Jirga: Multi-Dimensional Tracking of Political Opposition Groups

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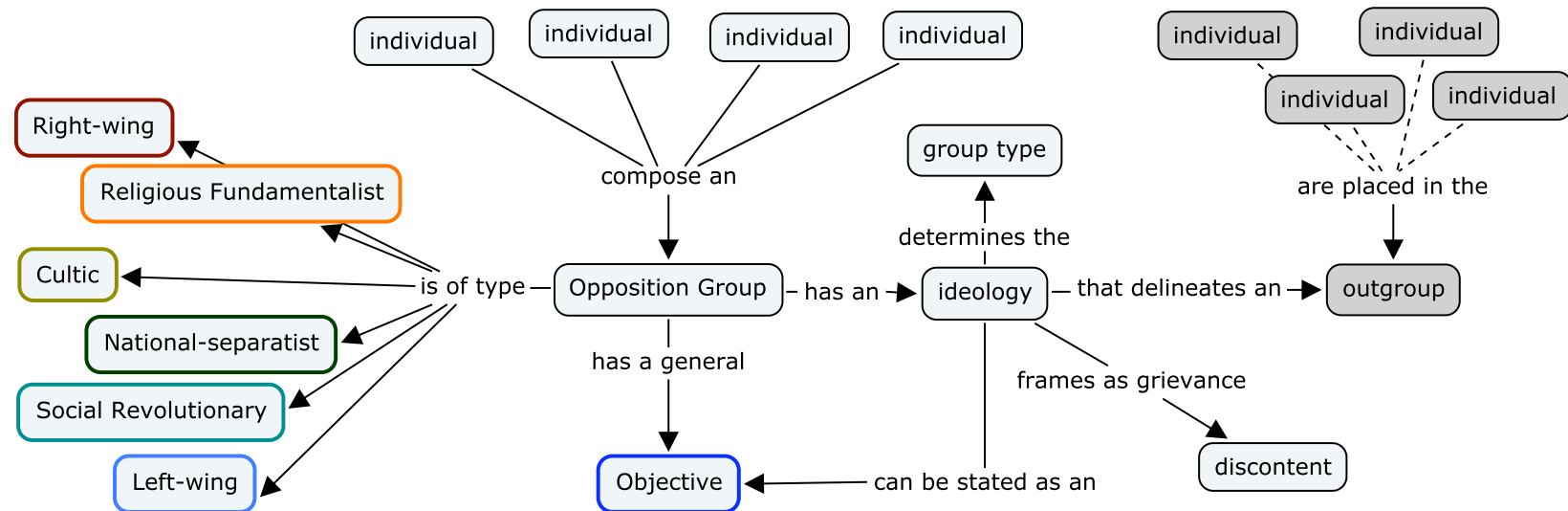- **Edward P. MacKerrow (PI)**

Abstract

In terrorism research, the ability to track changes in groups is a powerful analysis tool. There are a number of dimensions along which such tracking is useful. **Jirga** is a generalized software framework for tracking changes in political opposition groups along a number of dimensions including **geospatial**, **chronological**, and **social**.

In addition to providing the means to track political opposition groups, Jirga offers flexible tools to aid in **threat assessments** of the groups. The engine driving the assessments is an evidence-based methodology that allows the calculated probability of risk to be updated as new evidence is assigned. By continuously tracking **political opposition groups**, the threat assessments are conducted in an environment that provides the appropriate context for assigning evidence.
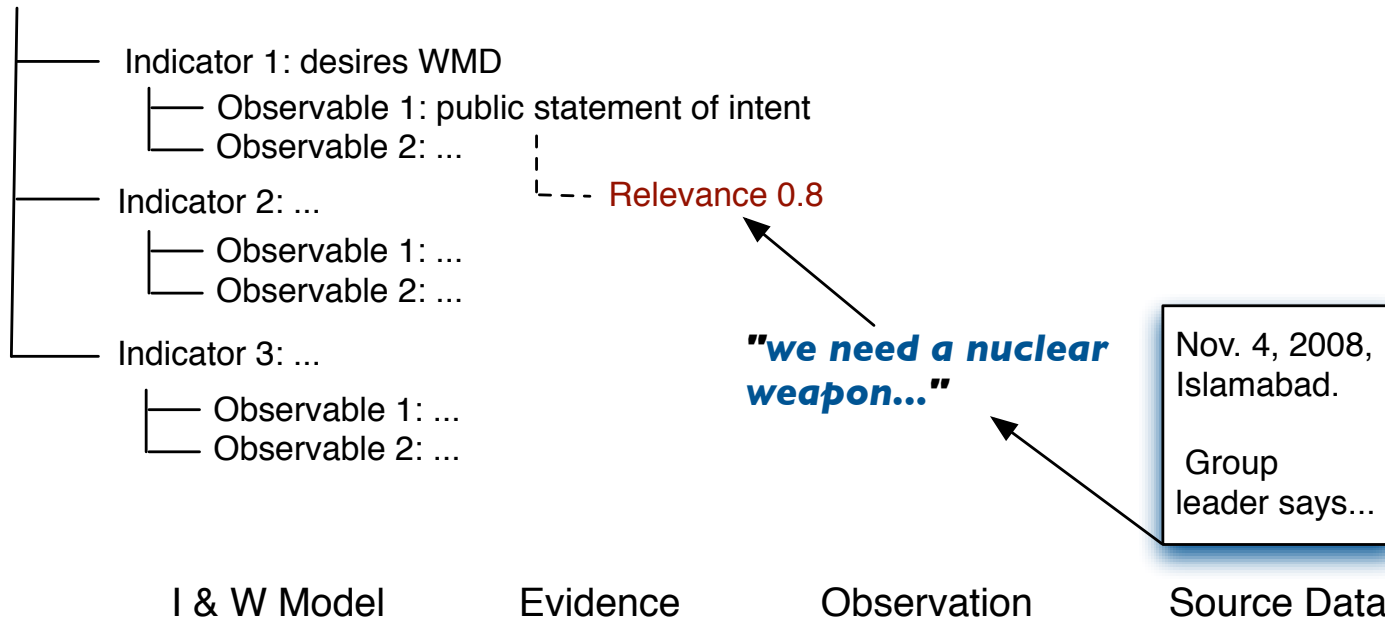
Political Opposition Groups

individual   individual   individual   individual   individual   individual

individual   individual

Right-wing

Religious Fundamentalist

compose an

group type

Cultic

is of type — Opposition Group — has an → ideology — that delineates an → outgroup

determines the

are placed in the

National-separatist

has a general

frames as grievance

Social Revolutionary

Left-wing

Objective ← can be stated as an

discontent

Jirga provides tools to monitor a group's motivation and intent.

Ku Klux Klan * Hamas * Aum Shinrikyo * Tamil Tigers * FARC * PETA

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Threat Assessment Workflow

Warning: acquisition of WMD

- Indicator 1: desires WMD
  - Observable 1: public statement of intent
  - Observable 2: ...
    - Relevance 0.8
- Indicator 2: ...
  - Observable 1: ...
  - Observable 2: ...
- Indicator 3: ...
  - Observable 1: ...
  - Observable 2: ...

"we need a nuclear weapon..."

Nov. 4, 2008, Islamabad.

Group leader says...

I & W Model   Evidence   Observation   Source Data

The role of the user in a threat assessment is to extract an observation from source data and to assign that observation as evidence to an observable in the I & W model with a subjective relevance weight.

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Subjective Weighting Requires Sensemaking

Sensemaking : the continuous effort to understand a situation so as to anticipate future actions

- Jirga: provide tools to assist the analyst in understanding the $context$ of the group

  - group history
  - group location
  - location history and facts
  - group motivation
  - intelligence question

- Not: providing automated reasoners to connect data to observables

Example: Analysis without Context

Warning: WMD attack in progress

Indicator 1: moving WMD in place to attack
- Observable 1: WMD moving with intent to launch
- Observable 2: ...

Indicator 2: ...
- Observable 1: ...
- Observable 2: ...

Indicator 3: ...
- Observable 1: ...
- Observable 2: ...
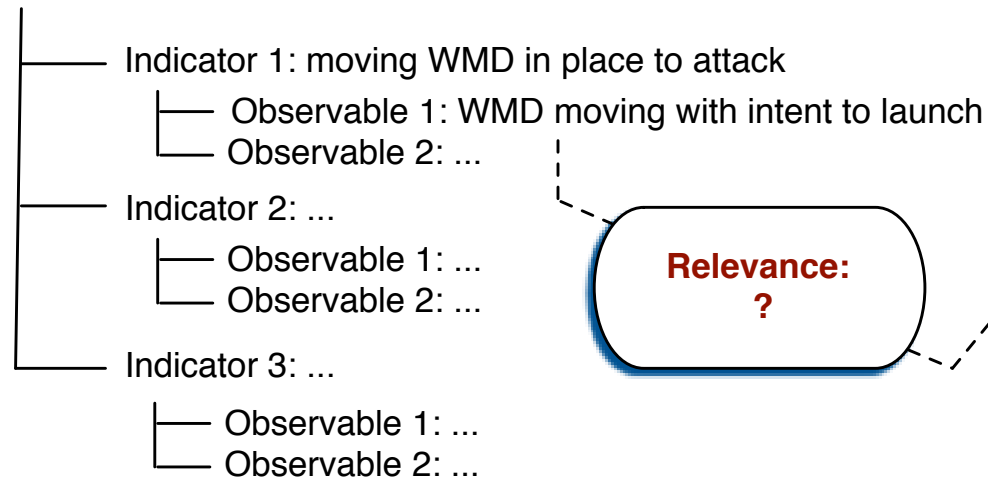
Relevance: ?

Apr. 6, 2009.

Country X's submarine has been stolen and is headed toward the US. The sub is equipped with a new engine that allows it to run virtually silent so that it can be positioned on the outskirts of any coastal city and launch missiles without giving the target any warning.

I & W Model   Evidence   Observation   Source Data

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Example: Analysis with Context

Captain's Profile.

One of the USSR's best submarine captains has stopped taking commands and is considered by the USSR as rogue. The captain is known to have approved of the defection of some of his fellow comrades to the US.

Hypotheses

a) about to commit act of war
b) attempting to defect

Apr. 6, 2009.

A USSR submarine has been stolen and is headed toward the US. The sub is equipped with a new engine that allows it to run virtually silent so that it can be positioned on the outskirts of any coastal city and launch missiles without giving the target any warning.

Background

Source Data

* scenario from the book and movie *The Hunt for Red October*

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Making Context Work

- What to include

- How to present it

- How to combine it

What to Include

National-separatist

Religious Fundamentalist

Social Revolutionary

Cultic

Right-wing

Left-wing

can be

Strategist

Cell Manager

Local Cell Member

Source of Inspiration

Expert

Fund-Raiser

Fodder

Networker

Local Agitator & Guide

can be

Group Type

Claims

Role

Photo

Status

Objectives

has

Alias

Ideology

Resources

have

Formation Date

Members

Abbreviations

Symbol

Aliases

compose an

Areas of Operation

Name

Profile

has

Translation

has

Description

Opposition Group

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How to Present It

- Hierarchically

- Chronologically

- Geospatially

- Numerically

Hierarchically

The level of risk is easily traced back to evidence when the I & W model is displayed as a hierarchy.

▼ ◉ Second Wave
   ▼ Ⓜ Motivations to Deploy a Terrorist Nuclear Device (0.94)
      ▶ Ⓘ Group wants to gain State status (0.5)
      ▶ Ⓘ Group has a low self-perception (0.2)
      ▼ Ⓘ Nuclear weaponary aligns with core objectives of the group (0.9)
         ▼ Ⓞ Group is publicity driven and wants long-lasting publicity. (0.2)
             Ⓔ Second Wave website clear about objectives
         ▼ Ⓞ Group wants to hasten Armageddon or Doomsday, End of the World. (0.3)
             Ⓔ Nostradamus inspiring terrorism
         ▶ Ⓞ Group has stated objectives to inflict mass casualties on a specific ethnic, national, or other identity group. (0.5)
         ▶ Ⓞ Group wants to intimidate or disrupt a State(s). (0.1)
          Ⓞ Group is in technological competition with other opposition groups. (0.6)
      ▶ Ⓘ Group has lost active audience of fear (0.3)
      ▶ Ⓘ Group has lost self-restraint based on composition changes (0.3)

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Chronologically

Jirga includes timelines of events, events by group, and the threat posed by the group so that changes can be tracked through time and correlated with events in the source data.
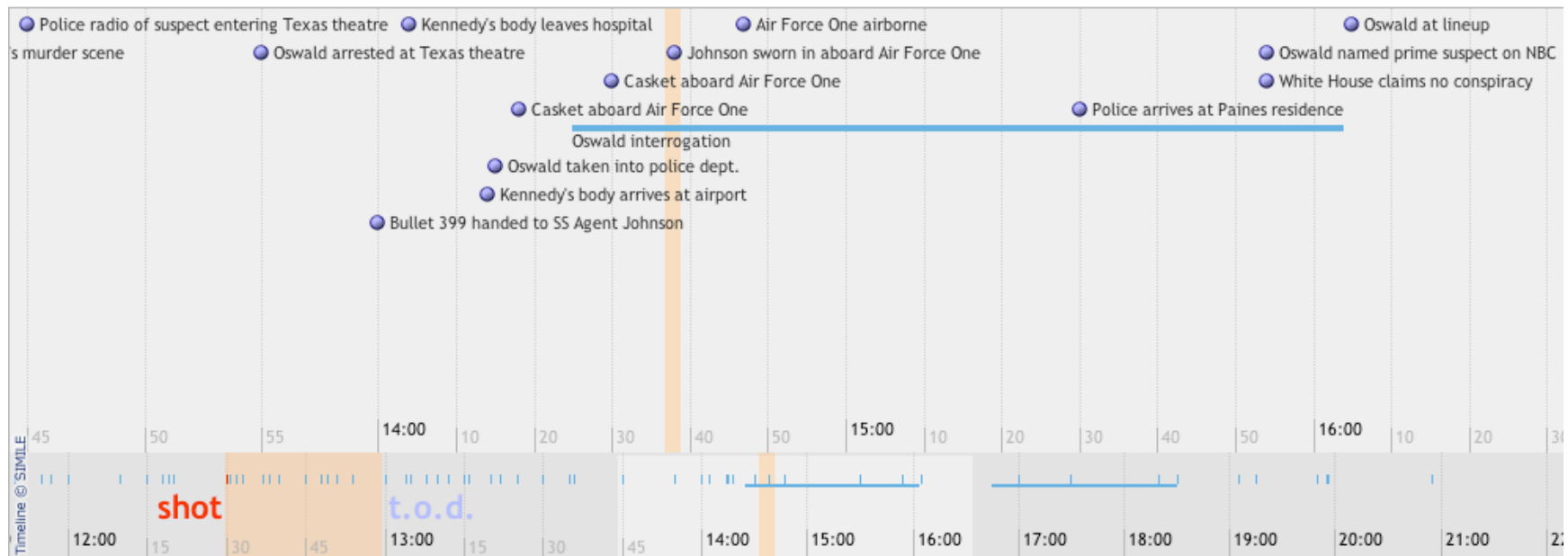
Geospatially

Regions with varying levels of fidelity (e.g., from villages to countries) can be displayed and color-coded to indicate areas of operation for a political opposition group or the overall threat-level of the region based on the groups it contains.

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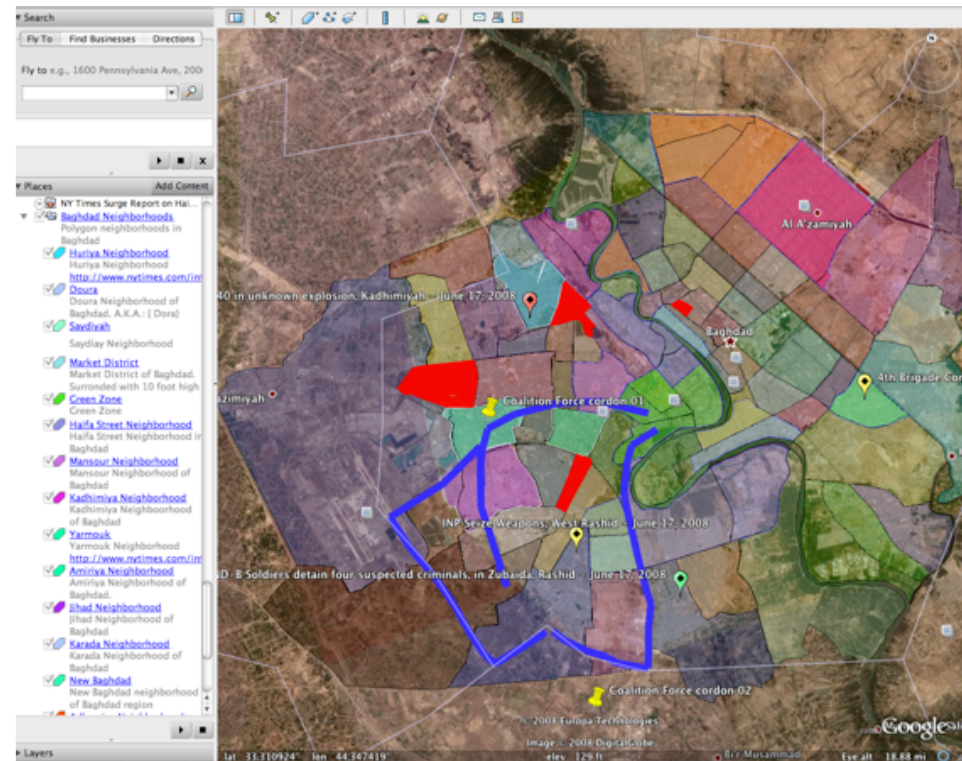
Numerically?

What is the best way to present risk?:

As a number

0.56

0.03 **22%**

2.0 .667

87%

In words

1. **Extremely likely**

2. **Likely**

3. **Neither likely nor unlikely**

4. **Unlikely**

5. **Extremely Unlikely**

In pictures
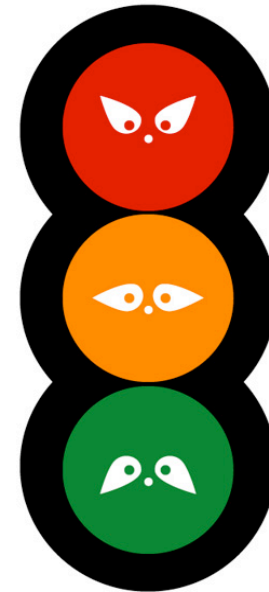
How to Combine It

Warning: acquisition of WMD

```
├── Indicator 1: desires WMD
│      ├── Observable 1: public statement of intent
│      └── Observable 2: ...
├── Indicator 2: ...
│      ├── Observable 1: ...
│      └── Observable 2: ...
└── Indicator 3: ...
       ├── Observable 1: ...
       └── Observable 2: ...
```

Relevance ?

Nov.12, 2008, Karachi.

According to sources...

Nov. 4, 2008, Islamabad.

Group leader says...

I & W Model   Evidence   Source Data
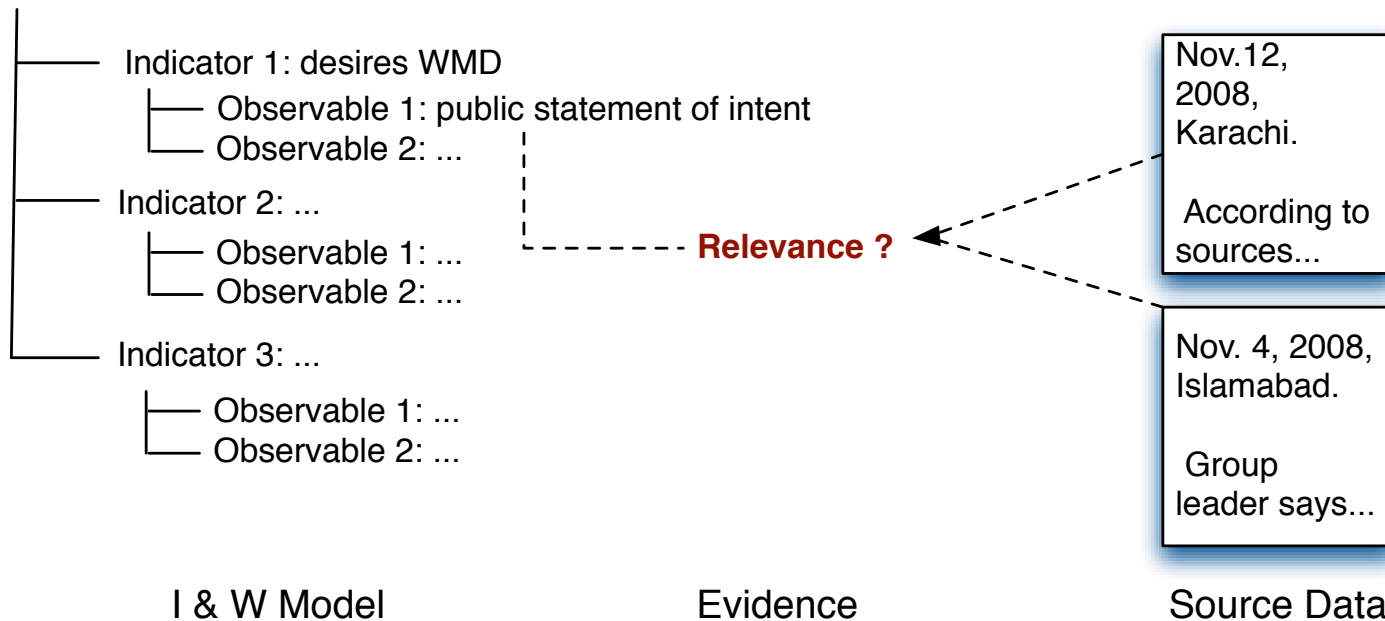
Bayesian Combination of Evidence

Warning: Intends to commit act of war

Indicator 1: Desires harm to the US

Observable 1: public statement of antipathy

no public statement of antipathy

Observable 2: history of malicious action

no history of malicious action

I & W Model

| Nov.12, 2008, Karachi. |
| Nov. 4, 2008, Islamabad. |
| Nov.1, 2008, Lahore. |
| Oct. 11, 2008, Quetta. |

Evidence

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Dempster-Shafer Combination of Evidence

Warning: Intends to commit act of war

Indicator 1: Desires harm to the US

Observable 1: public statement of antipathy

no public statement of antipathy

either no public statement or public statement

Observable 2: history of malicious action

no history of malicious action

either no history or history
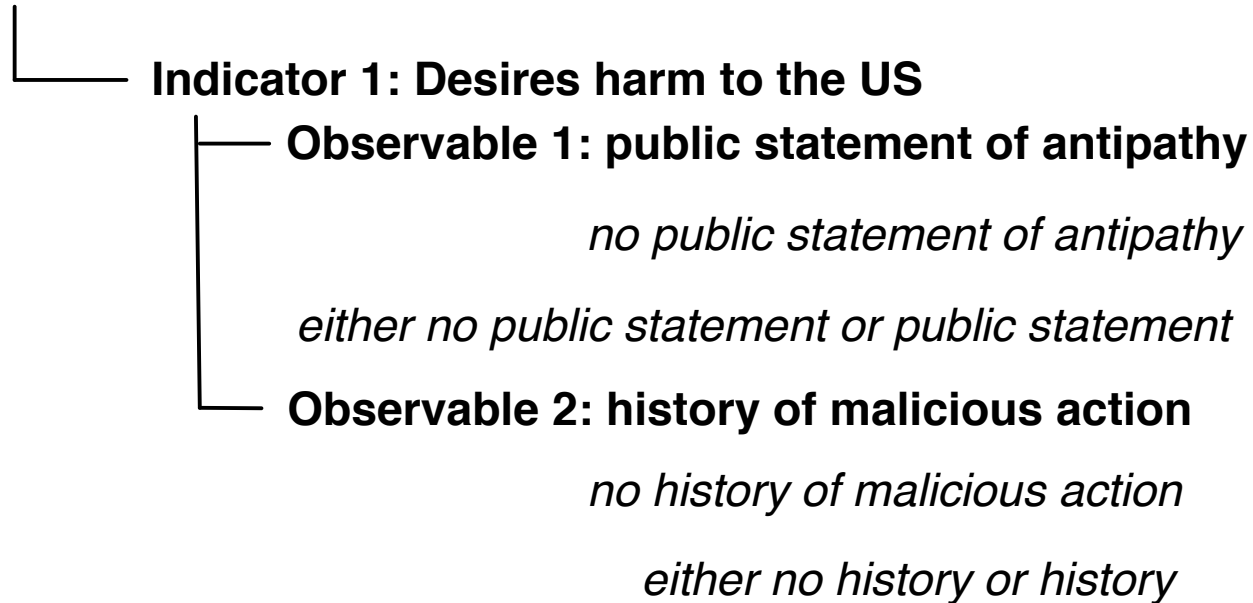
I & W Model

Baconian Combination of Evidence

Hypothesis: Intends to commit act of war

Hypothesis: Intends to defect

Oct. 11, 1984, Moscow.

Nov. 4, 1984, Moscow.

Nov.12, 1984, New York.

Nov.1, 1984, Wash. D.C.

Oct. 28, 1984, Wash. D.C.

Nov. 11, 1984, Wash. D.C.

Nov. 5, 1984, London.

Evidence

Not Diagnostic

Evidence

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Future Work

- alternate means to calculate risk

- user interaction include analyst, evidence, and credibility ratings

- bolster network visualizations for graphical analysis

Summary

- Jirga is an intelligence software tool to provide quantitative analysis of political opposition groups given data and an intelligence question. To aid the analyst in best performing this analysis, the tool includes features to assist in sensemaking. These tools present the information:

  - hierarchically
  - chronologically
  - geospatially
  - with risk presented in numbers, words, and pictures

Thank you

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