Information Cartography: Creating Zoomable, Large-Scale Maps of Information
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The Problem
- You want to understand some complex topic
- Search engines are great at retrieving pieces...
- But don’t even try fitting into a coherent picture

Google
About 47,140,000 results
No structure!

Metro Maps of Information
- Coherent storylines
- Different lines focus on different aspects
- See line interactions
- Zoom in and out
  - Challenge: what makes a good map?

What makes a good map?
1. Multi-resolution: support desired level of detail
2. Good metro stops: each stop is cohesive
3. Coherence: global theme through each line
4. Structure: map reflects structure of the story
5. Coverage: cover important and diverse topics

Formulating Objective: Metro Stops
- Community detection in co-occurrence graph
- Force dense overlaps
- Word \( w \) belongs to community \( C \) with weight \( F_{wc} \)
- Given weights, edges created with probability \( P(w, w') = 1 - \exp(-\sum F_{wc}F_{w'c}) \)
- Find weights that maximize likelihood of graph

Formulating Objective: Structure
- Found good metro stops for each timestep
- What is the structure of the story?
- Example: Lebron James

- Attempt 1: minimize number of coherent storylines that cover all stops
  \( sCost(\Pi | C) = |\Pi| + |\{c \in C | \Pi \cap c \neq \emptyset\}| \)
- Problem! Missing storylines.

- Attempt 2: minimize number of coherent storylines that cover all words
  \( sCost(\Pi | C) = \sum_{c \in C} |\Pi \cap c| + \sum_{w \in \Pi} |W(w)| \)

Zoom
- Zooming into the yellow (religion) line

User Study
- Are maps helpful?
- Users summarize news stories
- Using maps, Google News, TDT or flat maps
- Mechanical Turkers evaluate the summaries

Conclusions
- Goal: create metro maps -- structured summaries of information
- Challenge: formalize metrics for maps
- Efficient algorithms with theoretical guarantees
- User studies highlight the potential of maps

"It was so nice to see the different lines. I immediately could tell some of the important things I should write"