Lecture 1: Connect (1/4)

How the friendship we form connect us? Why we are within a few clicks on Facebook?

COMS 4995-1: Introduction to Social Networks
Tuesday September 6th

“I’m just a poor boy baby. Lookin’ to connect.”
???, If You Gotta Go, Go Now (1965)
What is the small world effect?

“You’re in NY, by the way, do you happen to know x?
- In fact, yes, what a small world!”

What seems remotely distant is indeed socially close.

The small world problem, S. Milgram, Psychology today (1967)
**Why study small world?**

* Small world hypothesis is *necessary* for
  - Fast and wide information propagation
  - Tipping point: small change has large effect
  - Network robustness and consistency
* Studying the conditions of the “small world” effects tells us a lot about *how* we are connected?
* “Man is, by nature, an animal of a society”
  “ζῷον πολιτικὸν”
Small world: a simplistic argument

* Remember how the King lost his fortune to the chess player?
* What would you turn down an offer?
  - An daily doubling series \{1¢, 2¢, 4¢, etc.\} over a month
  - Against $1,000? YES/NO
  - Against $100,000? YES/NO
  - Against $1,000,000? YES/NO
  - Against $100,000,000? YES/NO
Small world: a simplistic argument

⋆ How many people would you recognize by name?
  o ‘67 M. Gurevitch (MIT): about 500

⋆ Roughly, how many are socially related to you?

<table>
<thead>
<tr>
<th>how close to you?</th>
<th>Compares to</th>
<th>%. US pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 direct acquaintance</td>
<td>C.S. dept</td>
<td>0.00017%</td>
</tr>
<tr>
<td>250,000 share an acquaintance with you</td>
<td>Harlem district</td>
<td>0.083%</td>
</tr>
<tr>
<td>125m share an acquaintance with a friend of yours</td>
<td>Northeast + Midwest</td>
<td>42%</td>
</tr>
</tbody>
</table>
The previous model is way too optimistic!
  - Reason #1: it assumes acquaintance set are disjoint
    - whereas they are related as part of a social graph
    - expansion through the graph may be limited.
  - Reason #2: social acquaintances are biased
    Geography, occupation & social status, race
    - Favors clusters, inbreeding. Increases social distance
  - May be others: a few know much more people
UPCOMING NEXT WEEK

* Milgram’s “small world” experiment

* It’s a “combinatorial small world” (Sep. 8th)
* It’s a “complex small world” (Sep. 13th)
* It’s an “algorithmic small world” (Sep. 15th)