Week 01

Discussion

Thursday, August 26

INFO 5613: Network Science

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Agenda

- Finish running and discussing notebook (5-10 min)
- Synthesizing reading responses (5 min)
- Break-outs for readings (20 min)
- Break-outs for setting up computing environment (40+ min)

Today

- Readings
    - Borgatti, S. P., Mehra, A., Brass, D. J., and Labianca, G. (2009). Network analysis in the social sciences. *Science*, 323(5916):892–895
    - Butts, C. T. (2009). Revisiting the foundations of network analysis. Science, 325(5939):414–416
    - Brandes, U., Robins, G., McCranie, A., and Wasserman, S. (2013). What is network science? *Network Science*, 1(1).
- Post a 500-ish word discussion on Canvas summarizing your previous exposure to and current interests in network analysis and theories and your learning goals for our class
- On Thursday, we'll discuss readings, themes from discussions, debug any issues with configuring computing environment

Finish first notebook

What this notebook does

- Download "Class 01 – Test Notebook.ipynb", launch Jupyter Notebook, load notebook
  - Some (many!) of you may be having trouble with this step – we will address in second half of class
- Creating a basic social network of character co-occurrences from S01E01 of *Game of Thrones*
  - Basic functionality of Jupyter Notebooks
  - Retrieving data from web, cleaning and engineering into a network-friendly format, making a network
  - Nodes are characters, links are weighted by the number of scenes they appear in together
  - Visualizing the network to identify prominent nodes, community structure, *etc*.
- There is **<u>absolutely zero expectation</u>** right now that you understand the concepts in the notebook
  - This is a proof-of-concept of where we are going to go by the end of the class!

Reading responses

General feedback

- Looking for longer responses in general → closer to 500ish words

- I'll include prompts, but you are always welcome to discuss/share any of:

  - Responses to assigned readings

  - Summarizing and/or responding to extra readings

  - Applications/extensions of notebook activities to other data

Themes – Previous exposure?

- Six degree of separation

- Erdos/Bacon number

- Traveling salesman problem

- Decentralization/federation

- Recommender systems

Themes – Kinds of networks?

- Routing, internet, WWW
- Social media (Twitter, Facebook, Reddit, *etc*.)
  - Relationships, behavior, platforms, ads
- Clandestine, criminal, intelligence, security
- Biological, ecological, neurological
- Network*ing*
- Networked X: privacy
- Machine learning/AI (neural networks)
- Internet of things, sensors, surveillance
- Politics, elections, social movements
- Math (graph theory, traveling salesman)

- Recommender systems
- Personal, family, support networks
- Digital humanities
- Fandom, media production

Themes – Network interests?

- Analyzing complex social systems

- Alternative data literacies

- Improving networked organizations

- Disruptive networks (blockchains, *etc*.)

- Success, power, influence

- Governing networked processes

- Networked structuration/coevolution

- Folk theories of network processes

Themes – Learning goals?

- Network visualizations

- New analysis methods

- Computational methods and frameworks

- (Mis)representating networks (visualizations, *etc*.)

- Combining theory and methods

- Network typologies

- Networked values (decentralization, *etc*.)

- Prediction

Provocations

○ Borgatti, *et al*. (2009) recounts aspirations to use SNA to make social behavior as predictable as laws of physics. How is this project working out so far and why hasn't or won't it?

○ Network ideas moved across many fields and professions through its history. What are some of the opportunities, challenges, and dangers of migrating methods and theories? Versus trying to synthesize diverse methods and contexts into a single field like "network science"?

○ Social media is an increasingly common point of entry for thinking about networks. Thinking about Table 3 of Borgatti, *et al*. (2009), what are different kinds of nodes, relations, and other meta-data that exist within the affordances of popular social media platforms?

○ Consequences of a node's position in a network is one of the "most fundamental axiom[s]". What are examples for your personal experience, current/historical events, *etc*. where a social actor's connections had profound consequences?

○ Following Butts (2009), what are some challenges in appropriately defining nodes, edges, timescales in research contexts you care about?

Setting up Anaconda + Jupyter

Starting is the hardest part

- **Goal**: load and run the "Class 01 – Test Notebook.ipynb" file on your own

- Keeping Anaconda maintained, launching Jupyter Notebook, loading a notebook file
  - Working with Terminal and navigating file system

- Some of you may already have your battle scars, let's help the newcomers

- Anaconda is the "Microsoft Office" and Jupyter Notebook is the "Excel" where we're going to code

Steps

1. Make sure your operating system is up-to-date (probably wait until after class)
2. Download Anaconda Individual Edition: https://www.anaconda.com/products/individual
   - If your computer was purchased in last 3ish years, use the 64-bit editions
3. Install Anaconda IE (no PyCharm needed)
4. Launch Terminal (macOS) or Anaconda Prompt (Windows)
5. Type: `conda update -all` and consent to updates
   - PC: May need to launch in administrator mode
   - Mac: "conda command not found" is the start of a huge headache… let's schedule a 1-on-1 to debug
6. Download the "Class 01 – Test Notebook.ipynb" file from Canvas to a class-specific folder
7. Use the Terminal/Anaconda Prompt to navigate to your class folder
   - Mac: `cd ..` to go up a level, `cd dirname` to go to "dirname", `ls` to list current files & folders
   - PC: `cd ..` to go up a level, `cd dirname` to go to "dirname", `dir` to list current files & folders
8. Type `jupyter notebook` and wait for a new browser tab/window to launch
9. Click the "Class 01 – Test Notebook" link in the Jupyter navigator to launch the notebook
10. Select a cell and click the "Run" button (or press Shift + Enter) to execute the cell

Break-out based on step

- Room 1: Help with downloading/installing Anaconda

- Room 2: Help with Terminal, updating, navigating filesystem

- Room 3: Help with launching and using Jupyter