

Information Spread based on Topics

Maryam Aly

Advisors: Luis von Ahn and Brendan Meeder

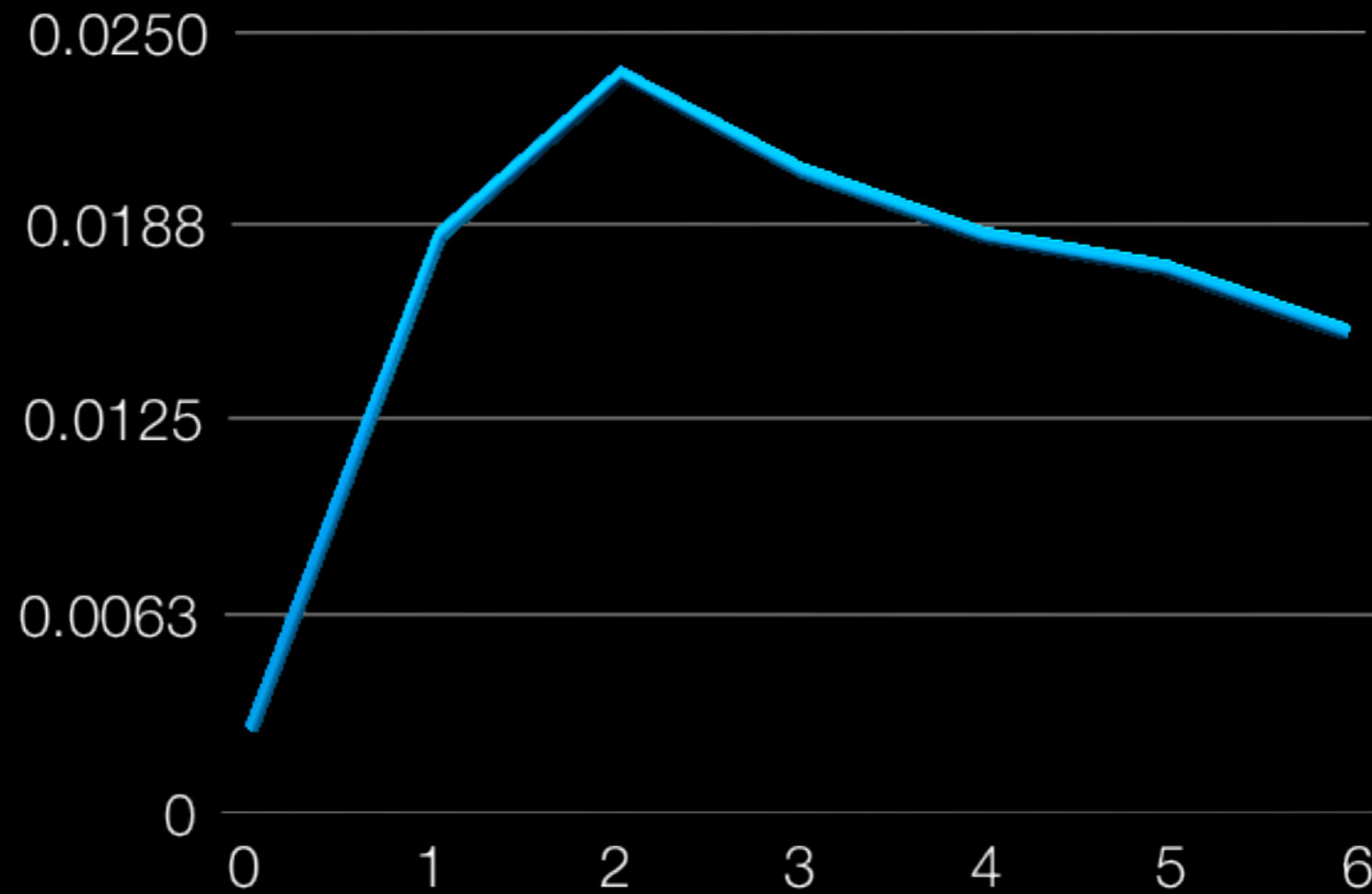
Influences on information spread

- ✦ Network structure
- ✦ Initial adopters
- ✦ Prestige of those spreading information
- ✦ Topic of information

Background

- ✦ Stickiness
- ✦ Persistence
- ✦ These two characterize a given topic's exposure curve
 - ✦ Probability (y) of spreading information after seeing it x times

Example exposure curve



What about centrality curve?

- ✦ How does the centrality of the spread change over time?
- ✦ How does the centrality of the spread compare to that of the underlying network?

How

- ✦ Examining hashtags on Twitter
 - ✦ Using data from August 2009 - January 2010
- ✦ Underlying network is the @mention network
- ✦ Studying hashtag spread over time

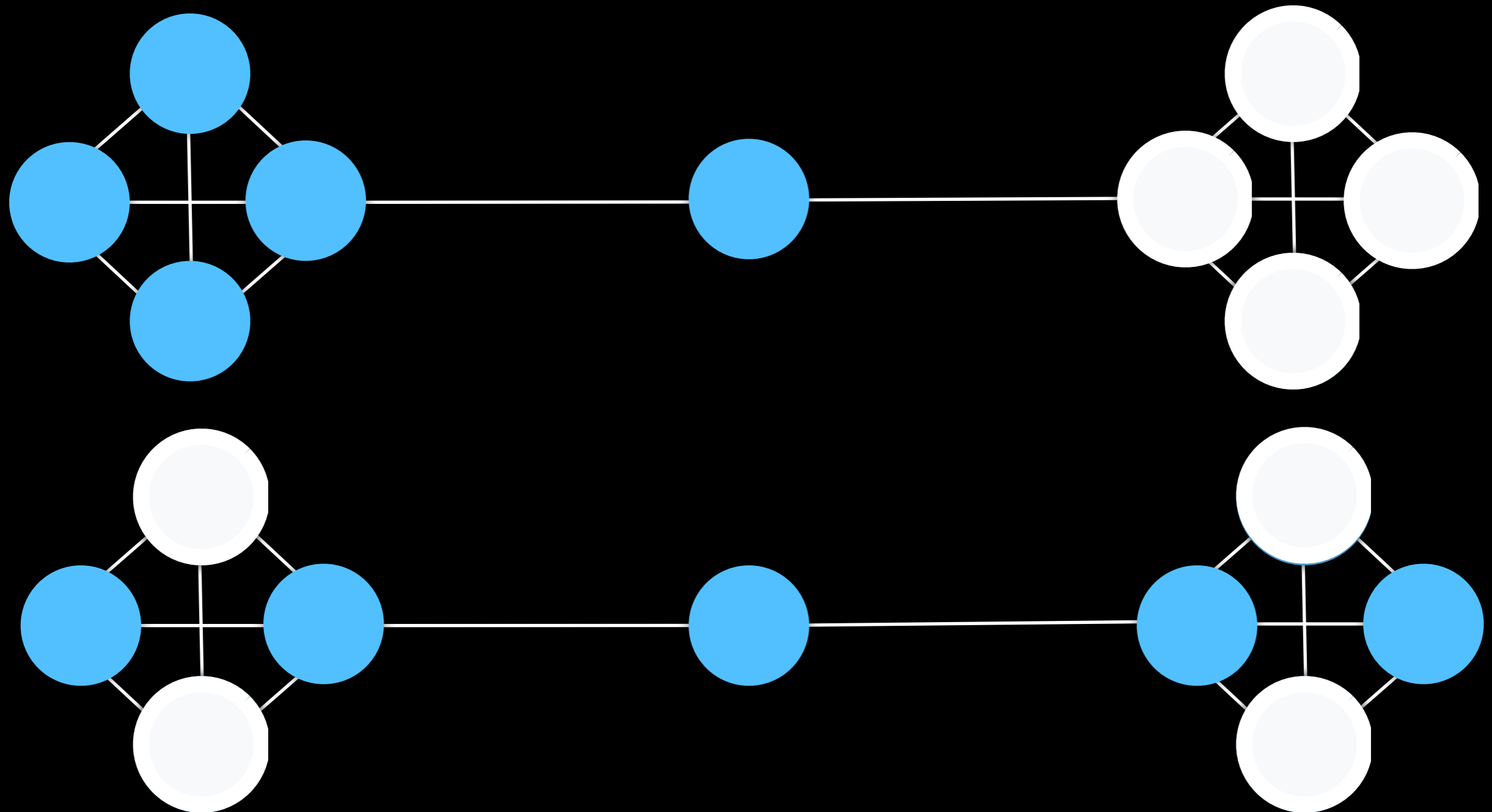
@mention graph

- ✦ Examples of mentions:
 - ✦ maryam: “hi @bren”
 - ✦ “@google <http://google.com>”
- ✦ user1 lists @user2 in at least k tweets
- ✦ Edge from user1 to user2

Hashtag subgraph over time

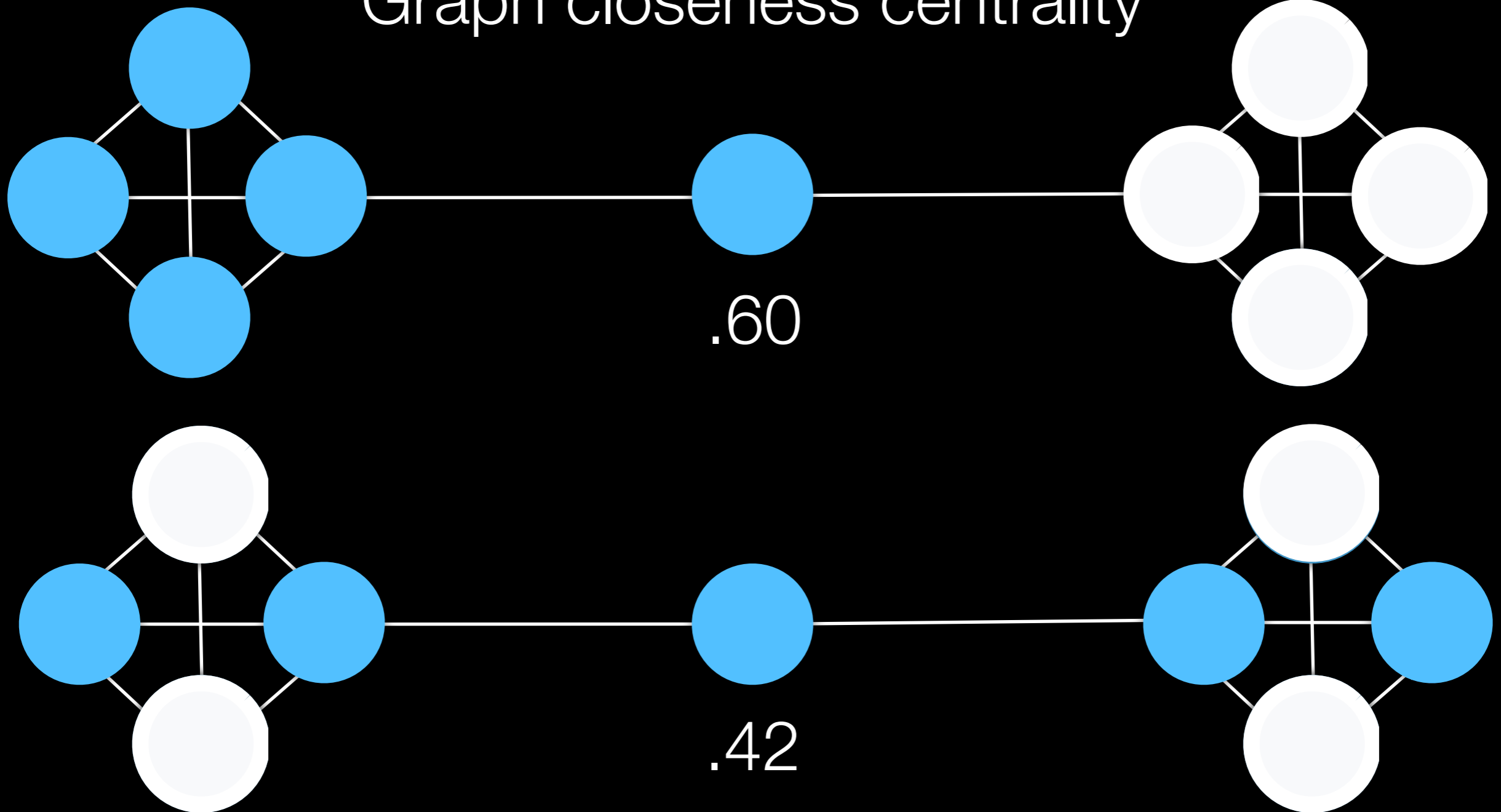
- ✦ Examples of hashtags:
 - ✦ “waiting in line #thingsihate”
 - ✦ “ahhh these doctor bills #hcr”
- ✦ (user1, user2) is an edge in the @mention graph
- ✦ user1 has tweeted #hashtag by time t
- ✦ user2 has tweeted #hashtag by time t
- ✦ At time t, there is an edge from user1 to user2

Differences in centrality



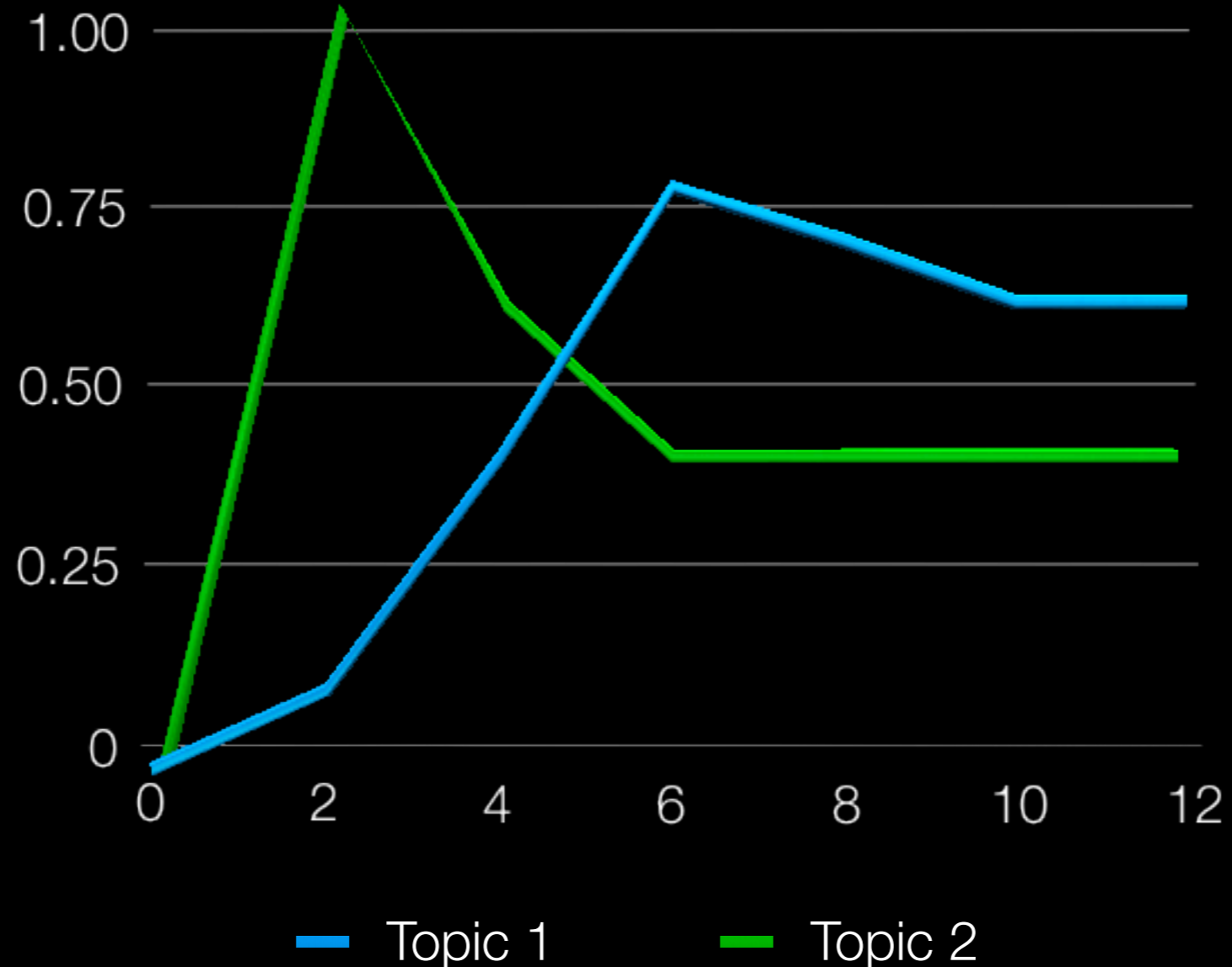
Differences in centrality

Graph closeness centrality



Differences in centrality

An expected example over time



Importance

- ✦ Gives us insights into what is more easily accepted by the general population versus a certain group
- ✦ Gives us insights into whether information spreads depth or breadth first

Evaluation

- ✦ Use old data to make models
- ✦ Use new data to validate models
- ✦ Use simulation to show differences between topics are significant

Things to come

- ✦ Find average centrality curve and the average for each topic
- ✦ How well do persistence and stickiness describe this curve?
- ✦ What other factors could describe this curve?

Questions



Thanks!

Bibliography

- D. Romero, B. Meeder, J. Kleinberg. Differences in the Mechanics of Information Diffusion Across Topics: Idioms, Political Hashtags, and Complex Contagion on Twitter. Proc. 20th International World Wide Web Conference, 2011.
- Easley, David, and Jon Kleinberg. Networks, Crowds, and Connected World. New York: Cambridge UP, 2010. Print.
- D. Bindel, J. Kleinberg, S. Oren. How Bad is Forming Your Own Opinion? Proc. 52nd IEEE Symposium on Foundations of Computer Science, 2011.