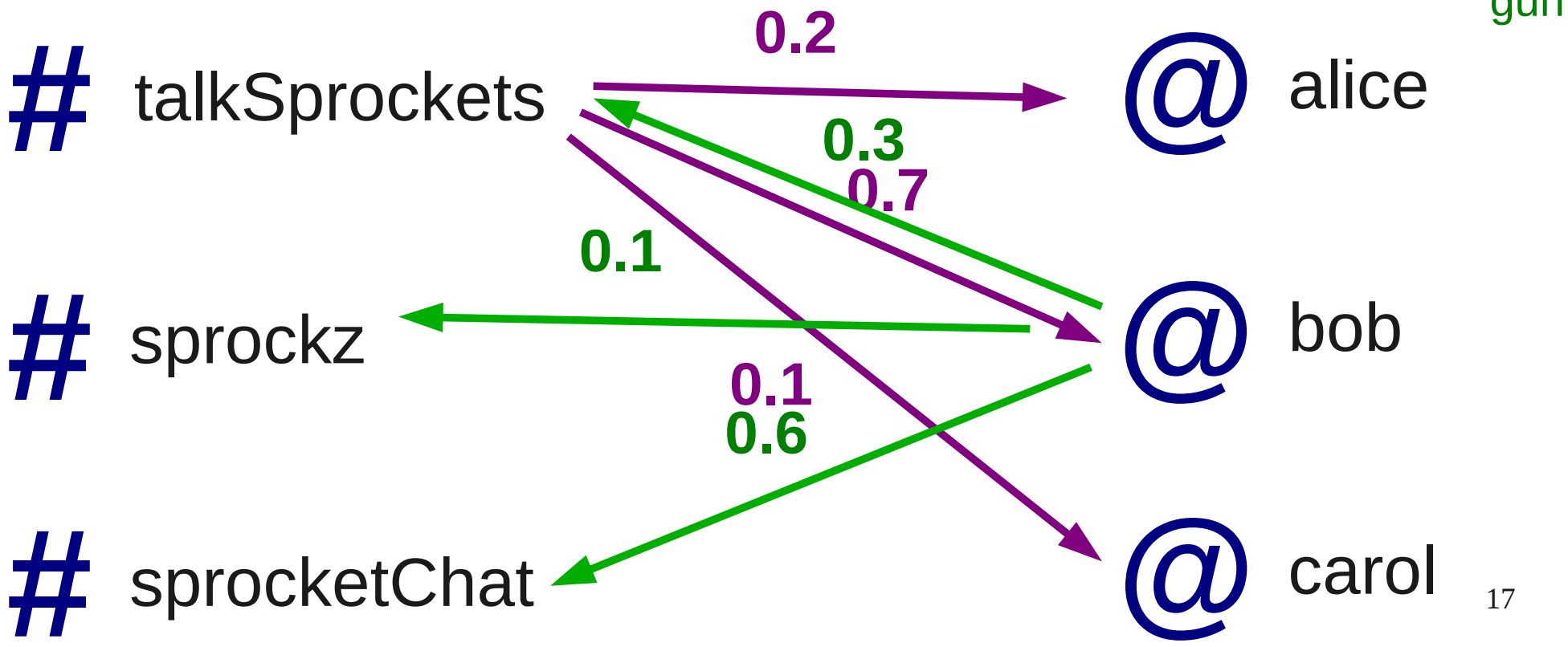
#talkSprockets

#sprockz

$$M_{gh} = \square \sum_u A_{gu} P_{guh}$$

Authority Scores A_{gu}

Preference Scores P_{guh}

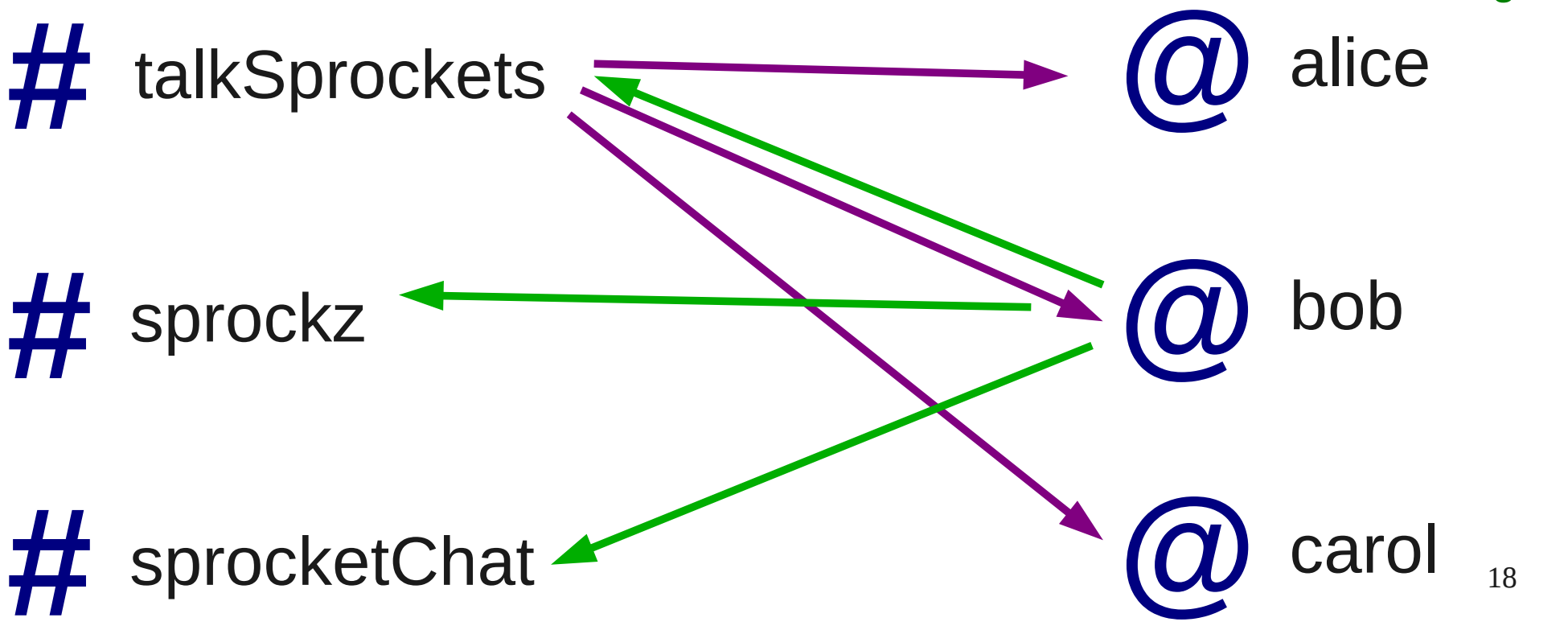


$$M_{gh} = \lambda D_h + (1-\lambda) \sum_u A_{gu} P_{guh}$$

Teleport Distribution D_h

Authority Scores A_{gu}

Preference Scores P_{guh}



Group Preference Model

$$M_{gh} = \lambda D_h + (1-\lambda) \sum_u A_{gu} P_{guh}$$

Find stationary distribution π

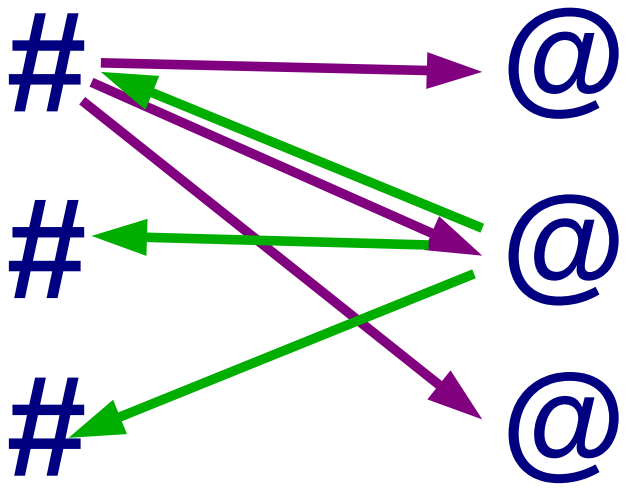
Rank $g > h$ if $\pi_g > \pi_h$

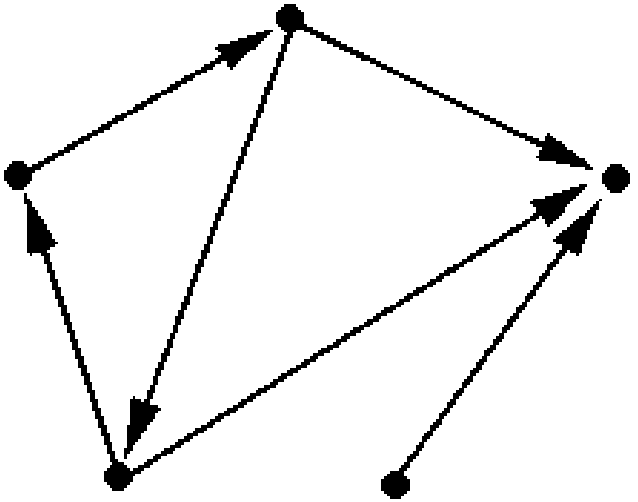
DISCLAIMER:

Use only for ranking.

Not a model of reality.

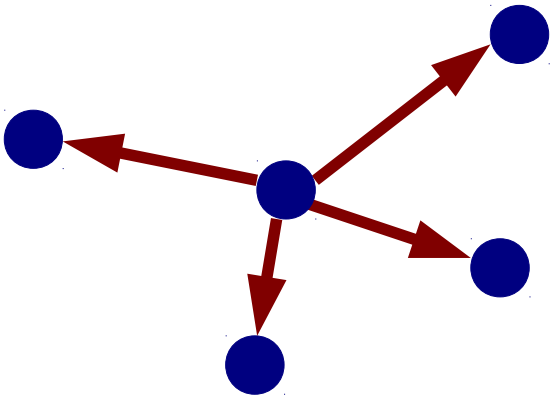
Group Preference Model





Random Surfer Model
(PageRank)

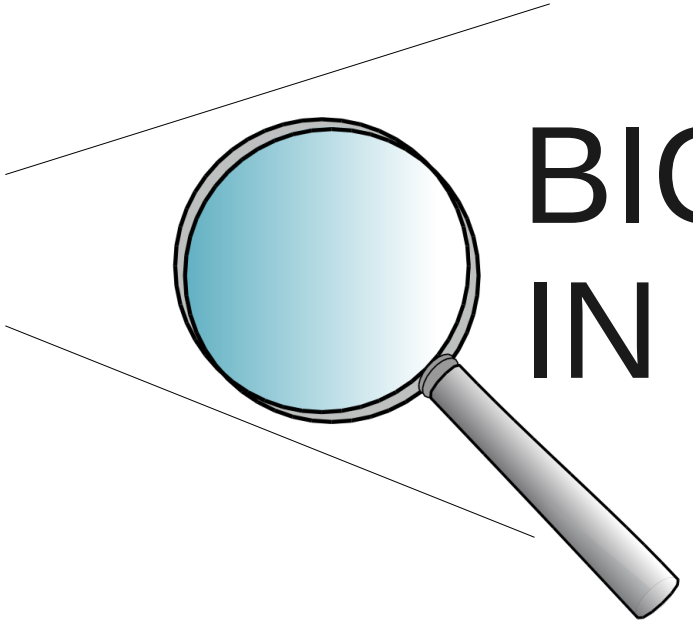
Hubs and Authorities



Stability

Stability

small change in input



BIG CHANGE IN RANKING?

- PageRank and HITS are unstable.

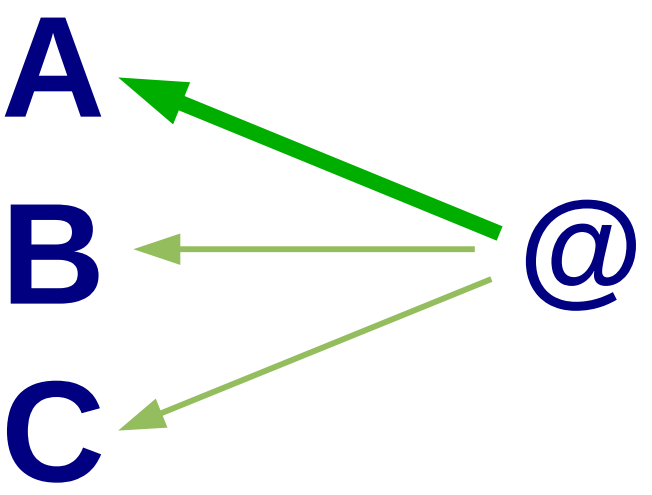
- Our algorithm is also unstable.

Stability

Theorem

If we increase one user's preference for group A (at the expense of other groups) then A's rank will not go down.

[Chien, Dwork, Kumar, Simon, Sivakumar 2003]

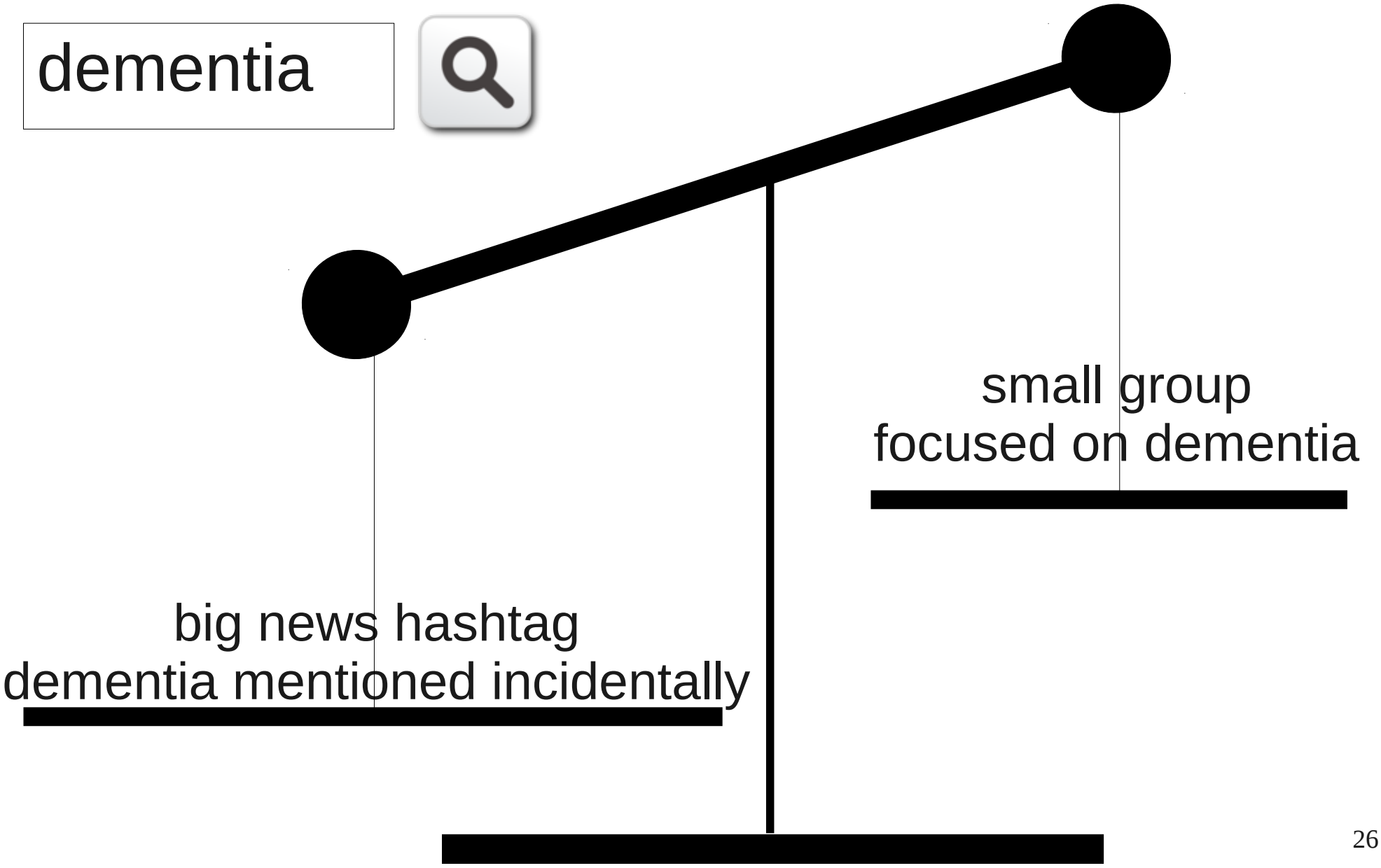


Rank by # times query occurs?

dementia 

Rank by # times query occurs?

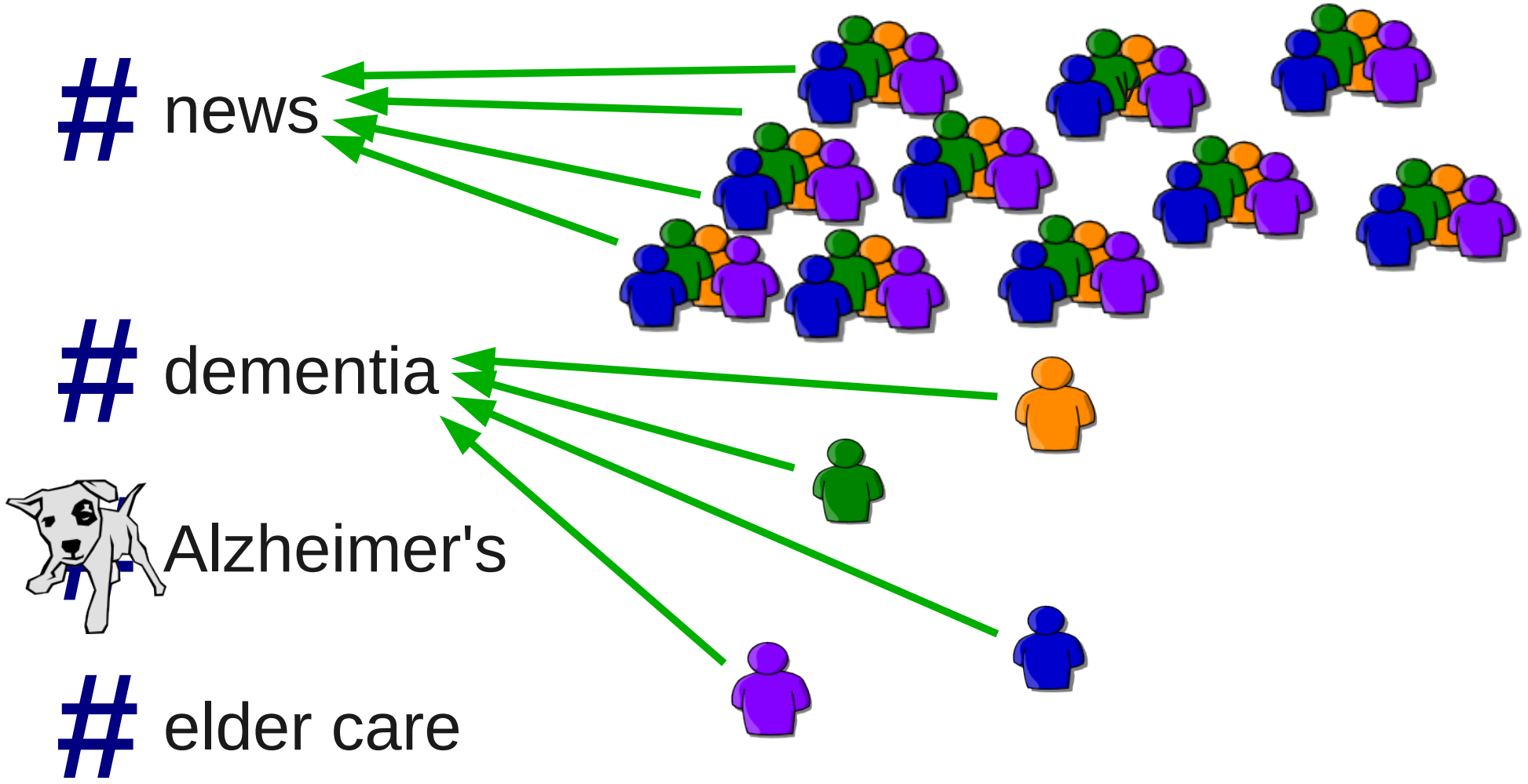
dementia



Example

Theorem: Dementia chat ranked at top.*

*(Assuming the teleport distribution is uniform.)



Evaluation

Baseline algorithms:

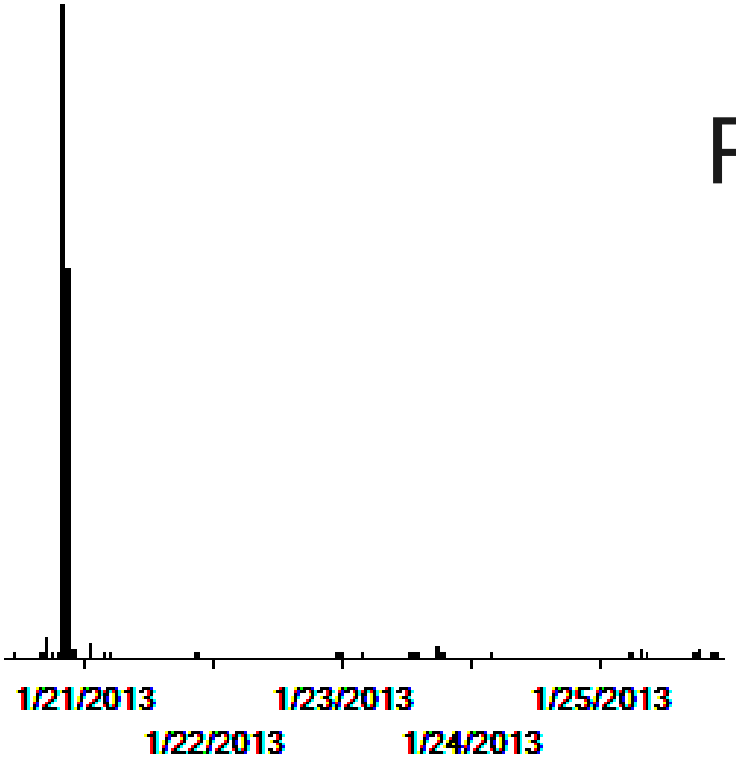
- # tweets with query
- Fraction of tweets with query
- # users who tweet with query

Evaluation

- Queries
- Ground Truth
- Dataset of group discussions

Evaluation: Dataset

One year of tweets



One week of #MTOS

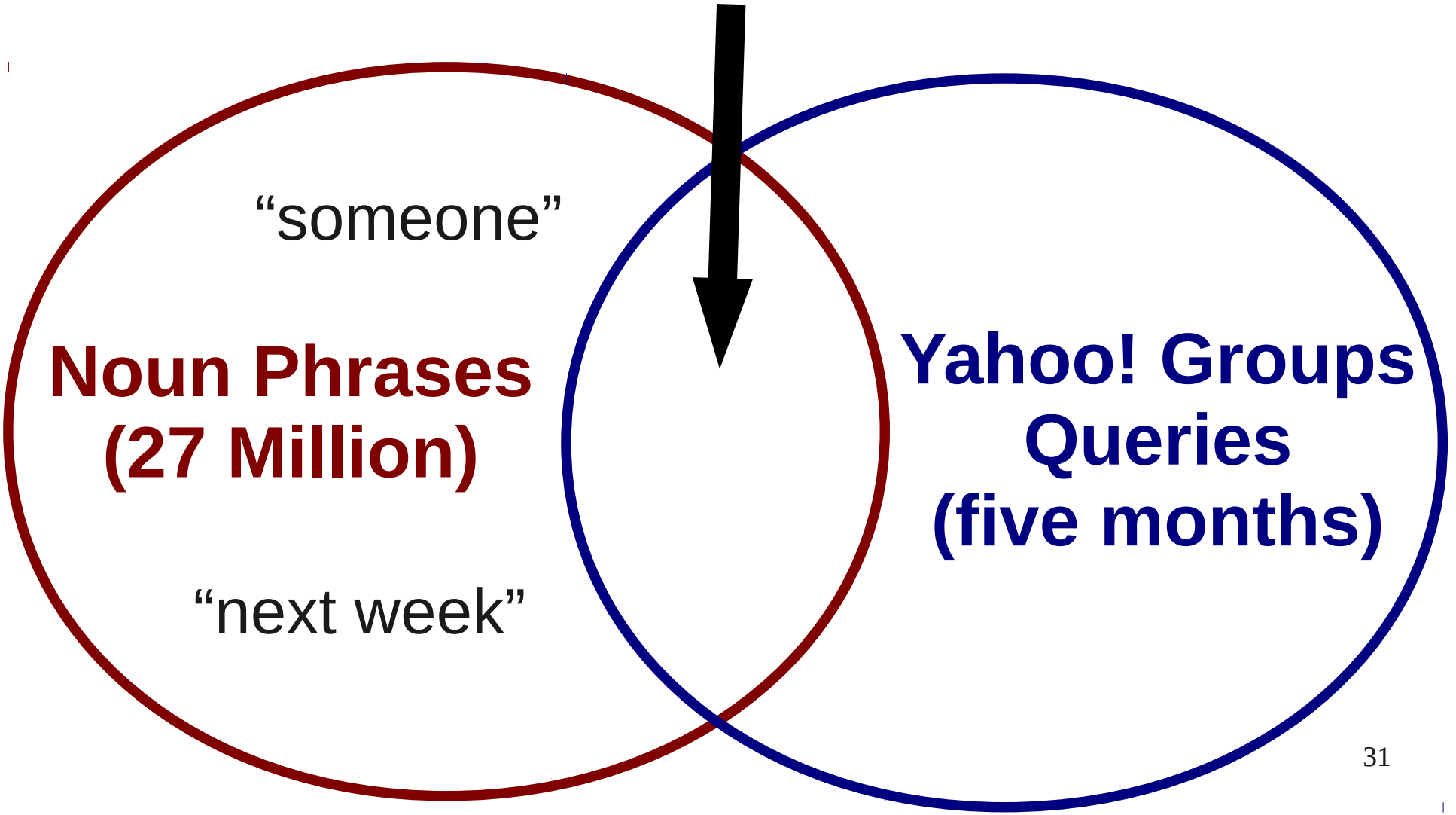
Require at least 10 meetings

↓

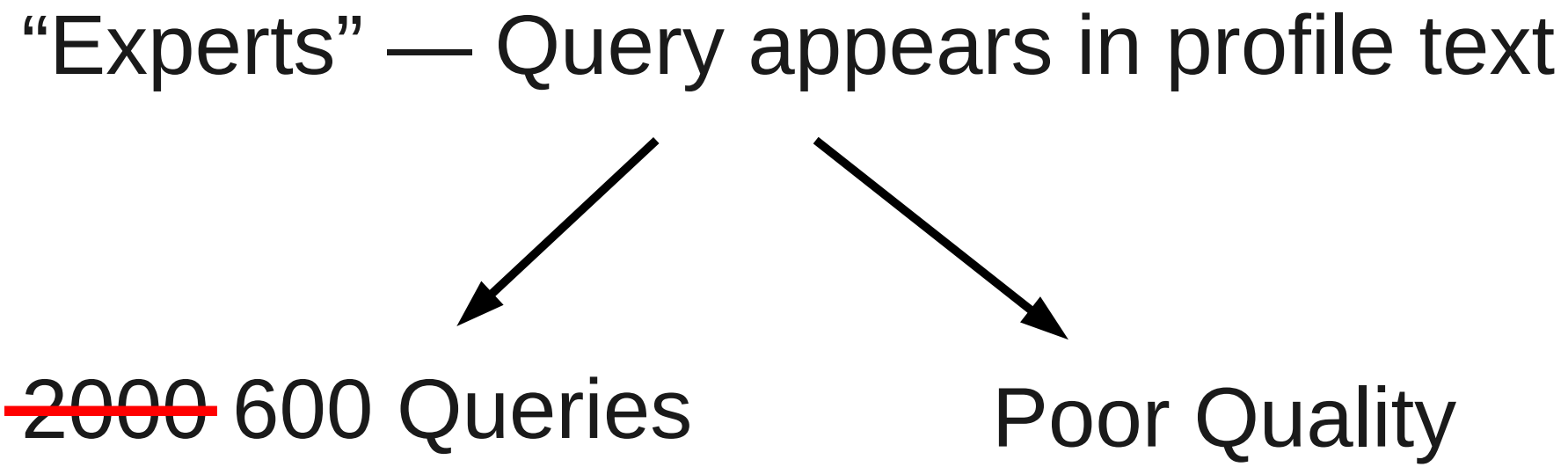
27K group discussions

Evaluation: Queries

2000 Test Queries



Evaluation: Ground Truth



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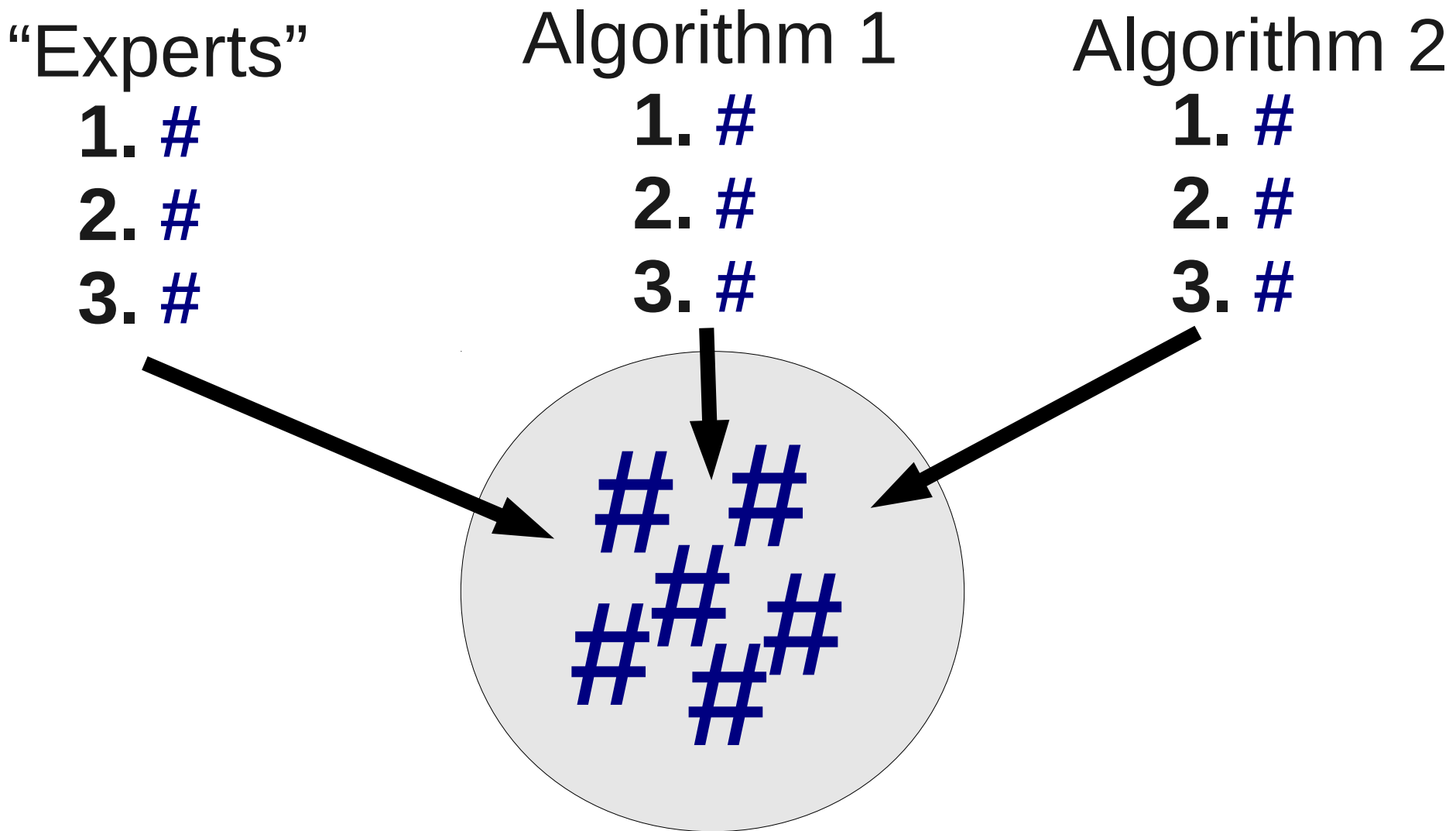

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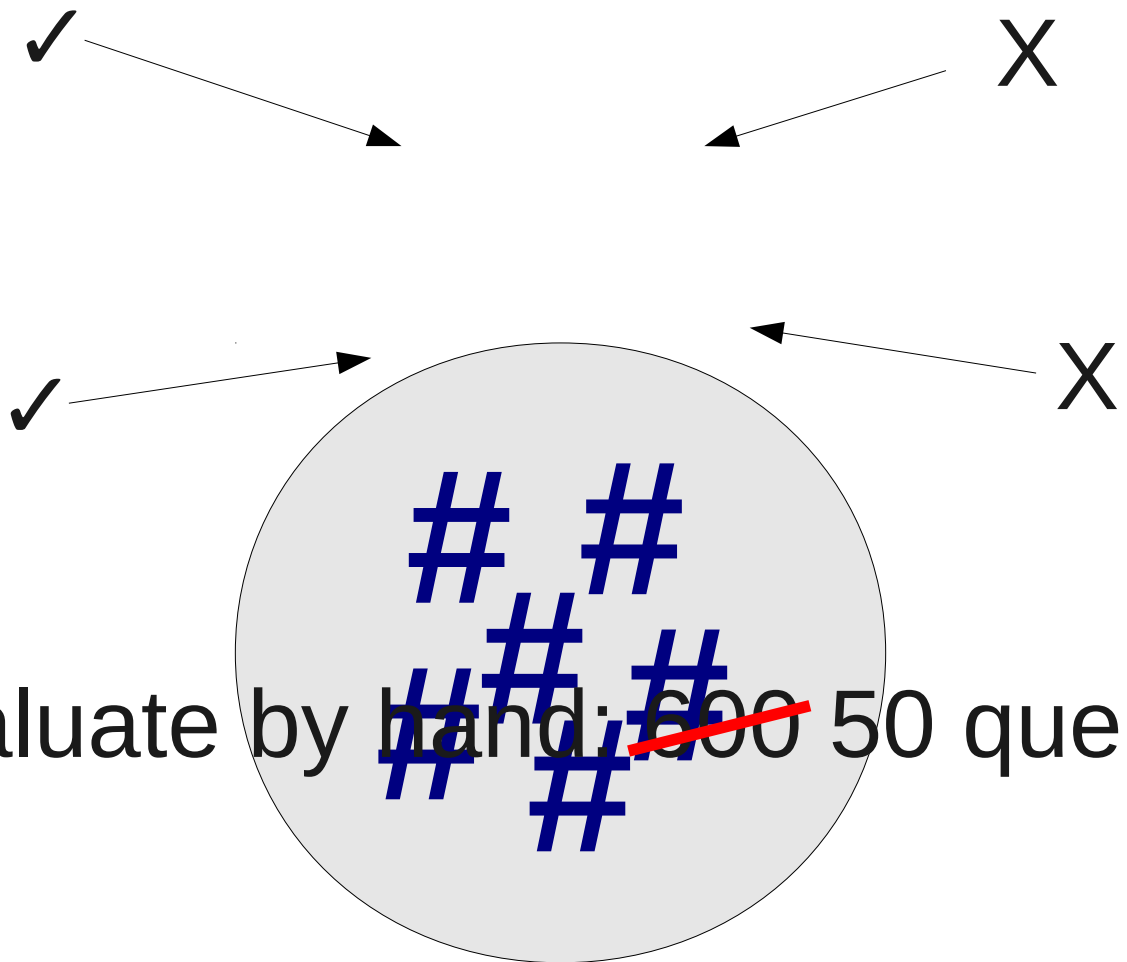
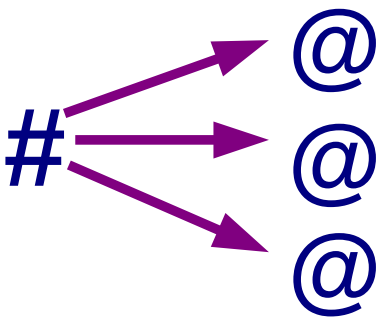


Evaluate by hand: ~~600~~ 50 queries

Results

	Precision@5	Recall@5
Group Preference Model	**0.40**	**0.49**
# distinct users	0.24	0.28
# tweets	0.31	0.36
Fraction of tweets with query	0.27	0.38
(“Experts”)	*(0.53)*	*(0.71)*

Computing Authority Scores



Method	Precision@5	Recall@5
# tweets with query	**0.40**	**0.49**
# @-mentions with query	0.38	0.47
# followers	0.38	0.47
uniform	0.40	0.48

Summary

We designed the Group Preference Model, and found good theoretical and experimental results.

Future Directions

- Which groups are easy to join?
- Different types of query
- Personalized ranking
- Groups are always changing
- Put it online!

Thanks!