

United Nations General Assembly Vote Similarity Networks

Rijul Magu¹ Gonzalo Mateos²

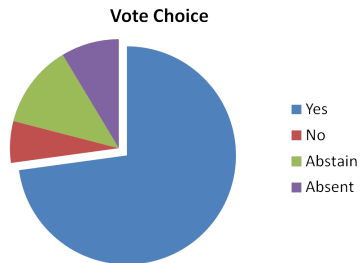
¹Department of Computer Science
University of Rochester

²Department of Electrical and Computer Engineering
University of Rochester

Complex Networks, Decemeber 1, 2017

- ▶ **Q:** Is it possible to identify actual nation alliances by modeling United Nations voting patterns as a network?
- ▶ **Q:** Can we address a real-world diplomacy problem using the constructed network?
- ▶ **Q:** Does the voting network overlap with other international networks (such as bilateral trade)?

- ▶ United Nations General Assembly voting data
 - ▶ Votes cast for all resolutions between 1946 and 2015

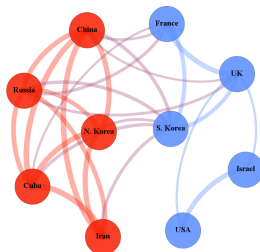


- ▶ Erik Voeten, “Data and analyses of voting in the UN General Assembly”, July 2012

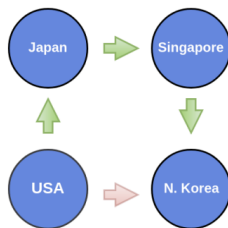
- ▶ Model the modern international political landscape (2000-14)
 - ⇒ Analyze pairwise voting behavior among countries
- ▶ Network graph construction
 - ▶ Nodes: 180 member nations of the United Nations
 - ▶ Edges: nontrivial voting similarity between two given countries
 - ▶ Weighted, undirected graph
- ▶ **Def:** vote similarity $VS(i, j)$ between nodes i, j

$$VS(i, j) = \frac{\#agreements(i, j) - \#disagreements(i, j)}{\text{total_mutual_votes}(i, j)}$$

- ▶ Applied Louvain method to detect underlying communities
 - ▶ Structure found captures known political relationships



- ▶ **Q:** Diplomatic paths bridging highly dissimilar countries?
- ▶ **Ex:** identified path between USA and North Korea



- ▶ **Def:** Diplomatic path between two given countries has
 - ▶ Highest mean value of weights (i.e. similarity) along path
 - ▶ Subject to a path length constraint (e.g., length 3 above)

- ▶ **Q:** Similarities between UN voting and product trade graphs?
- ▶ Network representation of bilateral trade among countries
 - ▶ Nodes: 180 member nations of the United Nations
 - ▶ Edges: relative contribution of country i to j 's total trade
 - ▶ Weighted, directed graph
- ▶ Both networks show similar community structure
 - ▶ Quantify network overlap via Jaccard similarity coefficients

Vote Community	Trade Community	Jaccard Similarity
A	A	0.718
B	B	0.487

- ▶ Analyzed a network of United Nations member states
 - ▶ Similarities based on General Assembly voting patterns
 - ▶ Community structure reflective of known political alliances
- ▶ Used to unveil diplomatic paths between “enemy” countries
- ▶ Voting and trade networks constructed shown to overlap