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NLP Tools

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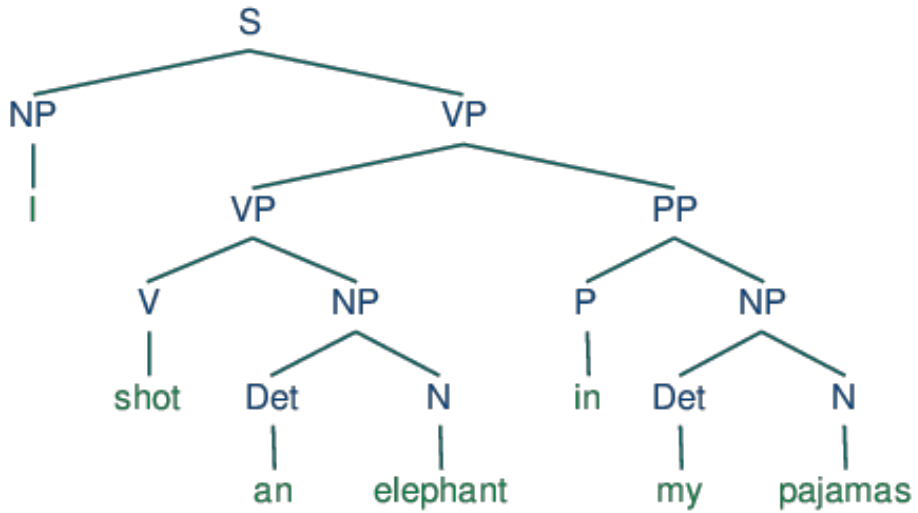
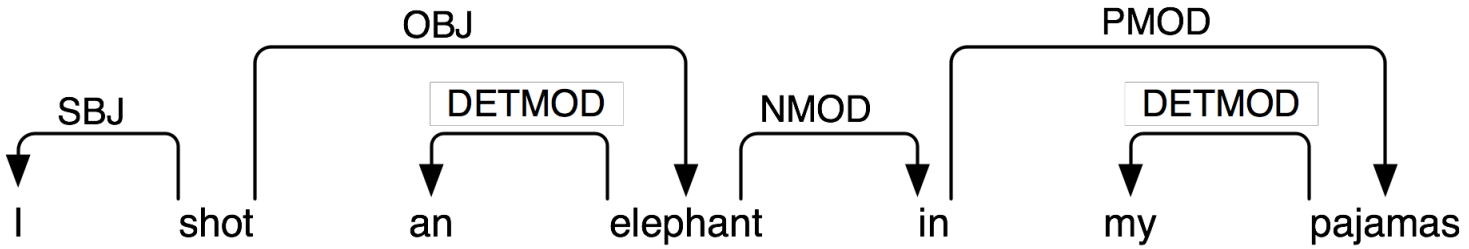
NLP Tools

- Syntactic Parsing
- Named-Entity Recognition
- Lexical Resources
- Language Modeling
- Sentiment Analysis
- Natural Language Generation
- General NLP Libraries

Syntactic Parsers (1)

- I shot an elephant in my pajamas.





Syntactic Parsers (2)

- Stanford Parser (Java)
  - http://nlp.stanford.edu/software/lex-parser.shtml
- Berkley Parser (Java)
  - https://code.google.com/p/berkeleyparser/

…

Part-of-Speech Taggers (1)

I shot an elephant in my pajamas.

PRP/I VBD/shot DT/an NN/elephant IN/in
PRP$/my NN/pajamas.

Part-of-Speech Taggers (2)

- Stanford Tagger (Java)
  http://nlp.stanford.edu/software/tagger.shtml
- Ilinois POS-Tagger (Java)
  http://cogcomp.cs.illinois.edu/page/software_view/3

  …
- Greek Part-of-Speech Tager (Java)
  http://nlp.cs.aueb.gr/software.html

Named-Entity Recognizers (1)

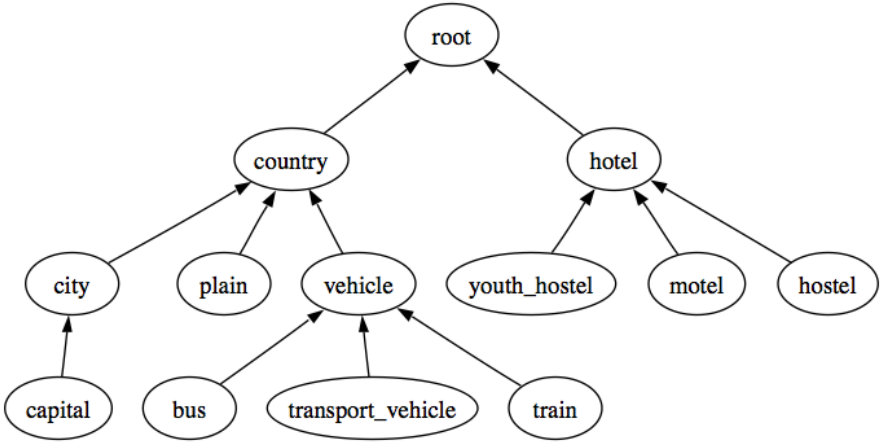
The origins of the order lie first in the 1978 Foreign Intelligence Surveillance Act and then in Section 215 of the Patriot Act, backed by George W Bush and passed by Congress after 9/11. In 2006 it was discovered that a similarly wide database of cellular records was being collected from customers of Verizon, AT&T and BellSouth.

Named-Entity Recognizers (2)

- Stanford NER (Java)
  http://nlp.stanford.edu/software/CRF-NER.shtml
- Ilinois Named-Entity Tagger (Java)
  http://cogcomp.cs.illinois.edu/page/software_view/NETagger
  …
- Greek NER (Java)
  http://nlp.cs.aueb.gr/software.html

Lexical Resources

WordNet



Try it online:
http://wordnetweb.princeton.edu/perl/webwn

Download:
http://wordnet.princeton.edu/wordnet/download/

APIs:

JAWS (Java): http://lyle.smu.edu/~tspell/jaws/

JWNL (Java): http://sourceforge.net/projects/jwordnet/

Wordnet-blast (C++):
https://code.google.com/p/wordnet-blast/

FrameNet

[*Cook* Matilde] fried [*Food* the catfish] [*Heating instrument* in a heavy iron skillet].

[*Item* Colgate's stock] rose [*Difference* $3.64] [*Final value* to $49.94].

APIs:

FrameNet API (Java): http://www.cl.uni-heidelberg.de/trac/FrameNetAPI

Stanford FrameNet II Reader (Java):
http://nlp.stanford.edu/software/framenet.shtml

FrameNet Project:

Data Hub: http://datahub.io/dataset/framenet

Language Modeling (1)

- Assign probabilities to sentences
  - Machine Translation
    - **P(**Alexander the **Great)** **>** **P(**Alexander the **Big)**
  - Spell Correction
    - **P(**too many **people)** **>** **P(**too many **pepole)**
  - Speech Recognition
    - **P(I believe)** **>** **P(Eye be live)**
  - Natural Language Generation, Summarization etc.

- **P(**"my house on the hill"**)**= P(my) × P(house | my) × P(on | my house) × P(the | my house on) × P(hill | my house on the)

Language Modeling (2)

- SRILM (C++) http://www.speech.sri.com/projects/srilm/download.html
  - Language Modeling
  - Smoothing Techniques
  - Data Testing
  - Word Prediction
  - …
- BerkleyLM (Java)
  https://code.google.com/p/berkeleylm/

Sentiment Analysis

- Calculate word/sentence/text polarity (positive/negative/objective).
  - SentiWordNet (http://sentiwordnet.isti.cnr.it/)
  - Alchemy API (http://www.alchemyapi.com/)
  - Text-Processing (http://text-processing.com/docs/sentiment.html)
  - RepuState (https://www.repustate.com/)
  - SocialMention (http://www.socialmention.com/)
  - NLTK
  - LingPipe
  - Custom solutions

Natural Language Generation (1)

- Content Determination
  - Databases
  - RDF
  - …
  - Information Extraction
- Sentence Planning
  - Templates
  - ‘Standard’ NLG
- Surface Realization
  - Realization Engines
  - Readability, grammaticality

Natural Language Generation (2)

- SimpleNLG

  https://code.google.com/p/simplenlg/wiki/Section1

```
SPhraseSpec p = nlgFactory.createClause();
p.setSubject("Mary");
p.setVerb("chase");
p.setObject("the monkey");
```

Mary chases the monkey.

General NLP Libraries

- Stanford CoreNLP (Java + Python Interface)
  http://nlp.stanford.edu/software/corenlp.shtml
- LingPipe (Java)
  http://alias-i.com/lingpipe/
- Apache OpenNLP (Java)
  http://opennlp.apache.org/
- NLTK 2.0 (Python)
  http://nltk.org/

General NLP Libraries

	CoreNLP	LingPipe	OpenNLP	NLTK
POS-Tagging	✓	✓	✓	✓
Parsing	✓	✓	✓	✓
Lexical Resources				✓
Named Entity Recognition	✓	✓	✓	✓
Text Classification		✓		✓
Sentiment Analysis		✓		