DataDeps.jl

and other foundational tools for data driven research (Especially NLP)

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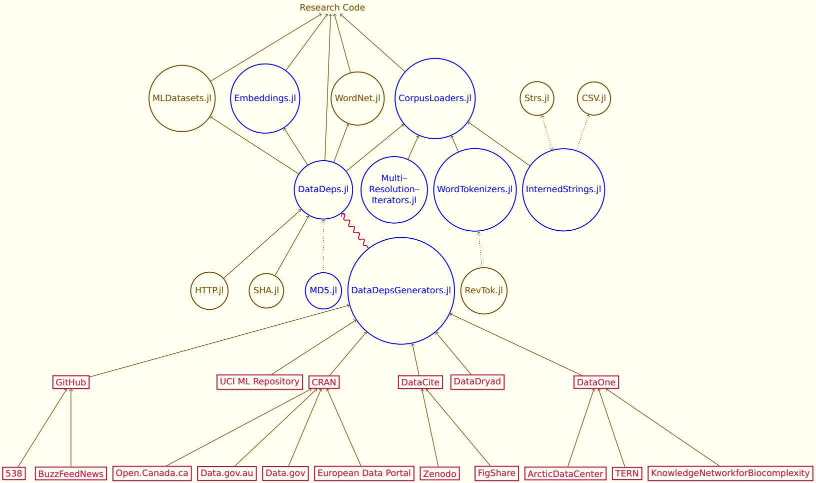
blbla


Research Code
MLDatasets.jl
Embeddings.jl
WordNet.jl
CorpusLoaders.jl
Strs.jl
CSV.jl
DataDeps.jl
Multi–
Resolution–
Iterators.jl
WordTokenizers.jl
InternedStrings.jl
HTTP.jl
SHA.jl
MD5.jl
DataDepsGenerators.jl
RevTok.jl
GitHub
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538
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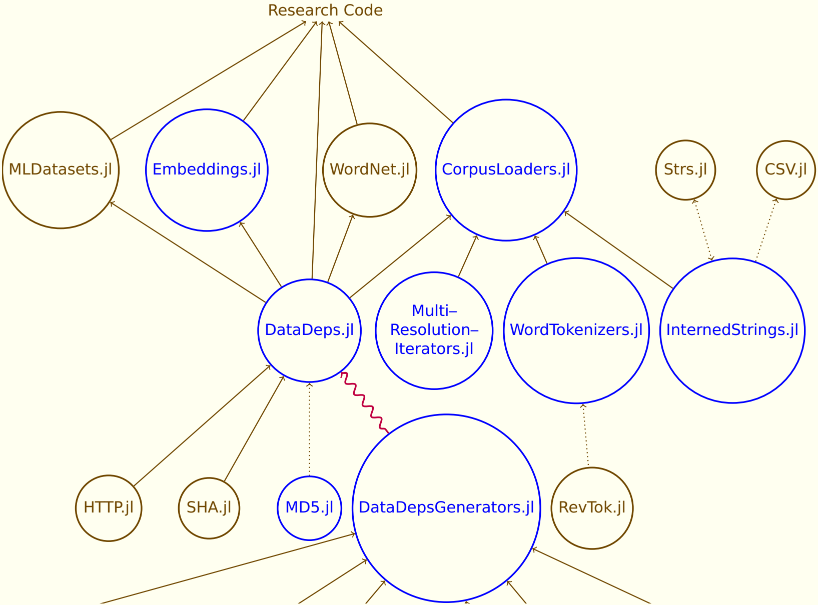
European Data Portal
Zenodo
FigShare
ArcticDataCenter
TERN
KnowledgeNetworkforBiocomplexity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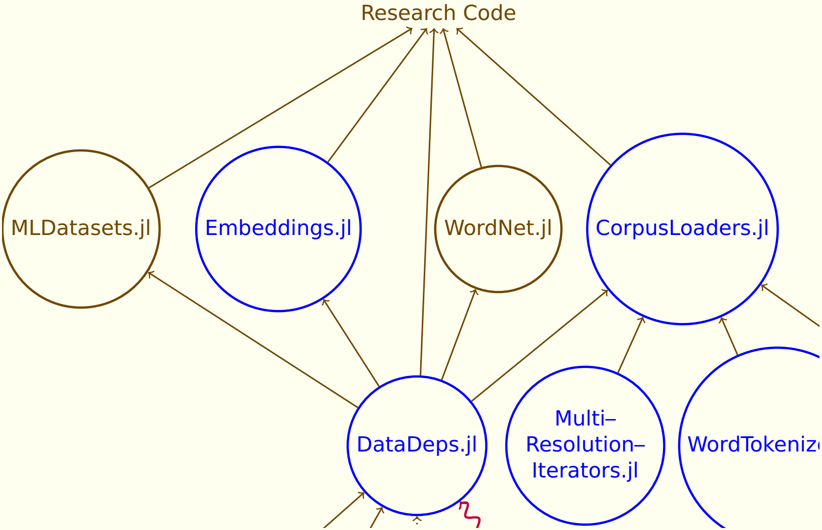
DataDeps.jl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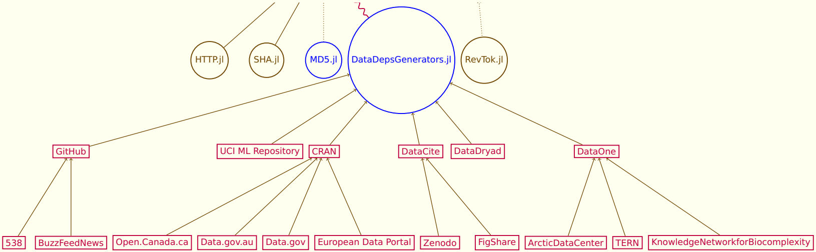
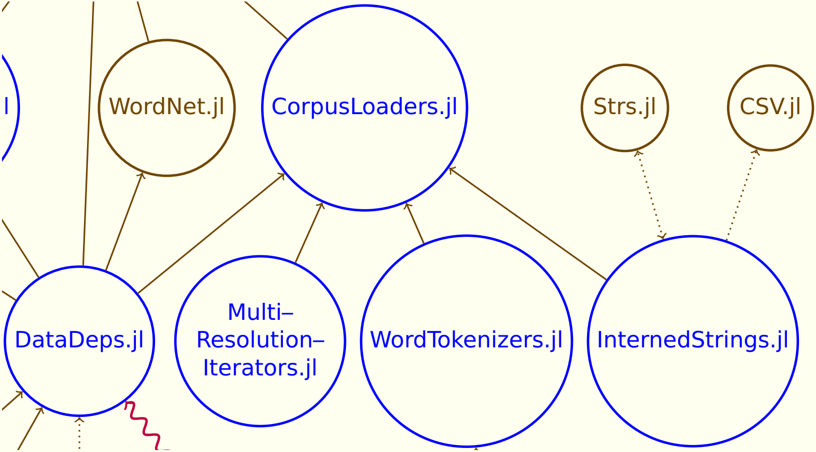
DataDepsGenerators.jl



CorpusLoaders.jl



Vabdewakke’s 6 Degree’s of Replicability

1. The results cannot seem to be reproduced.
2. The results could be reproduced by, requiring extreme effort.
3. The results can be reproduced, requiring considerable effort.
4. The results can be easily reproduced with at most **15 minutes** of user effort, requiring some proprietary source packages (MATLAB, etc.).
5. The results can be easily reproduced with at most **15 min** of user effort, requiring only standard, freely available tools (C compiler, etc.).

Vandewalle, Kovacevic, and Vetterli (2009), “Reproducible research in signal processing”

What happens when I try and reproduce someone’s research code?

1min Find the website from the paper, and download the code

2min Read enough of the README to get rough bearings

1min Find out where to get the data from and download the data

2min Try and remember how to use `tar -xzfvalphabetsoup` etc.

2min Workout how to tell script where data is

2min Setup any software dependencies etc.

3min Run the code and make sure it isn’t crashing etc.

2min Interpret the output

You can’t trust hardcoded paths; but they are nice to work with.

- Ideally we’ld just use hard-coded, absolute paths
- Absolute paths work with all applications
- Hard-coding the paths in code means less typing
- But they break if anything is moved.
- Making the path be passed in as an argument to the script solves this
  - but now user has to be typing it in to run it.
  - So harder to use.
  - You could include a bash-script that invokes it with the path, but now you’re just hard coding it somewhere else

You could making the path be passed in as an argument. But...

- Now user has to be typing it in to run it.
- So it is harder to use.
- You could include a bash-script that invokes it with the path, but now you’re just hard-coding it somewhere else

`datadep"Census 2018/populations.csv"` A path you can trust

- Always resolves to an absolute path to that file
- Even if that means it has to download it first
- But before resorting to downloading checks a large number of places
  - `<PKG>/deps/data`,
  - `~/.julia/datadeps`,
  - `/usr/share/datadeps`, etc.
- You know that if you use a datadep path it will resolve to a file that exists.

Current Usages of DataDeps.jl

MLDatasets.jl

- Provides easy access to a bunch of ML datasets
- `xs, ys = MNIST.traindata()`
- Gives you regular julia arrays

CorpusLoaders.jl

- Provides easy access to linguistic corpora
- `corpus_gen = load(WikiCorpus())`
- gives you a multi-resolution iterator

Current Usages of DataDeps.jl

Embeddings.jl

- Provides access to hundreds of pretrained word embedding models.
- `load_embeddings(FastText_Text{:fr})`
- gives you a table of French word embeddings.

WordNet.jl

- Look up lexical relations and definitions.
- `lemma = db['a', "glad"]`
- `antonyms(db, synsets(db, lemma)[1])`

DataDep Registration Block

```
register(DataDep("WordNet 3.0",
"""
Dataset: WordNet 3.0
Website: https://wordnet.princeton.edu/wordnet

George A. Miller (1995).
WordNet: A Lexical Database for English.
Communications of the ACM Vol. 38, No. 11: 39-41.

License:
This software and database is being provided to you,
the LICENSEE, by Princeton University under
the following license...
""",
"http://wordnetcode.princeton.edu/3.0/WNdb-3.0.tar.gz",
"658b1ba191f5f98c2e9bae3e25...";
post_fetch_method = unpack
))
```

Registration Block: Breakdown

```
register(DataDep("DataDepName",
"""
Free Text Field Displayed to user before download.
Use to give credit, and tell people about licensing.
Or other messages.
""",
"Download URL",
"file hash (if you skip this, it will be printed on down
post_fetch_method = function to run on downloaded files
))
```

Registration Block: Recursive Example

```
using MD5

register(DataDep("DataDepNameRec",
"""
Warning these files are all together 39.8GB
""",
["http://example.com/readme.txt",
     ["http://example.com/data1.zip",
      "http://example.com/data2.tar.gz",
     ]
],
(md5, "658b1ba191f5f98c2e9bae3e25")
post_fetch_method = [identity, unpack]
))
```

DataDepGenerators.jl

Developers still have to write registration blocks

- DataDeps.jl shifts the work from manually to automatic
- But defining the work still has to be done.
- Writing a registration block normally means copy and pasting from a website.
  - Download URL
  - Author Name
  - Publication Date
  - License

For published data this information is all available from some API

WordTokenizers.jl

Configurable `tokenizer` and `sentence_segmenter`.
Abuses `eval` and #265 so that you can change the tokenizer being used globally.
Also compatible with externally defined tokenizers like RevTok.jl.

Nabbed the original Penn Tokenizer sed-script.
Wrote some code that converts basic sed language into julia AST.
Ported some of NLTK's tokenizers into sed.

Rule-based sentence splitter based on Sampo Pyysalo & Yoshimasa Tsuruoka's perl script.

Regex is just really good at working with English.

InternedStrings.jl: All these duplicate strings are using all my memory

- Strings are immutable, so we only need one copy of each
- We can maintain a pool of `WeakRefs` to each string allocated.
- `str = intern(str)`
  - Add the `str` to the pool if not already
  - replace `str` with an element of the pool
- Because the pool only has `WeakRefs` strings can still be garbage collected.

MultiResolutionIterators.jl: The structure of a Corpus

- Corpus
- made up of: Documents
- made up of: Paragraphs
- made up of: Sentences
- made up of: Words or Tokens
- made up of: Letters or Characters

MultiResolutionIterators.jl: Not everyone wants every level of structure

Full corpus structure is
Documents ►Paragraphs ►Sentences ►Words ►Letters

A Corpus Linguist may want
a stream of: Sentences ►Words

An Information Retrieval researcher may want
a stream of: Documents ►Words

A char-RNN language modeller might just want
a stream of Letters