Higher-level Natural Language Processing with `textacy`

Burton DeWilde / Chartbeat

PyGotham 2016

github.com/bdewilde/pygotham_2016

whoami

- particle physicist turned data scientist
- at intersection of media, data, and social good
- Python coder since 2009 (Py3 since 2014 🙌)
- work at Chartbeat, volunteer with DataKind

Chartbeat

- leading real-time analytics provider for publishers
  - ~50B pageviews/month
  - ~300k requests/second

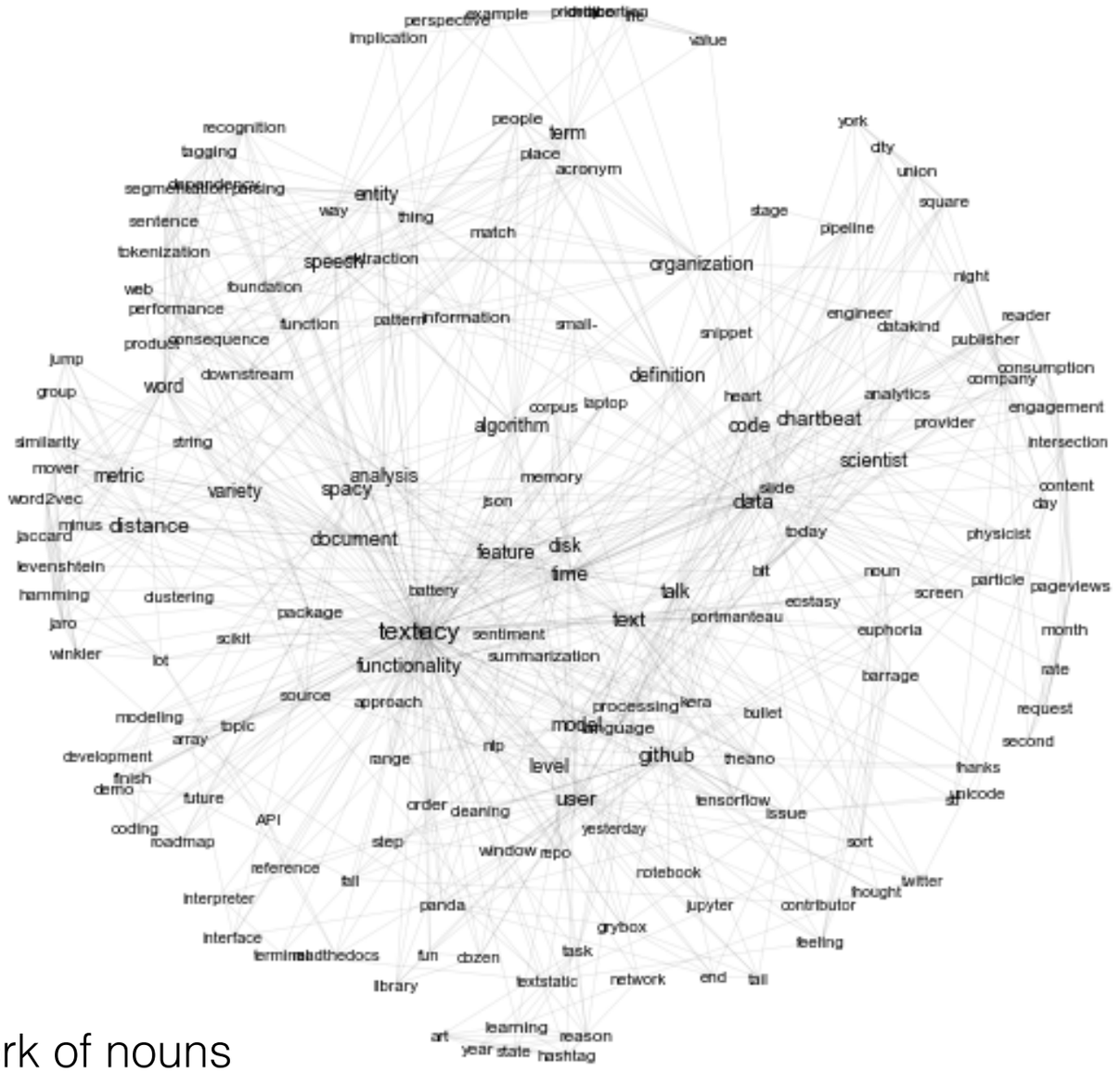
#BigData

Chartbeat

- leading real-time analytics provider for publishers
  - ~50B pageviews/month
  - ~300k requests/second
- founded in 2009, based in NYC
- Chartbeat ❤️ Python

Outline

- hello, `textacy`
- features
- topic modeling demo
- roadmap



this talk, as a semantic network of nouns

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  - built on spaCy’s “lower-level” tokenization, POS-tagging, NER, dependency parse, …

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  - cover broad range of user needs
  - fun and user-friendly

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tex·ta·cy

noun

1. The euphoria you get from a barrage of excellent and meaningful texts.

source: urbandictionary.com

Getting Started

Step 1:

```
$ pip install textacy
```

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Step 3 (Windows users only):

🙏

Features!

- stream text, json, and spaCy binary data to/from disk

```
>>> rr = textacy.corpora.RedditReader('RC_2015-01.bz2')
>>> for i, text in enumerate(rr.texts(limit=3)):
...     print(i, text)

0 Most of us have some family members like this. Most of my family is like
this.
1 But Mill's career was way better. Bentham is like, the Joseph Smith to
Mill's Brigham Young.
2 Mine uses a strait razor, and as much as i love the clippers i love the
razor so much more. Then he follows it up with a warm towel. I think i
might go get a hair cut this week.

>>> textacy.fileio.write_file_lines(rr.texts(limit=3), 'comments.txt')
```

Features!

- clean and normalize raw text

```
>>> text = """
... This first line is nice and clean.
... But â€” not the 2nd &amp;amp; 3rd!
... Don’t worry,   go here: http://textacy.readthedocs.io/.
... """
>>> textacy.preprocess_text(
...     text, fix_unicode=True, no_urls=True, lowercase=True)

this first line is nice and clean.
but — not the 2nd & 3rd!
don't worry, go here: *url*
```

Features!

- unsupervised information extraction

```
>>> text = list(textacy.corpora.WikiReader('enwiki-latest-pages-
articles.xml.bz2').texts(limit=1))[0][10:]
>>> doc = textacy.TextDoc(text)

>>> list(doc.named_entities(good_ne_types={'PERSON'}))[:3]
[Robespierre, William Godwin, Wilhelm Weitling]
```

```
>>> {acro: def_ for acro, def_
...  in doc.acronyms_and_definitions().items() if def_}
{'CGT': 'Confederación General del Trabajo',
 'FOTLU': 'Federation of Organized Trades and Labor Unions',
 'LPF': 'League of Peace and Freedom',
 'WTO': 'World Trade Organization'}

>>> doc.key_terms(algorithm='textrank', n=3)
[('anarchist', 0.03284751614198023),
 ('anarchism', 0.02039916051740292),
 ('movement', 0.00841834859681396)]
```

Features!

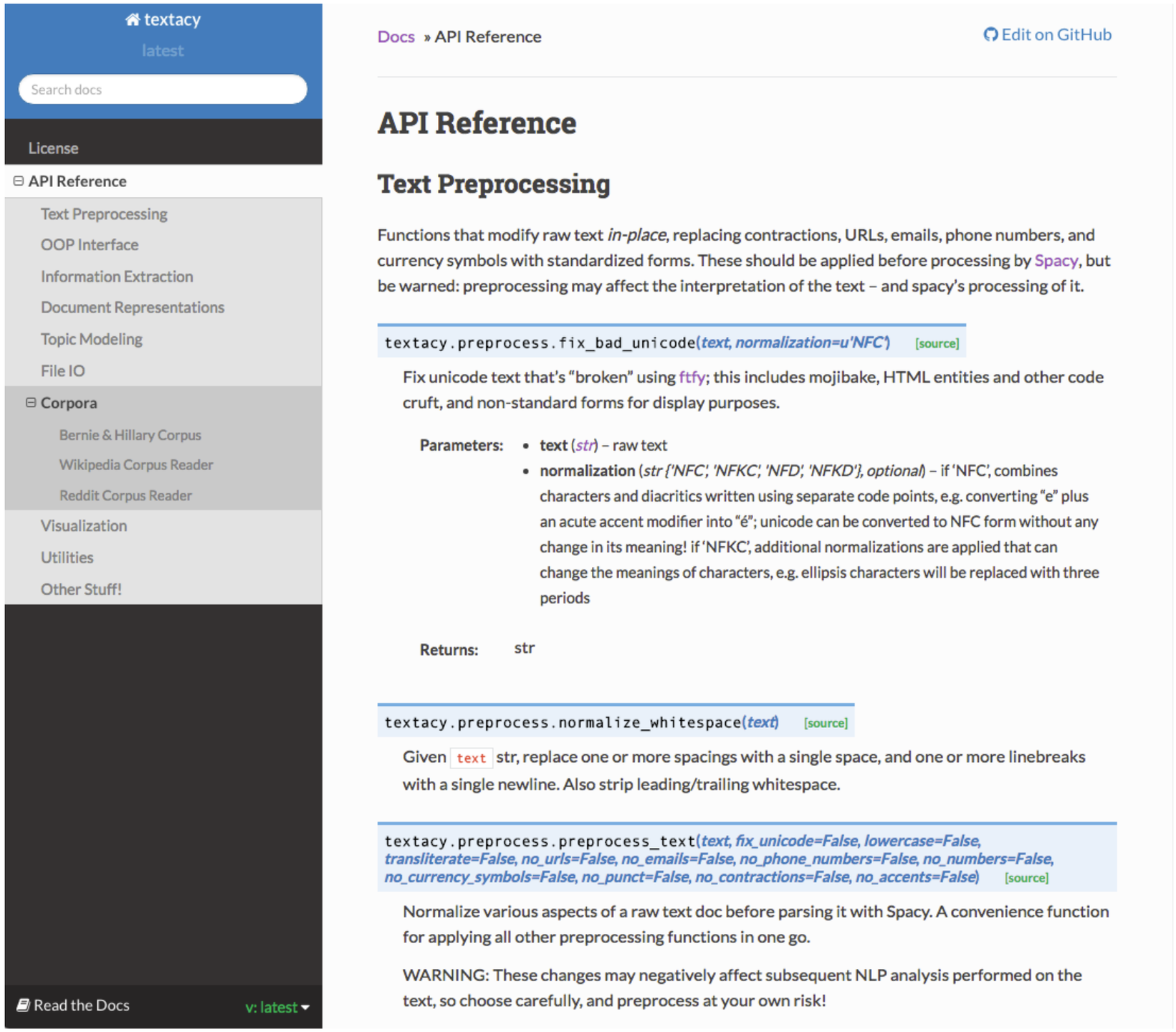
- string, set, and document distance metrics

```
>>> doc1 = TextDoc('She spoke to the assembled journalists.')
>>> doc2 = TextDoc('He chatted with the gathered press.')

>>> textacy.distance.word_movers(doc1, doc2)
0.467695532304

>>> textacy.distance.word2vec(doc1, doc2)
0.08903646589322613

>>> textacy.distance.jaccard(
...     [w.lemma_ for w in doc1], [w.lemma_ for w in doc2])
0.8333333333333334
```

Features!

(and more)

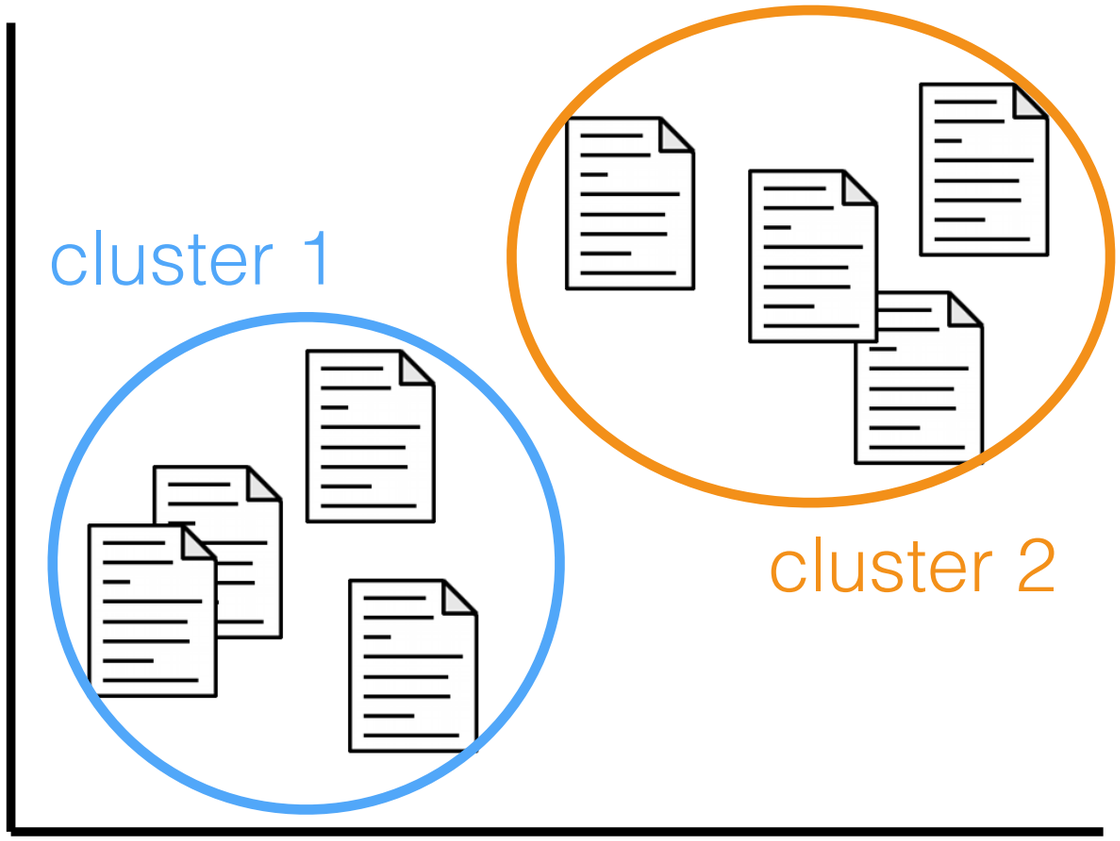
Features!


textacy
latest
Search docs
License
API Reference
Text Preprocessing
OOP Interface
Information Extraction
Document Representations
Topic Modeling
File IO
Corpora
Bernie & Hillary Corpus
Wikipedia Corpus Reader
Reddit Corpus Reader
Visualization
Utilities
Other Stuff!
Read the Docs
v: latest
Docs » API Reference
Edit on GitHub
API Reference
Text Preprocessing
Functions that modify raw text in-place, replacing contractions, URLs, emails, phone numbers, and currency symbols with standardized forms. These should be applied before processing by Spacy, but be warned: preprocessing may affect the interpretation of the text – and spacy's processing of it.
textacy.preprocess.fix_bad_unicode(text, normalization=u'NFC') [source]
Fix unicode text that's "broken" using ftfy; this includes mojibake, HTML entities and other code cruft, and non-standard forms for display purposes.
Parameters:
text (str) – raw text
normalization (str {'NFC', 'NFKC', 'NFD', 'NFKD'}, optional) – if 'NFC', combines characters and diacritics written using separate code points, e.g. converting "e" plus an acute accent modifier into "é"; unicode can be converted to NFC form without any change in its meaning! if 'NFKC', additional normalizations are applied that can change the meanings of characters, e.g. ellipsis characters will be replaced with three periods
Returns: str
textacy.preprocess.normalize_whitespace(text) [source]
Given text str, replace one or more spacings with a single space, and one or more linebreaks with a single newline. Also strip leading/trailing whitespace.
textacy.preprocess.preprocess_text(text, fix_unicode=False, lowercase=False, transliterate=False, no_urls=False, no_emails=False, no_phone_numbers=False, no_numbers=False, no_currency_symbols=False, no_punct=False, no_contractions=False, no_accents=False) [source]
Normalize various aspects of a raw text doc before parsing it with Spacy. A convenience function for applying all other preprocessing functions in one go.
WARNING: These changes may negatively affect subsequent NLP analysis performed on the text, so choose carefully, and preprocess at your own risk!

$ jupyter notebook

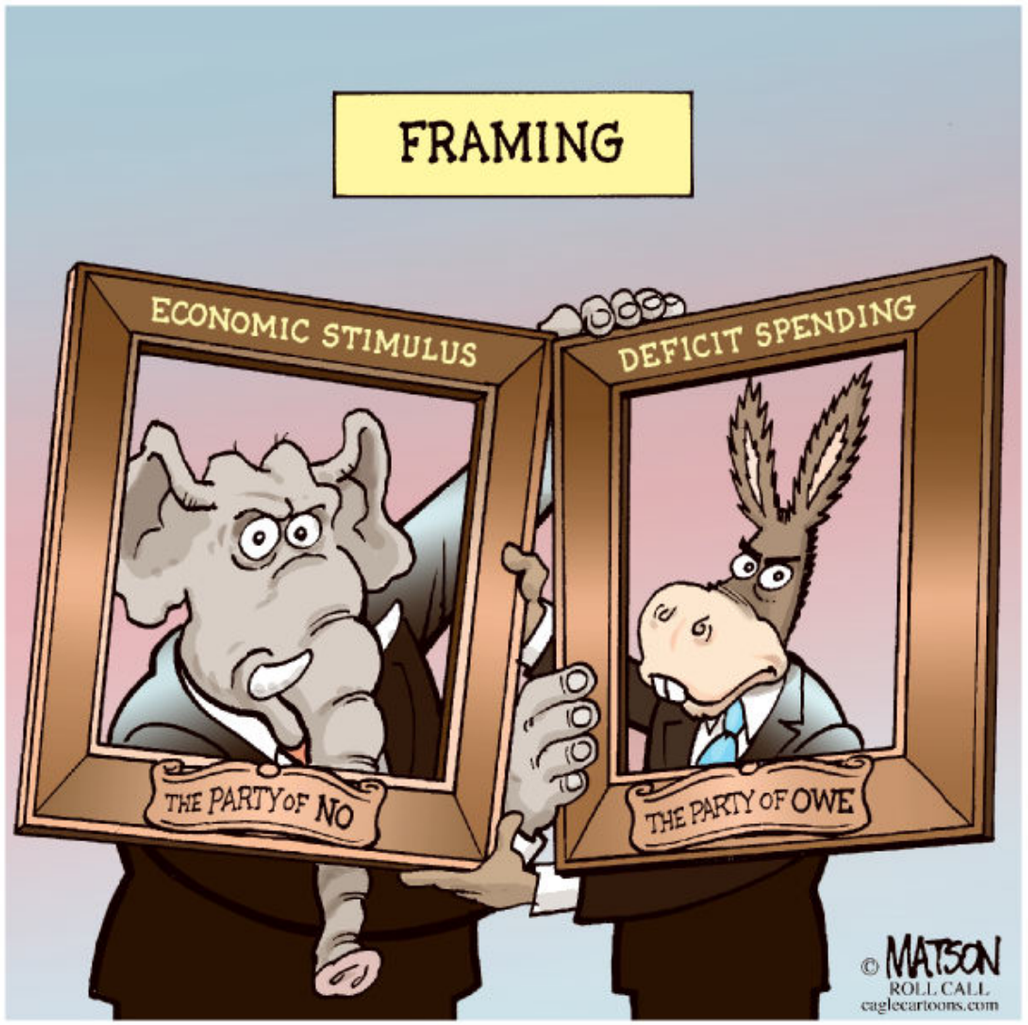
Roadmap

- document clustering



Roadmap

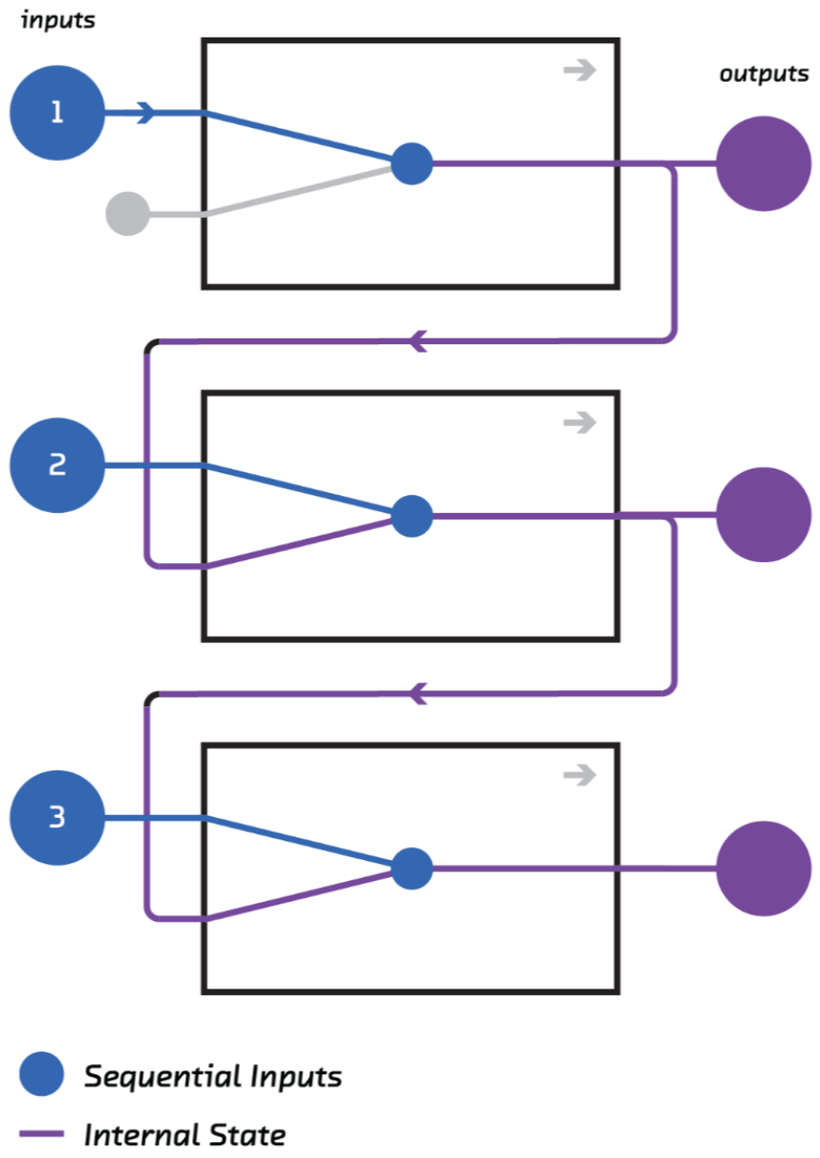
- document clustering
- media framing



Roadmap

- document clustering
- media framing
- #DeepLearning

RNN from yesterday's
"Summarizing Documents" talk:
http://mike.place/talks/pygotham/



Roadmap

- document clustering and classification
- media frames analysis
- #DeepLearning
- under active development…

Hello? World?

users and contributors wanted!

THANK YOU 🙇

twitter: @bjdewilde, #textacy

slides: github.com/bdewilde/pygotham_2016

docs: textacy.readthedocs.io/

code: github.com/chartbeat-labs/textacy

BONUS

Features!

- easy access to and filtering of linguistic elements

```
>>> text = list(textacy.corpora.WikiReader('enwiki-latest-pages-
articles.xml.bz2').texts(limit=1))[0][10:]
>>> doc = textacy.TextDoc(text)

>>> list(doc.sents)[0]
Anarchism is a political philosophy that advocates self-governed societies
with voluntary institutions.

>>> list(doc.words(filter_stops=False))[:5]
[Anarchism, is, a, political, philosophy]

>>> list(doc.ngrams(2, filter_stops=True))[:3]
[political philosophy, advocates self, governed societies]

>>> list(doc.noun_chunks())[:3]
[Anarchism, political philosophy, self-governed societies]
```

Additional Resources

- topic modeling
  - theory: Blei's "Probabilistic Topic Models" review https://www.cs.princeton.edu/~blei/papers/Blei2012.pdf
- other NLP Python packages
  - `spacy`: https://spacy.io/
  - `nltk`: http://www.nltk.org/
  - `gensim`: https://github.com/RaRe-Technologies/gensim
  - `textblob`: http://textblob.readthedocs.io/