A Hybrid Text Analysis Method for Comparing Contextual Specificity in Political Documents

David Sylvan Jean-Louis Arcand Ashley Thornton
Graduate Institute of International and Development Studies

American Political Science Association

September 28, 2021

Three goals

- Overview of our project: announcements and interpretations
- Contextual specificity: domain and topical
- Machine learning considerations on syntax and semantics

Project

Home
About
Collaborators
Research
Data
Contact Us
The Intrepid Project
Interpreting policy announcements
using machine learning
GRADUATE INSTITUTE GENEVA
© 2019 - 2021 The Intrepid Project
idiap

Announcements and interpretations

- State agencies and officials routinely make announcements about policy (press releases, speeches, answers to questions)
- These are interpreted by various actors: politicians, business executives, investors, interested citizens, foreign leaders – and journalists (our focus)
- The interpretations characterize announcements as:
  - What policy is, or was, or will be
  - What policy might or will not be
  - Reasons for the policies and their goals and timing
- Use ML techniques, with syntactic and semantic information, on the announcement-interpretation pairs to generate interpretations from announcements

An example: the Federal Reserve

"The F.O.M.C. meeting ended at 12:55 PM; there is no further announcement." (Fed press release, December 22, 1998)

"The Federal Reserve voted today to hold interest rates steady, judging that three rate reductions in the fall had given the economy a big enough kick to keep it growing at a healthy pace into the new year." *NYT* article, December 23, 1998

Semantic information: what the F.O.M.C. is and what it usually does; also knowledge about the world and recent decisions.

An example: U.S.-Russian relations

“We already, as you know, provide non-lethal aid. We do everything working with the London 11 and a group of partners, some of whom provide other things to the opposition coalition. And we will continue ... as President Obama said, standing next to President Hollande to look at every option that is open to us to see what else we can do to be helpful.” (State Dept. background briefing on Syria, February 14, 2014)

“Diplomats here said the administration might consider stepping up an existing covert program to train and arm the moderate Syrian opposition or even weigh the threat of military force to compel the delivery of humanitarian aid.” *NYT* article, February 15, 2014

Semantic information: what the U.S. and U.S. allies are doing, what “helpful” means. Syntactic information: what the temporal scope is of “will continue ... to look”

Facts and figures

- Two issue areas: monetary policy and foreign policy
- Two cases (so far): U.S. Federal Reserve and U.S. policy towards Russia
- Fed policy: approximately 1,700 separate announcements from 1967-2018
- Fed policy: approximately 5,500 NYT newspaper articles (multiple passes using different search parameters)
- Russia policy: no count yet on announcements (still doing it; many more sources than for Fed case), from 1993-2016
- Russia policy: so far (2001-2016), approximately 3,400 articles (searching much more complicated)

Annotation of articles: specifying interpretations

- Standardized sentence (StSt) (container):
- Reference document (announcement) (required)
- Act (required; text plus summary)
- Actor (required)
- Motives (goal)
- Evidence (what spurred policy)
- Scope (when occur, how long)
- Attribution (if a recommendation)
- Russia Link (required for foreign policy case; text plus summary)

Annotation is done in TagTog
Output is a file in JSON format

Annotation: Example

"1" "TheFed'sMessage:Exhale.STAT_2017-03-15....The economy will keep growing just enough to put more Americans back to work, but without overheating to generate excessive inflation. American workers will see gradual pay raises that keep compensation rising faster than inflation. Interest rates will rise gradually, while staying low by historical standards. And that's all before accounting for any major stimulative policies that may emerge from the Trump administration and Congress. That was the view of the economy sketched by the Federal Reserve chairwoman, Janet Yellen, at her first news conference of 2017 on Wednesday. In short, the Fed believes that after nearly eight years of trying to nurse the economy back to health, its work is nearly done. The general sense of rosiness isn't really anything new -- for years, Ms. Yellen and her predecessor, Ben Bernanke, have forecast that the economy will steadily converge toward a Goldilocks-like state of being neither too hot nor too cold. Two things have changed. First, that day now feels imminent, with the unemployment rate at 4.7 percent and inflation closing on the 2 percent the Fed thinks best. That is a key reason the Fed raised its interest rate target Wednesday. Second, markets now believe the Fed's message that higher rates are on the way; bond markets suggest that the Fed will actually follow through with its intentions on gradual interest rate rises. You couldn't say that a year ago. ''The simple message is: The economy is doing well,'' Ms. Yellen told reporters. The overwhelming message was of gradualism -- both on the rate of economic improvement and the Fed's own efforts to wind down its era of low interest rates. She suggested no urgency toward a tightening of the money supply that might suggest a hair-trigger readiness to accelerate interest rate increases. Ms. Yellen evinced little fear that the Fed is behind the curve, suggesting that two more interest rate increases are on the way over the remainder of 2017. This will, if these plans stay in force, remain the slowest cycle of interest rate increases in modern history. She also displayed little of the fear of setback that has been pervasive at the Fed for years. The central bank has spent the last eight years trying to help the recovery along with a series of monetary interventions; more than any other institution in Washington, it owns the recovery. That has also meant that the Fed has acted with haste to signs of softening. In the winter of 2016, for example, barely a year ago, the central bank backed off plans for more rate increases after a steep stock market sell-off and a rise of economic pessimism. After years of persistently undershooting its 2 percent goal for inflation, the Fed explicitly, if subtly, raised the possibility on Wednesday of erring in the other direction. The central bank's policy committee said it would be monitoring ''actual and expected inflation developments relative to its symmetric inflation goal.'' In this context, ''symmetric'' implies that it aims for 2 percent inflation and would be equally displeased by inflation that was too high or too low. That implies that the Fed is not inclined to overreact to the possibility that inflation could drift slightly -- and in the Fed's view temporarily -- above 2 percent in the coming months. After the announcement, the interest rates on Treasury bonds actually fell. That implies that markets were ready for signals of even more aggressive rate rises. And the clearest signal that the Fed is in steady-as-she-goes territory was in how Ms. Yellen talked about the possibility of new tax cuts or

Document Labels

Document_note

Document_note

Entities

total 28 not normalized 28

Group/filter entities

The economy will keep growing just enough to put more Americans back to work, but without overheating to generate excessive inflation. American workers will see gradual pay raises that keep compensation rising faster than inflation. Interest rates will rise gradually, while staying low by historical standards. And that's all before accounting for any major stimulative policies that may emerge from the Trump administration and Congress. That was the view of the economy sketched by the Federal Reserve chairwoman, Janet Yellen, at her first news conference of 2017 on Wednesday. In short, the Fed believes that after nearly eight years of trying to

Contextual specificity

- Standard approach: mapping from announcements to interpretations
- Problems of contextual specificity
  - Domain specificity (e.g., “tightening”; “hard-liner” in monetary vs. foreign policy)
  - Topical specificity (e.g., “tightening” for bank-lending requirements vs. interest rates)
- Mapping requires meta-rules; hence problems of
  - Infinite regress
  - Novelty

Machine learning

- Train the program on the actual StSts, with an eye to generating them from the announcements
- One announcement can generate many interpretations: differ by level of detail (optional elements) as well as by modality (see next slide)
- Size problem: on the one hand, the corpora are small by computational linguistics standards; on the other hand, the announcements are too large and require either preliminary tagging or repeated sampling

Syntax and semantics

- Syntax 1: coordination (e.g., "The action, conforming in part to recent declines in a number of market interest rates..."). Hence: dependency parsing as input to ML
- Syntax 2: modality (e.g., "to develop more severe actions that could be taken if Russia continues to escalate the situation"). Hence: specify modality of verbs and have ML generate possible actions (also anaphora: "the situation")
- Semantics 1: ("a company-size contingent of paratroopers from the U.S. Army Europe's ... will arrive in Poland ... since Russia's aggression in Ukraine, we have been constantly looking at ways to reassure allies and partners, and these exercises, they're ..."). Hence: specify semantic role (who did what to whom) to permit ML to generate Poland as an ally
- Semantics 2 (from above example): named entity recognition to permit ML to generate actor as US