Inferring Multilateral Events from Anomalous Interaction Behaviors in International Relations
Juston Moore, Aaron Schein, Hanna Wallach

UMass Amherst School of Computer Science

Identifying Multilateral Events
- Identifying events that involve multiple countries – i.e., multilateral events – is important for interpreting international relations.
- Data about pairwise interactions between countries is extracted automatically at a large scale from news sources.
- We do not directly observe multilateral events, but multilateral events are evidenced by multiple news stories.
- Goal: Identify and characterize latent multilateral events evidenced by pairwise interactions between countries.

Modeling Contributions
We jointly infer:
- A partition of the country pairs into groups.
- A base rate for each country pair.
- Activation states for each group at each time step.
- Deviation factors for each group at each time step.

Results on the IEEE VAST Challenge 2008
- VAST 2008 included a synthetic data set of simulated cell phone calls between 400 callers over 10 days.
- Our model infers two groups (picted) – top group is big with constant behavior throughout, bottom group is small and exhibits correlated anomalous behavior.
- Prior anomaly detection work found anomalous group with post-hoc analysis, our model discovers it automatically.

Structure in Anomalous Observations
- A similar pattern of media coverage for multiple country pairs provides evidence for a multilateral event involving those pairs.
- We can account for each pair’s normal pattern of media coverage by looking for deviations from normal behavior shared by multiple pairs.
- Hypothesis: multilateral events coincide with shared deviations.
  - Activity will increase or decrease at approximately the same times.
  - The magnitude of the deviations will be similar among country pairs.
- Approach: Infer groups of country pairs involved in a latent multilateral event by identifying shared deviations from normal activity patterns.

The Infinite Multilateral Event Model

Results on GDELT Data
- We counted events involving the top 200 directed pairs of countries during the weeks of 2003.
- Results:
  - Iraq War (picted): the largest group inferred by the model contains country pairs involved in the Second Gulf War.
  - Reciprocity: most groups contain two symmetric pairs.
  - Geography: many groups contain 3-5 pairs of geographically close countries.
  - Backdoor Diplomacy (picted): three groups contain a broken triangle relationship between three countries. A possible hypothesis is that the media’s coverage of these pairs reflects a real-world intermediary relationship.

Group corresponding to the 2003 invasion of Iraq. Directed pairs involve USA, UK, Iraq, Egypt, Afghanistan, and New Zealand:

Global Database of Events, Language, and Tone
- GDELT is a dataset of 200 million events involving country pairs.
- The dataset includes information about action types and locations; in this work we only use the source and target of each action.

Directed pairs involve Egypt, Israel, and Palestine:

Directed pairs involve China, South Korea, and North Korea:

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