CHOOSING A DIGITAL METHOD

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NETWORKS

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START WITH YOUR RESEARCH

What's your research question?
At what stage is your research?
What's the scale of your research?
NETWORK ANALYSIS VOCABULARY (PART I)

- Node
  - a thing

- Edge
  - a connection between things

- Ego
  - The one node you’re interested in right now
NETWORKS = CONNECTIONS IN A&H

- Explore and analyze connections
  - Identify clusters of similar nodes (where you set and reset the definition of “similar”)
  - Find outlier nodes (connections between otherwise disconnected clusters, or disconnected nodes that don’t belong)
  - Multidimensional analysis (across space, and time, as well as node-edge pair)
  - All of this, across two or more networks

- Visualize (and even embody) connections
  - Bridge gap between human pattern-matching and size of data set
  - Expose connections and relationships in real time

- Influence behavior?
NETWORK ANALYSIS VOCABULARY (PART II)

- Centrality: the importance of a node
  - Degree centrality: the number of links to/from a node
  - Closeness centrality: how far from the farthest node any single node is
  - Betweenness centrality: how often a node is on the shortest path between two other nodes

- Weight: the number of connections between two nodes

- Force
  - How centrality and edge weight combine to affect visualization patterns
SOCIALLY CONSTRUCTED SPACE

- Trace Encounters, 2004
<table>
<thead>
<tr>
<th>Networks and text</th>
<th>Networks and maps</th>
<th>Networks and image mining</th>
<th>Networks and live people</th>
</tr>
</thead>
<tbody>
<tr>
<td>For connecting ideas to people</td>
<td>For connecting relationships to movement in space</td>
<td>For connecting visual trends</td>
<td>For connecting people and shaping behavior</td>
</tr>
<tr>
<td>• How will you demonstrate the connection of topics/words to people?</td>
<td>• Why is space important?</td>
<td>• What color/texture/shapes are you connecting?</td>
<td>• Who are you connecting, what connects them, and are these connections risky to expose?</td>
</tr>
<tr>
<td>• Is it people’s use of text or the text’s influence on people that matters? (or both?)</td>
<td>• How will you demonstrate the distribution of node-edge connections and clusters in geographic space?</td>
<td>• How will these affect node/edge/cluster display?</td>
<td>• Are you merely recording behavior or shaping it?</td>
</tr>
<tr>
<td>• How will you deal with people in the network who aren’t in the text?</td>
<td></td>
<td></td>
<td>• How will you display people and their connections?</td>
</tr>
</tbody>
</table>
A GEOGRAPHIC VISUALIZATION OF NETWORKS

Ryan Cordell

“Reprinting, Circulation, and the Network Author in Antebellum Newspapers”

LIMITATIONS AND ERRORS IN NETWORK ANALYSIS

- Be cognizant of your question as you gather data.
  - If you are interested in edges between people, will you be tracking face-to-face conversations, letters, or both? Different types of mediating connections may have different clustering coefficients.

- Be aware of the limits of network analysis
  - You can autoscrape data to extract nodes, but will that give you the kinds of edges you want?

- Be aware of what you can munge.*
  - People are ambiguous. There are 18 French kings named Louis and something like 8 named Charles

* Actually a technical term
PROBLEMS WITH NETWORKS IN PARTICULAR

- Networks are often incomplete (e.g., ego networks).
- Networks require you to represent mediation (modality) in ways other visualizations don’t.
- Networks can be hard to scale.
- Layouts are imposed, not inherent. Graphs can be topologically similar but layout entirely different.
GESTALT PSYCHOLOGY AND VISUALIZATION

Gestalt psychology
understanding how humans perceive patterns.

Gestalt psychology in visualization
remembering that we view separate elements as part of a whole pattern
VISUAL SIMILARITY = OBJECT SIMILARITY
VISUAL PROXIMITY = INHERENT GROUPING
BLANKS/GAPS = INTERPOLATED PATTERN
QUESTIONS TO ASK ABOUT VISUALIZED DATA OF ANY TYPE

- How is this organized?
- What do you recognize? What’s unsurprising?
- What’s new? Surprising?
- What questions does this bring up in terms of
  - Methods
  - Evidence/data
  - Conclusions
- Where can you go to get answers to these methods/data/conclusions questions?
  - Is there a clarification in the text?

- Remember our evidence -> warrant exercise.
  - Don’t let the reader make assumptions you don’t want them to. These questions to ask should guide your visualization revisions and help you explain the historical significance of the argument that your visualization makes.
A PRACTICAL EXAMPLE
Networks in Google Docs
https://iu.box.com/v/idahnetworks
HOW DOES FOOD CONNECT US?

- Use your initials to identify you as a node
- Type in 10 or so of the places you’ve eaten in the last few days
- Tips for Google Doc Collaboration
  - Scroll down. Look for empty space before entering data.
  - Try to coordinate naming conventions (copy entries above you in the spreadsheet)
NETWORK ANALYSIS WITH GOOGLE FUSION TABLES

- Google tool #1: Spreadsheet with two columns
  - Source
  - Target

- Google tool #2: Fusion Tables (instructor use only)

- Organizing students
  - When entry is done, instructor opens Google Fusion tables at https://fusiontables.google.com/DataSource?dsrcid=implicit
  - Choose “Google Spreadsheets” and follow the prompts until you see a table with data.
  - Select the red “plus” button next to “Cards 1” and add a chart. Select the “network” icon.
  - Set the “show link between” to “source” and “target”.
END WITH YOUR RESEARCH

What method(s) look useful?
What patterns do you think are there?
What data issues will you run into?
DIGITAL METHODS SKILL-BUILDING

Making Digital Objects
Noon, Sept 21, Wells E174

Network Graphs, Harry Potter, Cytoscape, and You!
Noon-1:30, Oct 20, Wells IQ Wall

Digital Tools and and Visualization Methods for Humanities series
http://go.iu.edu/1Gz0