

Events, Patterns, and Analysis: Forecasting International Conflict in the Twenty-First Century

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Abstract

The goal of our research is to develop a tool to provide early warning of the onset of serious international conflict. Using on-line media sources, analysis, and engineering, and collaborative findings from political scientists, we seek to predict conflict four to eight weeks prior to its outbreak. Our research is just beginning, but we are encouraged that using a preliminary version of our approach, we have been to identify the outbreak of serious conflicts using historical data from the Persian Gulf and the Middle East.

The Data Gathering and Analysis Process



The Problem

Armed conflict between countries remains a significant feature of today's world. Consider the actions of the US government in the short time since George Bush became President. The US has engaged in an armed conflict in Afghanistan, and may well become involved in a conflict against Iraq. As well, the US has also acted to prevent or reduce armed conflicts between Israel and the Palestinians, India and Pakistan, and China and Taiwan.

It is vital that we be able to predict the onset of international conflict. Early warning could aid in taking actions that could prevent some conflicts, and allow for better decisions in those situations where conflict cannot be avoided. Besides being important to understand in its own right, serious conflict between countries can have a significant impact on both the global and US economies.

The Project

Our goal is to develop the tools to monitor the actions of countries, and to provide four to eight weeks warning of the outbreak of serious international conflict (crises and wars). With support from the National Science Foundation and DTRA, we will present as follows (see graphic to the left):

• Build programs that gather a large set of current and archival electronic information sources (e.g., Reuters, AP, USA, etc. com, Lexis/Nexis) and extract event data from them. Events data sets contain information on when an event occurs, who participated in it and its essential characteristics (type of event and degree of cooperation or conflict of the event type).

• Aggregate, organize, and analyze events to uncover patterns that predict the onset of conflict. We believe that serious conflicts will appear as singularities in the stream of event data, and will be using wavelet analysis to identify and predict the onset of these singularities.

• Incorporate the body of knowledge about the conditions under which conflict occurs that has been developed by political scientists. We will use this knowledge both to develop more accurate predictions, and to provide an explanation for the outbreak of conflict.

First Efforts

To date we have conducted some exploratory work, using wavelet analysis on existing event data from the Persian Gulf and the Middle East. We have been trying to determine whether wavelet analysis of these event data can identify the outbreak of serious conflicts. At this point we cannot be sure that most or all serious conflicts appear as singularities in the event data, and equally important, that we do not generate too many false positive predictions.

Nevertheless, our preliminary work is encouraging. The onset is not identified by the wavelet analysis correspond to significant conflicts involving the eight countries.

Time Points

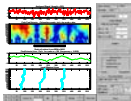
25-01 Sep, 1980
21-12 2003, 1988 Mar, 1984
100-12 2003, 1988 Mar, 1984
100-12 2003, 1988 Mar, 1984
100-12 2003, 1988 Mar, 1984

Conflict(s)

Onset and initial phases of Iran Iraq War
"Shah the Great" Iran Iraq War
Gulf War
Iraq Iraq and Israel Lebanon conflict
Iraq Iraq and Israel Lebanon conflict
Operation Desert Fox (USA, UK) and Israel conflict

Note: time points represent the biweekly period indicated on the chart.

Wavelet Analysis of Biweekly Gulf Data, 15 April 1979 to 31 March 99



Conclusions

We are just beginning our research, but we are encouraged. We believe that we are on the road to both predicting the onset of serious international conflicts, and developing a set of tools that can be used to predict and understand a variety of important phenomena.