A Network Framework of Cultural History

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Research Questions

- How does network science inform approaches to quantitative history?
- Does lifetime migration confirm qualitative narratives about sites of cultural significance?
- Can the lifetime migration network be used to identify events of historic significance?
- Are these findings replicable with other datasets?
Lifetime Migration Model

- Nodes are cities, edges track the migration of individuals
- Edges connect an individual’s place of birth and their place of death
- ONLY people who have died can appear in lifetime migration network!!
Lifetime Migration - Example

- If I were an edge:
  - Born in Voorhees, NJ
  - Died (hypothetically) in Troy, NY

- There is migration that this model does not capture (but this might not matter!)
Sources of Migration

• Reasons people move:
  – Education/Employment Opportunities
  – Familial Ties
  – Cultural Fit
• Families tend to be ‘sticky’ (little migration)
• Migration between economic and cultural centers of equal size should be reciprocal
Data Sources

- Schich et al. selected four data sources
- AKL, ULAN, WCEN: expertly curated artist bios
- Freebase: user submitted, broader scope
Temporal Distribution of Data
Results
Identifying Outliers

\[ e = \begin{cases} 
- \left( \frac{b-d}{\sqrt{b}} \right) & \text{for } b > d \\
0 & \text{for } b = d \\
\left( \frac{d-b}{\sqrt{d}} \right) & \text{for } b < d 
\end{cases} \]
Cultural Trajectory

Historic events can cause:

- Lasting effects on birth/death attractors
- Ephemeral spikes in birth/death rate
Extending the Work

- What new conclusions can we try to draw?
- What other datasets can we use?
- What can we confirm from the original paper?
Academic Migration

- Narrative of “Middle Coast Brain Drain” in US
- Do “academic hubs” form the same way “cultural hubs” form for the network of artists?
- Will the same cities still be death attractors?
Data Source: WikiData

- User submitted data (like Freebase)
- (Semi-)structured objects with:
  - Typing/Subtyping hierarchy
  - Collection of associated properties
- Public query service

- How do we find the right data?
WHERE
{
    
    SELECT ?person
    (SAMPLE(?birthplace) AS ?bp)
    (SAMPLE(?deathplace) AS ?dp)
    (SAMPLE(?bp_loc) AS ?birthloc)
    (SAMPLE(?dp_loc) AS ?deathloc)
    (MAX(?dob) AS ?dob_agg)
    (MAX(?dod) AS ?dod_agg)
    
    
    ?person wdt:P69 ?education;
    wdt:P19 ?birthplace;
    wdt:P20 ?deathplace;
    wdt:P569 ?dob;
    wdt:P570 ?dod.
    
    
    ?birthplace wdt:P31 wd:Q1093829;
    wdt:P625 ?bp_loc.
    
    ?deathplace wdt:P31 wd:Q1093829;
    wdt:P625 ?dp_loc.
    
    
    GROUP BY ?person
}

SERVICE wikibase:label { bd:serviceParam wikibase:language "en". }
Results
Quantifying Outliers
Results

- Geospatial network density reflects population distribution
  - (no one lives west of Mississippi)
- Academic hubs do appear, at:
  - Political centers
  - Technology hubs
  - University cities
  - Florida
Future Work

• How does the academic migration network inform other sociocultural narratives?
  – Political views
  – Economic prosperity

• What additional insight can be gained by adding a temporal dimension to this data?
  – Identify when cities become ‘academic hotbeds’