A Logistic Regression and Markov Chain Model for the Prediction of Nation-State Violent Conflicts and Transitions

Problem Statement
Use open source data to develop statistical models that predict and lend insight concerning when and where the world’s nations transition into and out of violent conflict.

Nation-specific Markov Chain Model

Question 1: How accurately can statistical models predict conflict transitions for individual nations?
Question 2: What factors are the significant predictors of conflict transitions?
Question 3: How is the number of global conflicts predicted to change by 2024 and beyond?
Question 4: What nations are susceptible to conflict transitions; which nations appear invulnerable to conflict transitions?
Question 5: Which nations, currently not in conflict, are identified as near-term risks for transitions into violent conflict?

Results
- Models achieved weighted predictive accuracies, at the world level, of 88.76% on the training data set, and 84.67% on the validation data set.
- Markov models achieve a validation accuracy of 85.16%.
- Over the next decade the global incidence of conflict is predicted to remain at 2014 levels with 84 (46%) of 182 nations in conflict.
- Long-run projections predict an increase in the conflict rate to 95 (52%) nations.
- 32 nations were identified as being susceptible to frequent conflict transitions.
- Micronesia, Nepal, Qatar, Trinidad and Tobago, and the United Arab Emirates as at risk for near-term transitions into violent conflict.

Significance of Research
This study accurately predicts the conflict status of 182 nations at least 3 years into the future and provides senior leadership with insight into future conflict trends for both nations and regions, allowing for both near-term planning and long-range strategy development.

Unique Contributions
- Advanced the field of conflict prediction analysis by conducting the first analysis predicting conflict transitions.
- Unique methodology using two conditional logistic regression models to calculate state probabilities for Markov models.
- Developed a metric (Transience Score) for identifying which nations are susceptible to conflict transitions.
- Established portable and reusable Microsoft tool that operationalizes Markov Chains.