

Learning to Extract international relations from political context

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1 Overview

The paper talks about extracting information related to inter-nation talks between various countries of the world. It employs unsupervised learning techniques to gather information from a dataset containing 6.5 million news articles.

2 Methodology

It makes use of dyads and temporal dependencies to calculate such inferences. Methods such as n-gram methods, filtering are also used.

3 Proof of concept

The paper also covers two case studies one on conflicts between Palestine and Israel, and the war between USA and Iraq. It also gives the time frames for events and how these events affect the 'sentiments' over time of their reporting in news articles.

4 Theory

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5 References/Data source

Source of newsarticles: Gigaword English edition + New York Times corpus. The country pairs are evaluated from a separate file, as do the type of relationship between parties in consideration ex: accuse, attack, etc.

6 Mathematical Support

The sentences extracted are stored as tuple of the following form: $\langle S, R, T, W \rangle$ where

S: Source of the topic (the party addressing in the sentence),

R: the party being addressed,

T: The timestamp of the sentence (date),

W: The context, ex: accuse, fight, etc.

W above can be a verb path. Also, as we are concerned only with events happening in the political arena only, we discard the events related to sports and finance using filtering techniques. This led to a reduction in the dataset to be considered

by around 10%. Also, pairs containing the same source and receiver entities were removed.

7 Model used

The model assumes that the tuple depicting relationships between pair of countries stays similar over a period of time, in the sense of topics involving them and a gradual shift between these contexts occur over a phase of time. The model of analysis involves vanilla modeling scheme and smoothing over frames.

There are two models considered for analysis:

7.1 Context model

Makes use of apriori information existing for each context. A context prior

$$\theta_{k,s,r,t} \tag{1}$$

for each k: context, s: source, r: receiver, t: timestamp (defined above).

7.2 Language Model

Contextual effects studies how events are manifested as textual predicate paths using the vanilla context model and smoothing across time frames. A smoothed frame model proposes that for a given dyad the frame distribution comes from a latent parameter that varies over time.

8 Results

Finally the paper presents us results with the help of case studies for relations between USA and Iraq, and between Palestine and Israel. It also features the impact events like peace treaties have the way they affect the use of words in the paper. For ex: Hostile words eventually get replaced with much more 'diplomatic' words in news articles. The following image shows the impact of a bombing operation 'Project Fox' by USA against Iraq and analysis of that bombing w.r.t. words referenced in news articles during that period using vanilla model and smoothing of frames (vertical line in the image).

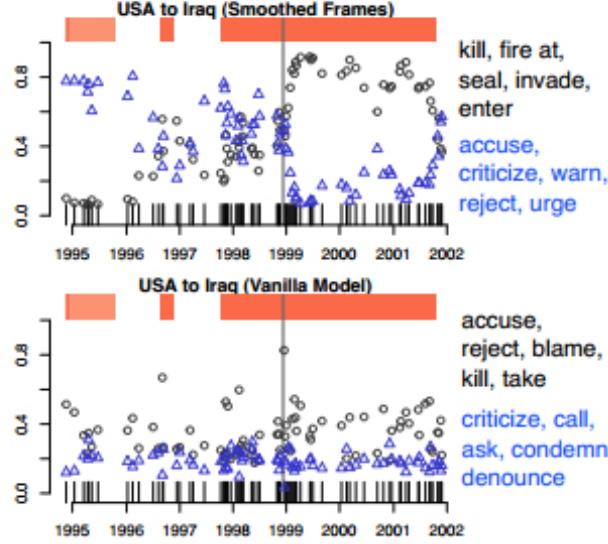


Figure 1: USA to Iraq dyad model,smoothed frames and vanilla model

9 Future Work

The work can be carried onto next stage by finding patterns from news records and predicting possible future extensions to them. For ex: Say, two countries have been deliberating over nuclear deal topic for some time now. The event occurs frequently with top leaders of the countries in frequent dialogue. Suddenly, a third nation pair start discussing over the topic. This can give a future insight onto a possible conflict in the international arena. Similarly, repeated warnings of attack by a country can also be used as an indicator of tension between the source (S above) and allies of receiver (R above) party. The work can be extended by including in more corpus data, perhaps some indicators from local news will be of help as they will help understand the mindset of people inside the involved countries. Same argument holds for local leaders, industries, bureaucrats, etc. This form of unsupervised semantic parsing and relation learning will help in understanding sociopolitical context and political behaviour.

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References

- [1] O'Connor, Brendan and Stewart, Brandon M. and Smith, Noah A. *Learning to Extract International Relations from Political Context*, Proc. 51st ACL (Long papers), (2013)