

**Automated Interpretation of Political and Economic Policy
Documents: Machine Learning Using Semantic and Syntactic
Information**

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Announcements and Interpretations

Announcements and Interpretations

An example: the Federal Reserve

An example: U.S.-Russian relations

Beyond bag of words

General structure of the project

Annotation: our grammar

Annotation: Example

.json output: pretty version

Notes

Machine learning

- 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, journalists)
- The interpretations characterize announcements as:
 - What policy is, or was, or will be
 - What policy might or will not be
 - Reasons for the policies, goals and timing of the policies

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“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.

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“We already, as you know, provide non-lethal aid. We do everything we can, 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 Secretary Kerry said, 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. The senior official declined to say whether a policy shift was underway, saying options were always being reviewed.” *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”

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Core problem is that there is a many-to-many semantic mapping of individual words and phrases onto states of affairs, with this mapping being modified by the syntactic structure of the sentences in which those words and phrases are found.

Hence, bag of words approaches, whether sentiment analysis, or frequency matrix-based analyses, such as topic modeling, will fail.

George Washington example

Instead, need three things:

- Large corpora of announcements
- Human annotation of interpretations (in this case, newspaper articles)
- Exploration of many-to-many mappings between the announcements and the annotations (via machine learning)

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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 3,000 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 (2007-2016), approximately 1,400 articles (searching much more complicated)

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

Annotation is done in tagtog
The output is a file in .json format

Annotation: Example

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"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

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The screenshot displays a web browser window with a URL from tagtog.net. The main content area shows a JSON object with the following structure:

```
{
  "text": "retreat from its economic stimulus campaign",
  "coordinates": [],
  "confidence": {
    "state": "pre-added",
    "who": [
      "user:AIPEPD"
    ],
    "prob": 1
  },
  "fields": {
    "f_43": {
      "value": "Start to end QE",
      "confidence": {
        "state": "pre-added",
        "who": [
          "user:AIPEPD"
        ],
        "prob": 1
      }
    }
  },
  "normalizations": {},
  "classId": "e_35",
  "part": "s1p2",
  "offsets": [
    {
      "start": 1370,
      "text": "account"
    }
  ],
  "coordinates": [],
  "confidence": {
    "state": "pre-added",
    "who": [
      "user:AIPEPD"
    ],
    "prob": 1
  }
}
```

The right sidebar, titled 'Entities', shows a list of entity types and their counts:

- ReferenceDocument: 5
- minutes: 1
- account: 2
- statement: 1
- paper: 1
- Act: 5
- before continuing to increase the Fed's benchmark interest rate: 1
- retreat from its economic stimulus campaign: 1
- setting the stage for a rate: 1

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Are around 5,900 Standardized sentences for Fed case

FP articles are much more intricate, more narrative, use more ref docs, generate more Standardized sentences, often involve third parties, and require more inferences as to motive

Given timing considerations, we will probably have one additional case before the scheduled end of the project (4 years in total)

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Train the program on the actual StSts, with an eye to generating them from the announcements

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

To date, can produce a syntactic graph as input to ML; are now working on doing the same for semantic graph

If you have further questions you can reach us at:
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