

Spreading phenomena

Introduction to Network Science

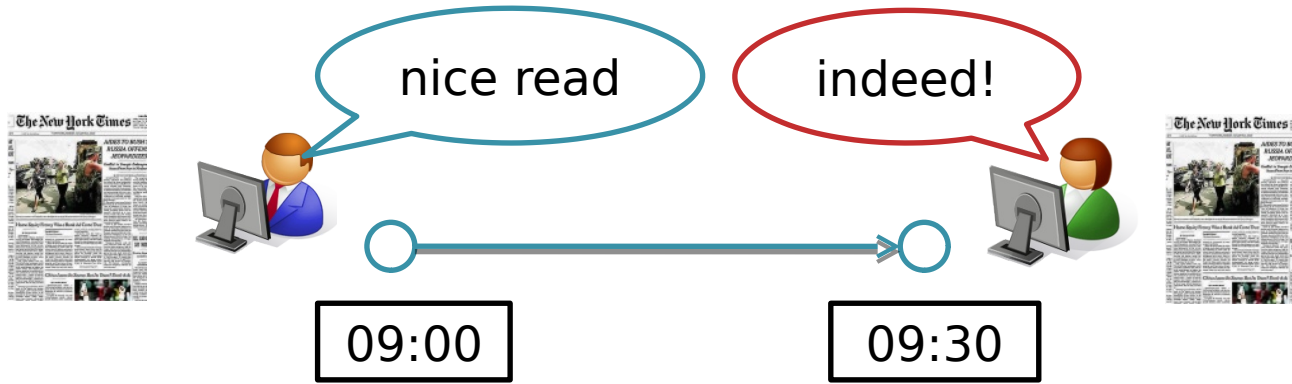
Carlos Castillo

Topic 24

Sources

- Easley and Kleinberg (2010): Networks, Crowds, and Markets [Ch 19](#)
- Carlos Castillo, Wei Chen, Laks V. S. Lakshmanan (2012): Information and Influence Spread in Social Networks, [KDD Tutorial](#).
- Carlos Castillo (2017): [Social influence](#) slides

Social influence



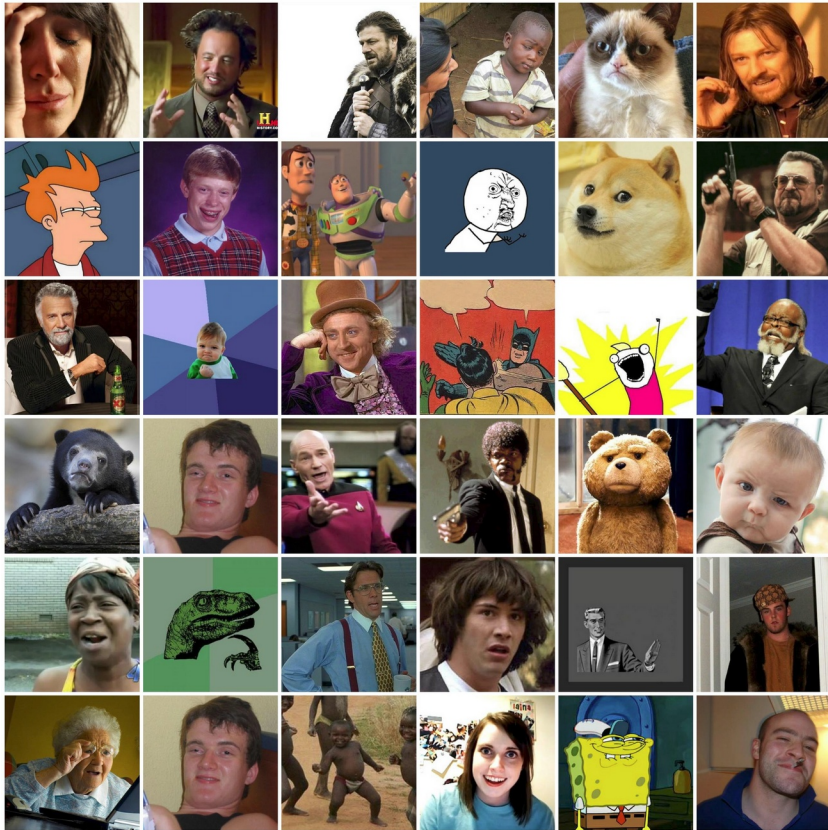
People are **connected** and perform **actions**

↓
friends, fans,
followers,
etc.

↓
comment, link, rate, like,
retweet, post a message,
photo, or video, etc.

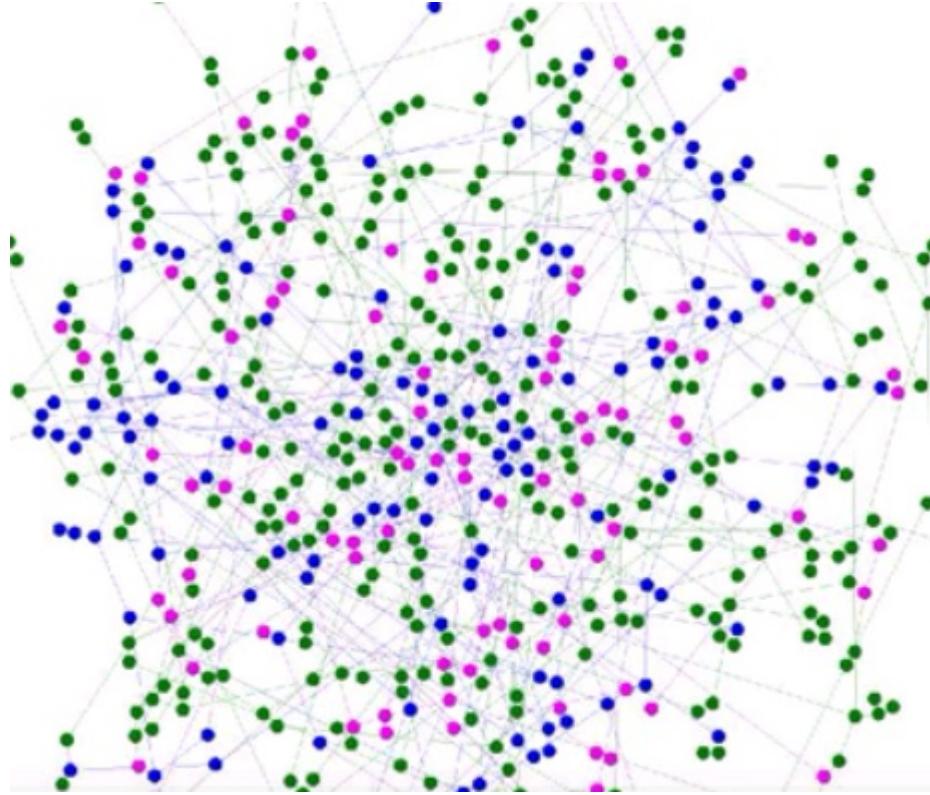
“The Selfish Gene” by Richard Dawkins (1976)

Chapter 11: “Memes: the new replicators”



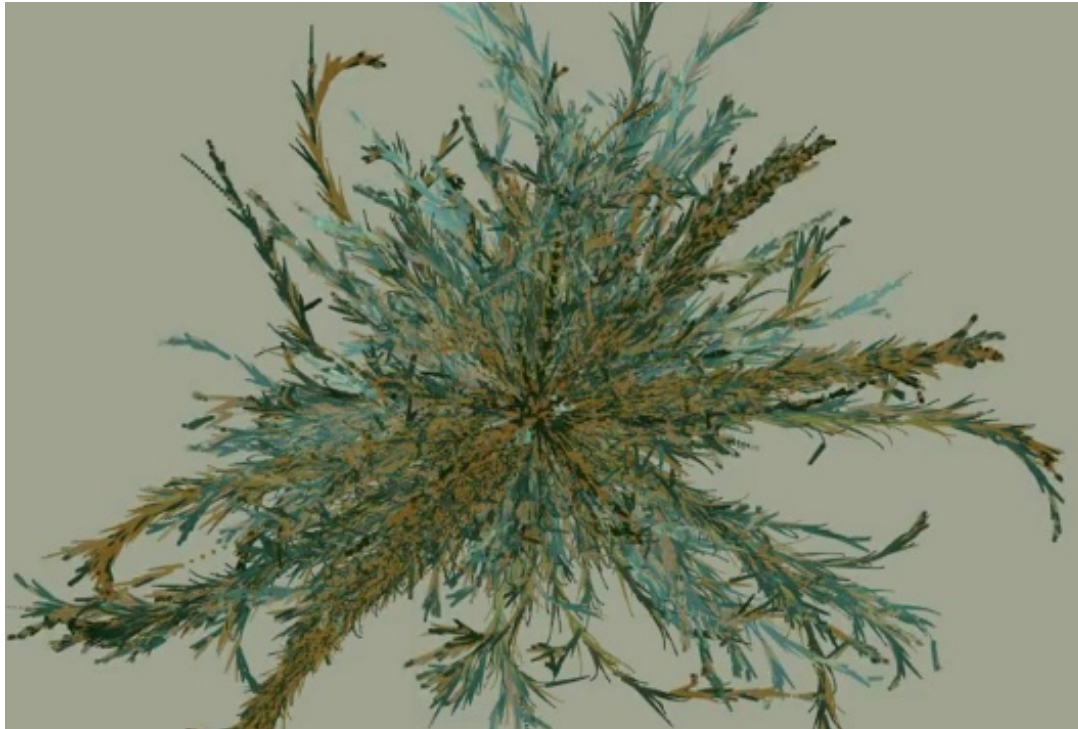


Contagion in graph

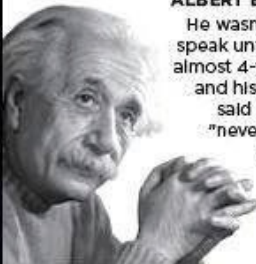
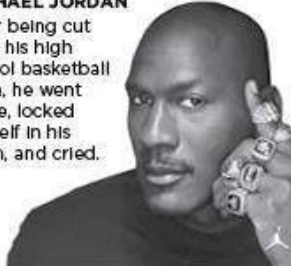

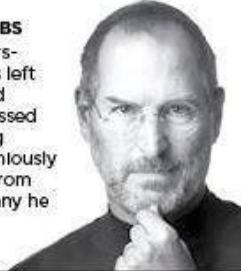




<https://www.youtube.com/watch?v=WWTmRIDsydA>

Spread of a Meme ("Famous Failures")

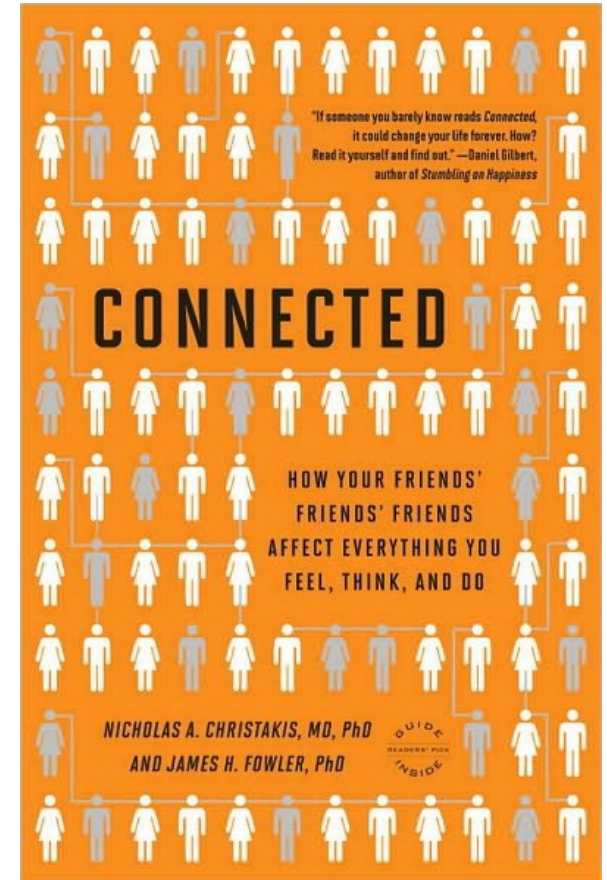


<https://vimeo.com/50730795>

FAMOUS FAILURES	
 <p>ALBERT EINSTEIN He wasn't able to speak until he was almost 4-years-old and his teachers said he would "never amount to much"</p>	 <p>MICHAEL JORDAN After being cut from his high school basketball team, he went home, locked himself in his room, and cried.</p>
 <p>WALT DISNEY Fired from a newspaper for "lacking imagination" and "having no original ideas."</p>	 <p>STEVE JOBS At 30-years-old he was left devastated and depressed after being unceremoniously removed from the company he started.</p>
 <p>OPRAH WINFREY Was demoted from her job as a news anchor because she "wasn't fit for television."</p>	 <p>THE BEATLES Rejected by Decca Recording Studios, who said "We don't like their sound—they have no future in show business."</p>
IF YOU'VE NEVER FAILED, YOU'VE NEVER TRIED ANYTHING NEW	

Non-trivial examples

- **Back pain:** spread from West to East in Germany after fall of Berlin Wall
- **Suicide:** well known to spread throughout communities on occasion
- **Sexual “scripts”:** expected sequences of behaviors during intimate situations
- **Politics:** the denser your connections, the more intense your convictions



What else?

What else propagates in a contagion-like manner?

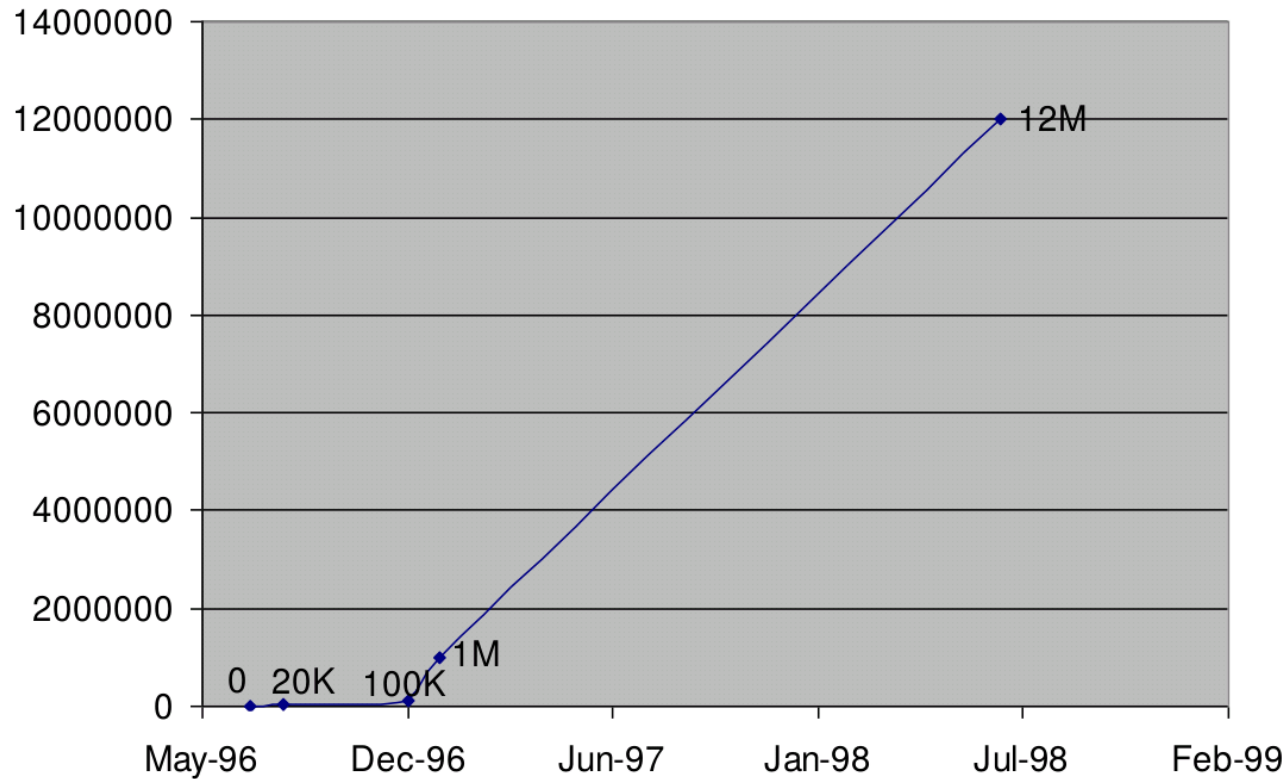
Answer in Nearpod Collaborate
<https://nearpod.com/student/>
Code to be given during class

Viral marketing

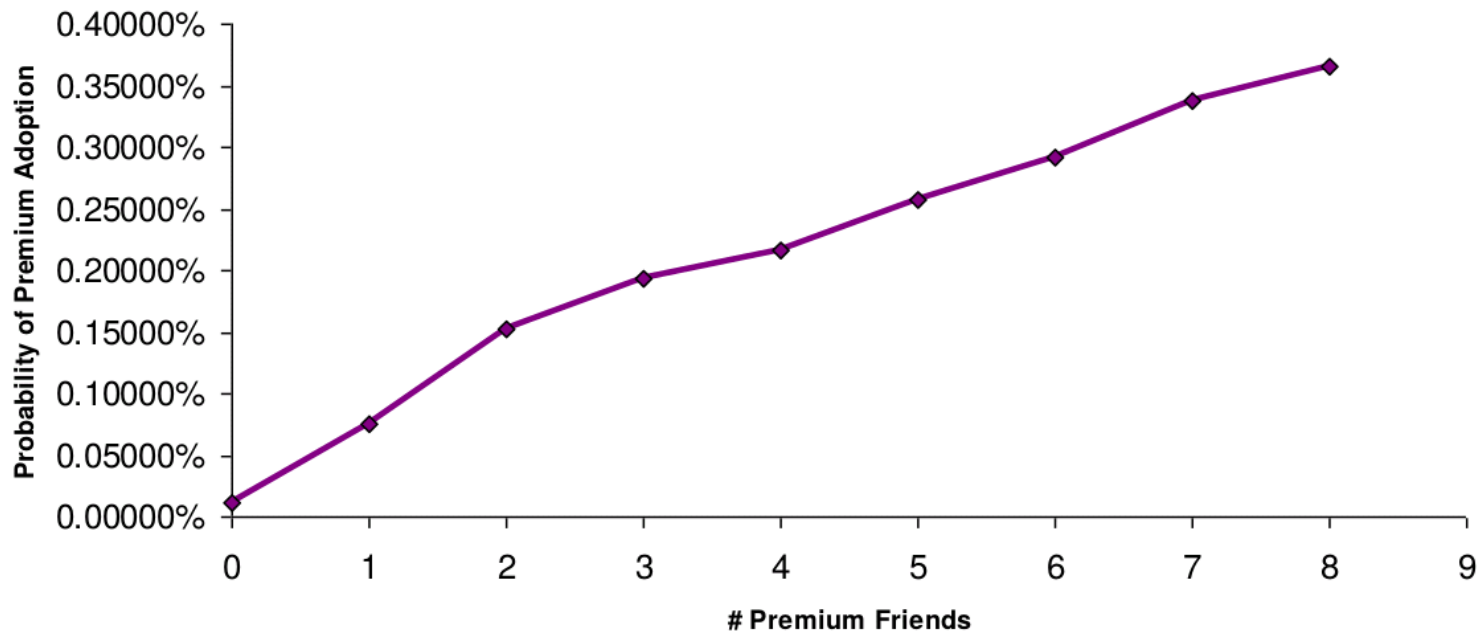
Viral Marketing Online

- Early example: Hotmail
 - Jul 1996: Hotmail.com started service
 - Aug 1996: 20K subscribers
 - Dec 1996: 100K
 - Jan 1997: 1 million
 - Jul 1998: 12 million
- Bought by Microsoft for \$400 million
- At the end of each email sent there was a message to subscribe to Hotmail.com: “Get your free email at Hotmail”

Hotmail users



Peer pressure (pay “premium” subscription)



Influencers and Viral Marketing

The promise of “influencers”

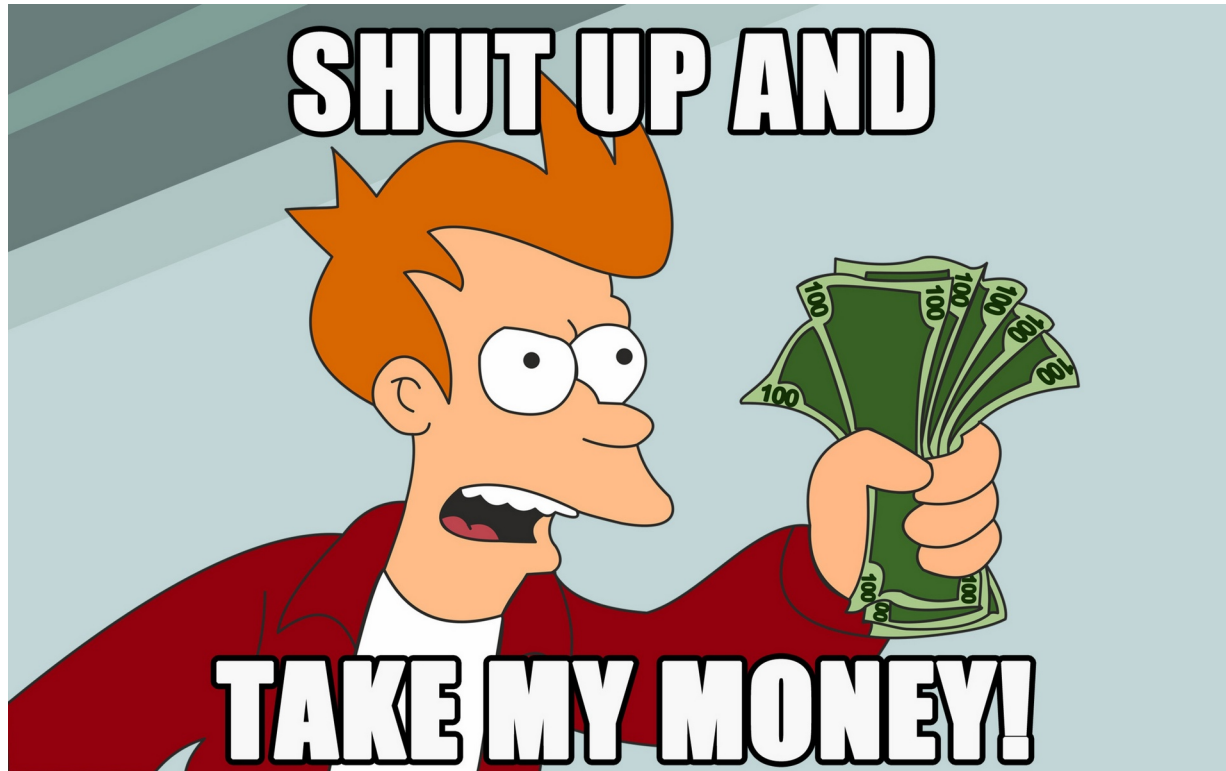
Influencers **increase** brand awareness.
product conversions
through Word-of-Mouth
Marketing (WoMM)

Influencers **advocate** a brand

Influencers **influence** purchasing actions



Viral marketing went through a
stage of ...



Can social influence really drive viral cascades?

- Watts et al. challenge the traditional notions and intuitions about SI causing viral spread
- Social epidemics are not always responsible for dramatic, possibly sudden social change
- Influence is hard to prove
- Do not dismiss influence altogether

How useful is viral marketing?

- Hard to predict which campaign will succeed virally
- Lack of predictability makes VM hard to implement;
- The magic might not be in a small number of influentials
- “Big seed” marketing is a predictable, practical alternative

Example: Huffington Post

- Ad agency buys all of the ad slots for a week
- Displays attractive videos with options for easy sharing
- Gets 7x more views due to social referrals, but ...
- None of the videos “goes viral” (grows exponentially in views) at any time



Watch "Gun Free"



Watch "Meth - David"

Viral content from many companies



Summary

Things to remember

- Influence phenomena exist,
but they are hard to engineer
- Viral content exists,
but it is hard to create it intentionally