

The FloWr Framework

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Flowchart Writer

Automated Flowchart...

Construction

Optimisation

Alteration

... for creative systems

What is it?

- Java-based platform for the development of creative systems
 - systems represented as flowcharts
 - flowchart nodes are task-specific processes
 - data transfer - output variables + input parameters

Input/Output for WordSenseCategoriser

WordSenseCategoriser input parameters

requiredSense: aj0
stringsToCategorise: #dictionaryWords
positionForSense:

WordSenseCategoriser output variables

#adj...s +
Name: #adjectives
WordSenseCategoriserOutput all
haveMainSense[*] first
dontHaveMainSense[*] middle
mainSense last
random
17

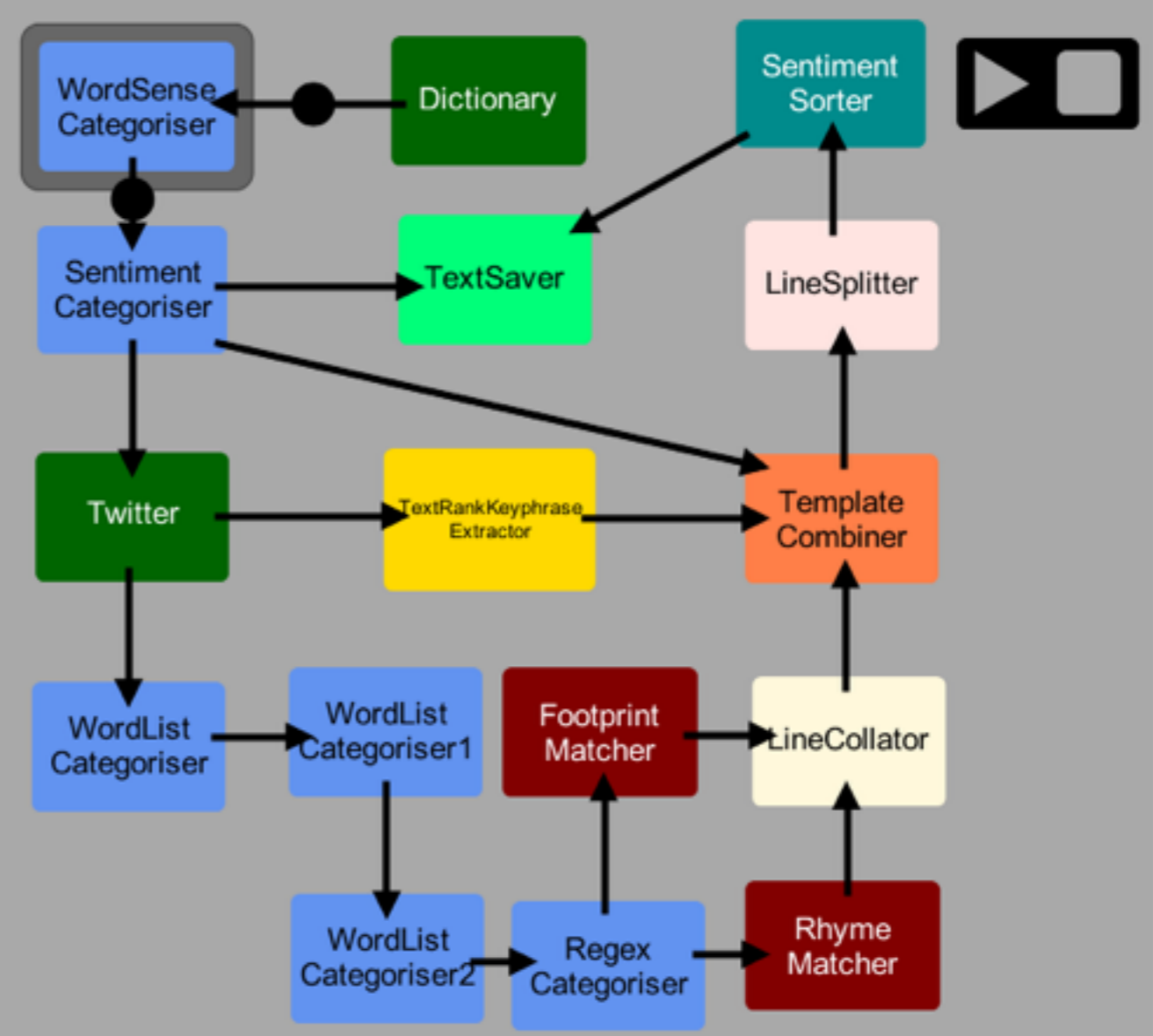
Update

WordSenseCategoriser Output

#adjectives

abdominal

1
772



Make-up

- Flow chart editing tool
- Library of task-specific nodes
- Flow chart running
- Framework for developing nodes
- Automation tools

Motivations

- Primary - automate creative process development
 - software develops process rather than follows it
 - hand over creative responsibility at process level
 - for discovery rather than problem-solving
- Secondary - development environment & repository
 - rapid development / experiment environment
 - code sharing
 - collaboration & co-operation

Background

- automated process development
 - hand over creative responsibility
 - not greatly studied so far, see paper
 - evolutionary art, game mechanics, ILP
 - exploratory vs task-specific
- flowcharting systems
 - common, paradigm rather than aim
 - from scratch - adaptation & power vs control & simplicity

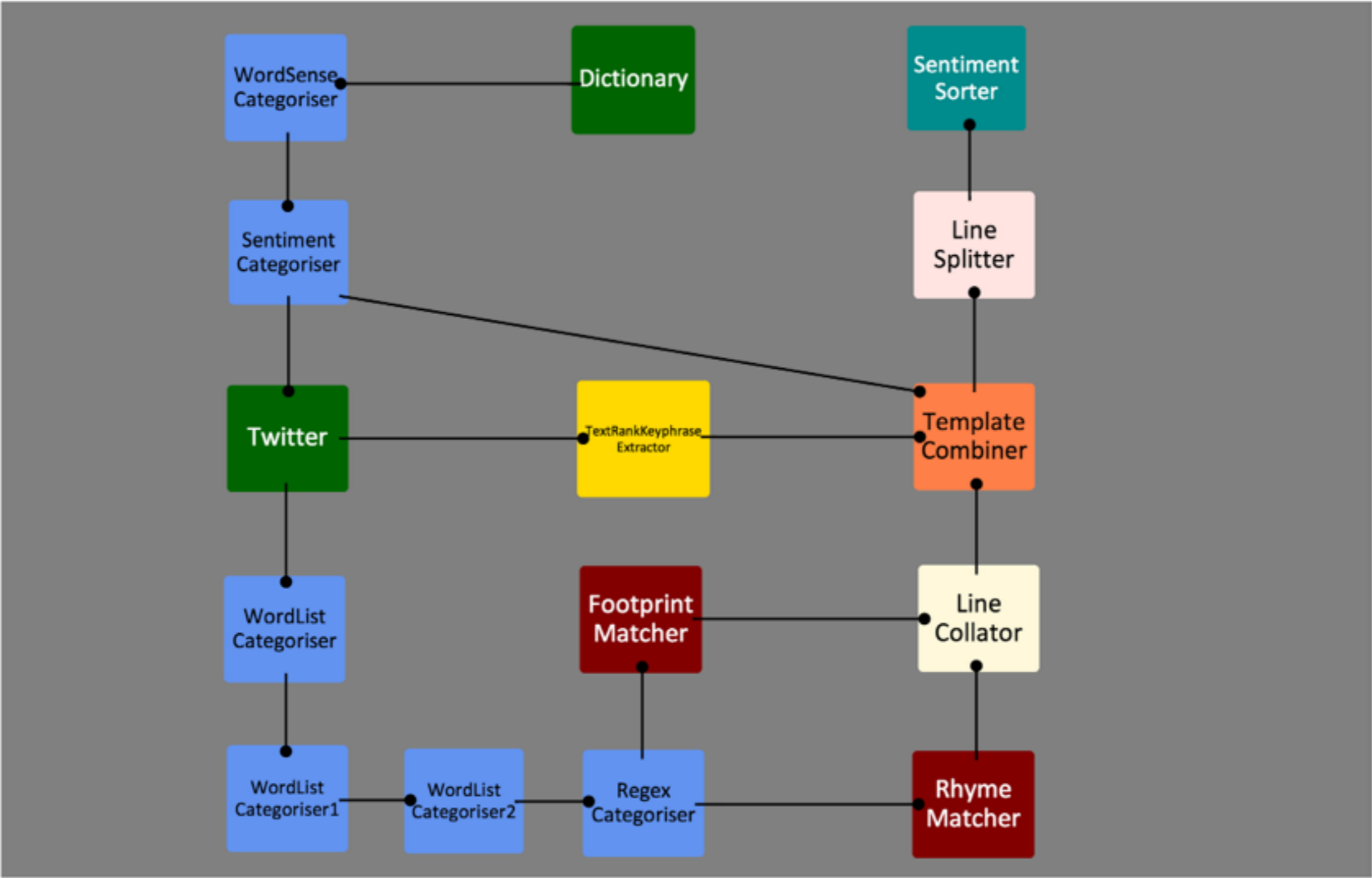
Rest of Talk

- Show the system and interface
- Show some of the flowchart-based systems
- Discuss some of the nodes in the library
- Describe the automation experiments
- Future
- Sales pitch

demotwitterpoems

- run
- stop
- switch
- new
- copy
- delete
- script
- logout

- future work
- schedule
 - optimise
 - generate
 - twitterbot



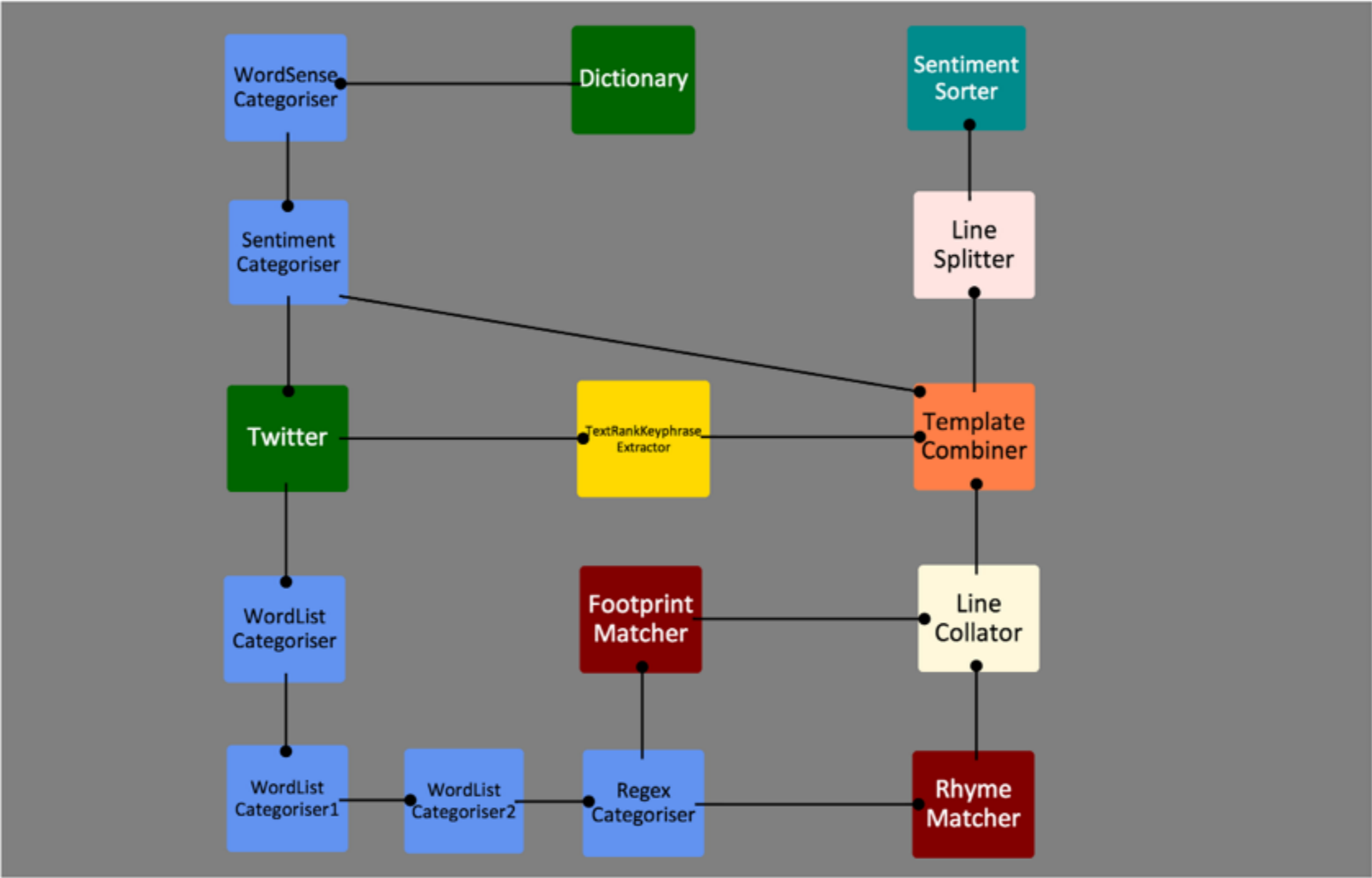
Scripting and Framework

- Nodes extend the *ProcessNode* class
- *ProcessOutput* classes for each node
- Flowchart a list of nodes in an underlying script
- Script includes parameters & output variables
- Execution order determined by examination

demotwitterpoems

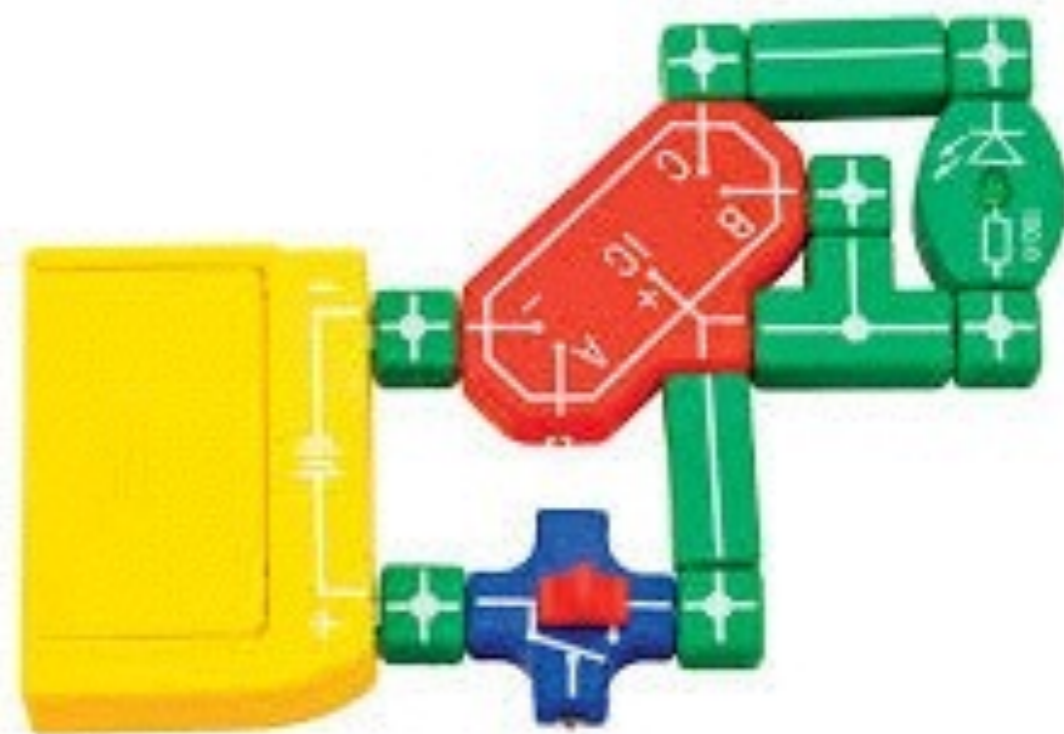
- run
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Automation

- main motivation
 - “ ... study the potential of automated process generation ... ”
- hitting the right level of complexity
 - flexible enough
 - not too complex



3 Grimshaw Park

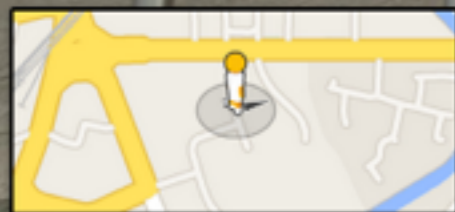
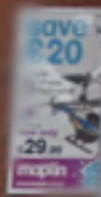
Blackburn BB2 3DY, UK – approximate address

NEW! Street View - Nov 2012

The electronics specialist

maplin

www.maplin.co.uk



Back to Map

Google

Search Space

- Node Types
- Parameters x parameter values
- Output variables - sub-objects x list selection
- Arrows
- Reduced by:
 - parameter restrictions (max, min, options)
 - parameter typing

Automation modes

- alteration & optimisation
 - maximise yield, minimise runtimes
- construction

Alteration

- tongue twister generation
- automated parameter tailoring
- regex generation

\bs[a-zA-Z]4\b\s1,\bs[a-zA-Z]5\b\s1,\bs[a-zA-Z]6\b

- applied to 100,000 Guardian articles
- returned 21 triples
 - 'small screen success'
 - 'short skirts showing'

demoregexguardianpoems

run

stop

switch

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optimise

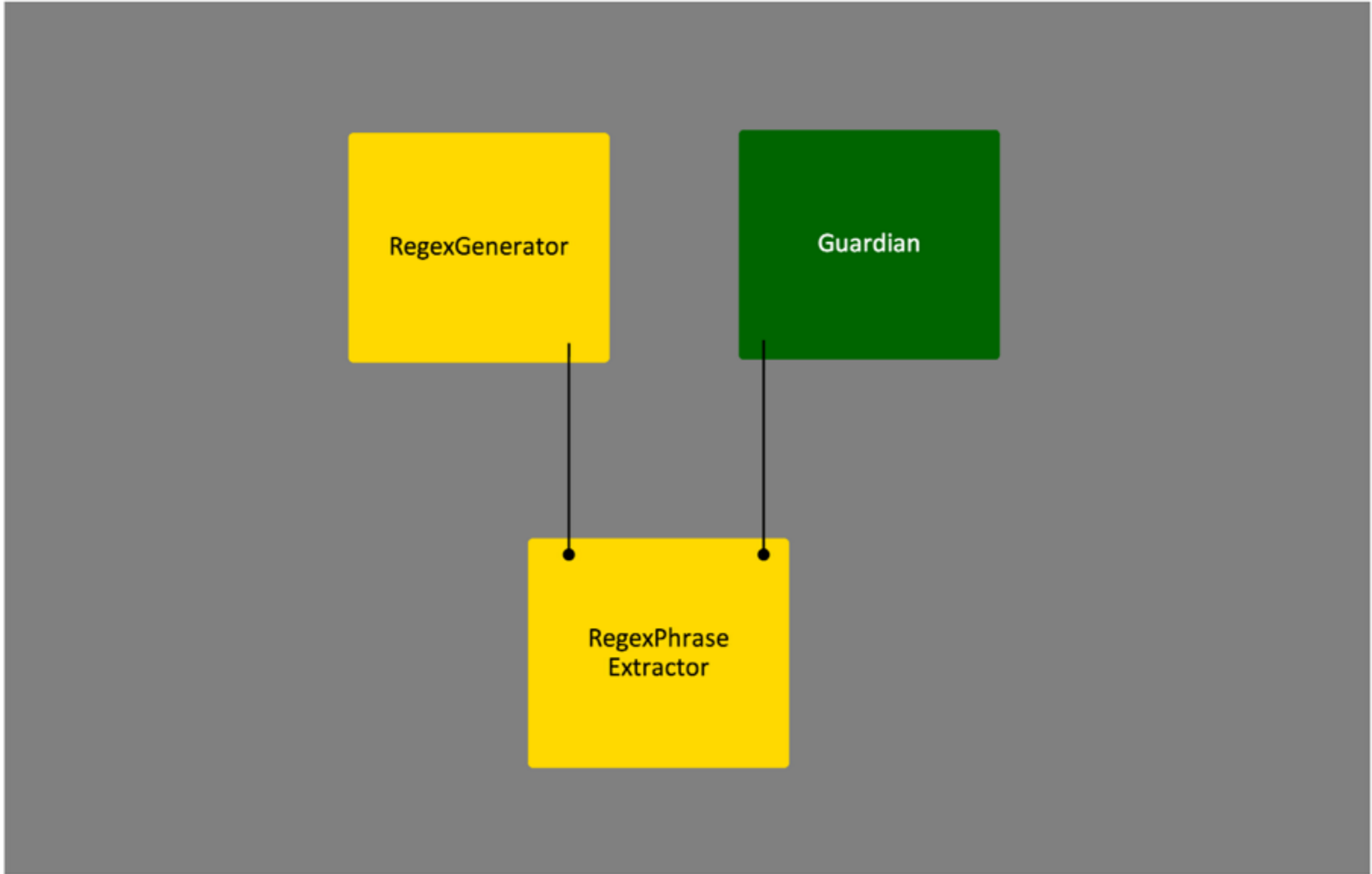
generate

twitterbot

RegexGenerator

Guardian

RegexPhrase
Extractor



S	NW	FWLen	WLCh	FLCh	LLCh	Yield(%)	Av.
1	3	3-6	equal	equal	none	55	48.6
2	3	3-6	equal	any	none	42	12.1
3	3-5	3-6	any	any	none	24	9.24
4	3	3-6	incr.	incr.	none	38	5.1
5	3-5	3-6	any	any	any	0	0

Table 2: Regex generation test yields (tongue twister texts).

posted	pretax	profit	cancer	despite	everyone
please	please	please	classy	devices	emerging
petrol	prices	played	carbon	dioxide	expelled
profit	public	policy	carbon	dioxide	emission
poorer	people	pushed	choice	defense	everyone

run

stop

switch

new

copy

delete

script

logout

future work

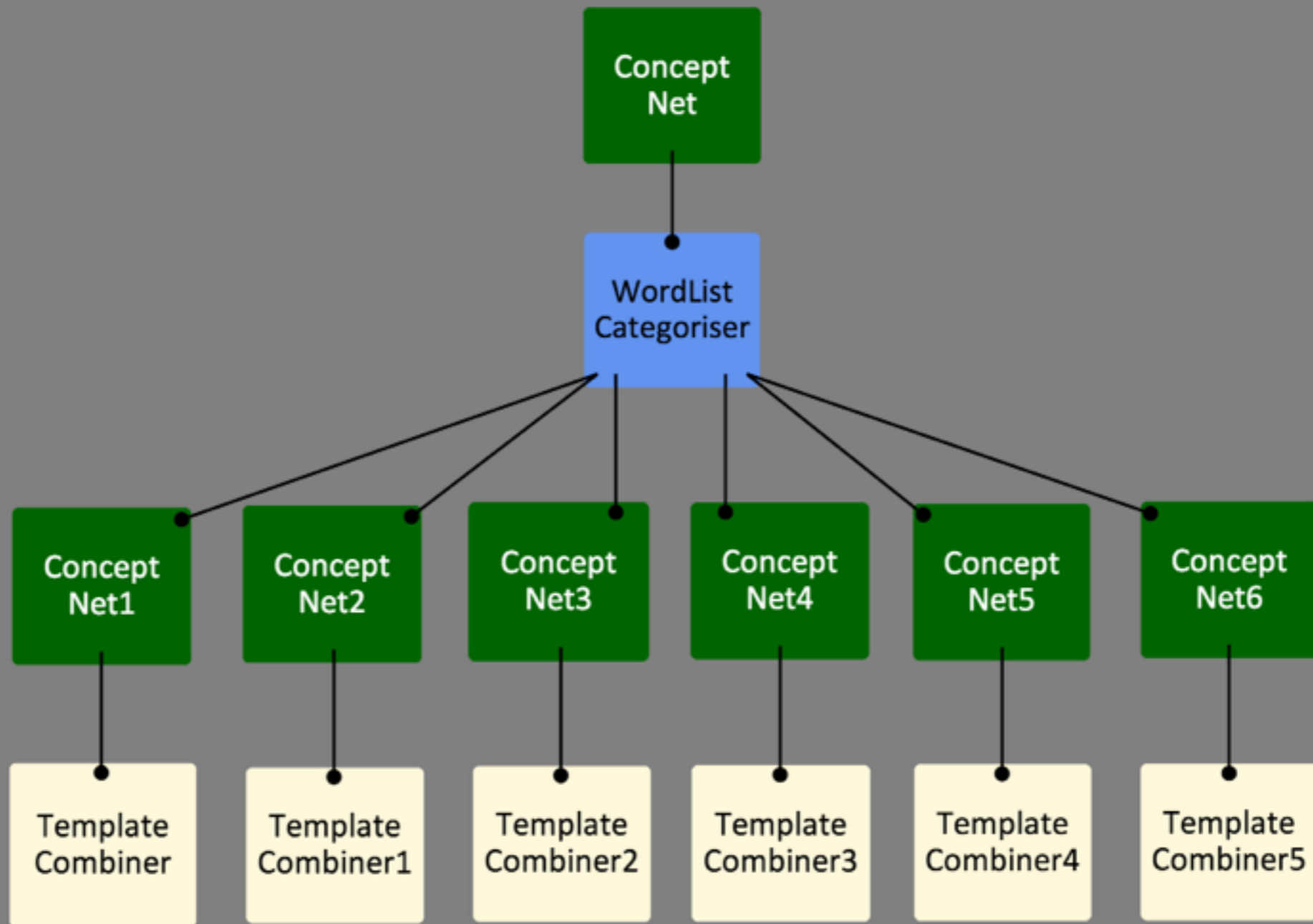
alter

optimise

generate

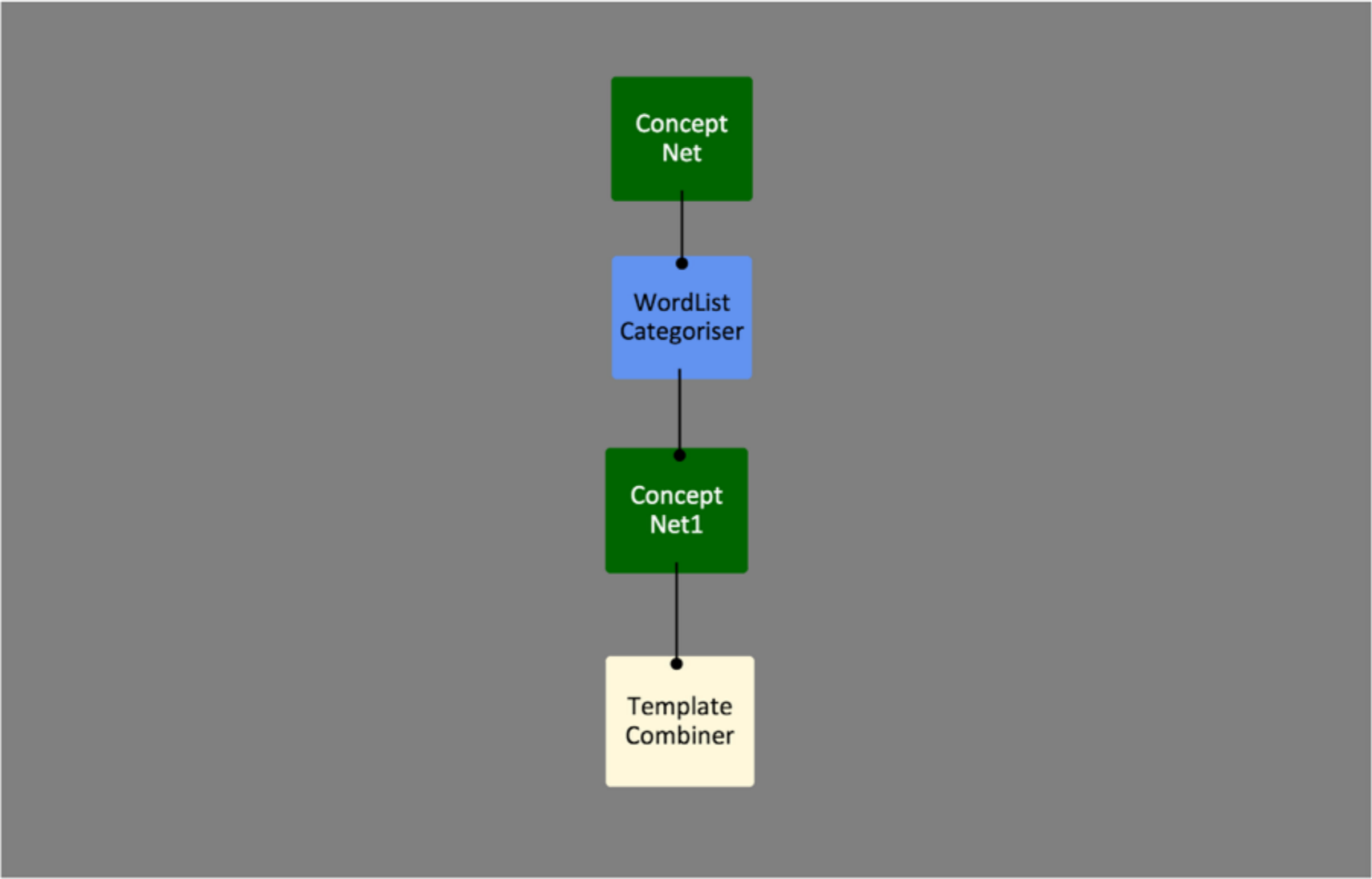
schedule

twitterbot



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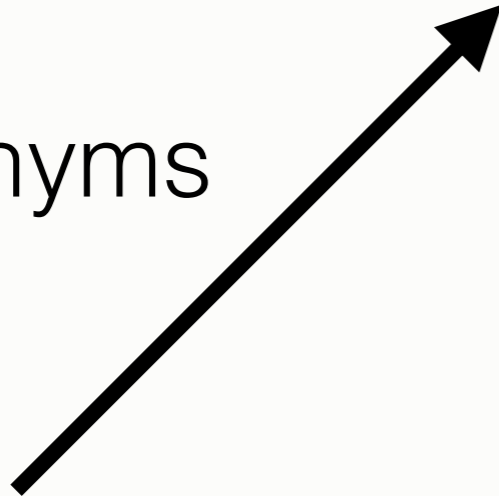
- future work
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WordNet suggestions

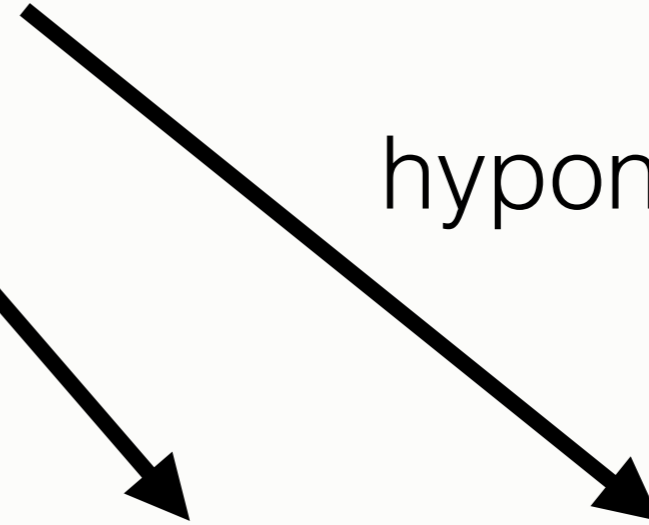
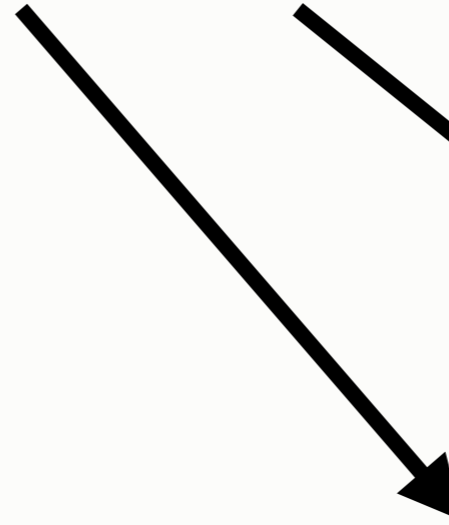
organism being

hypernyms



animal

hyponyms

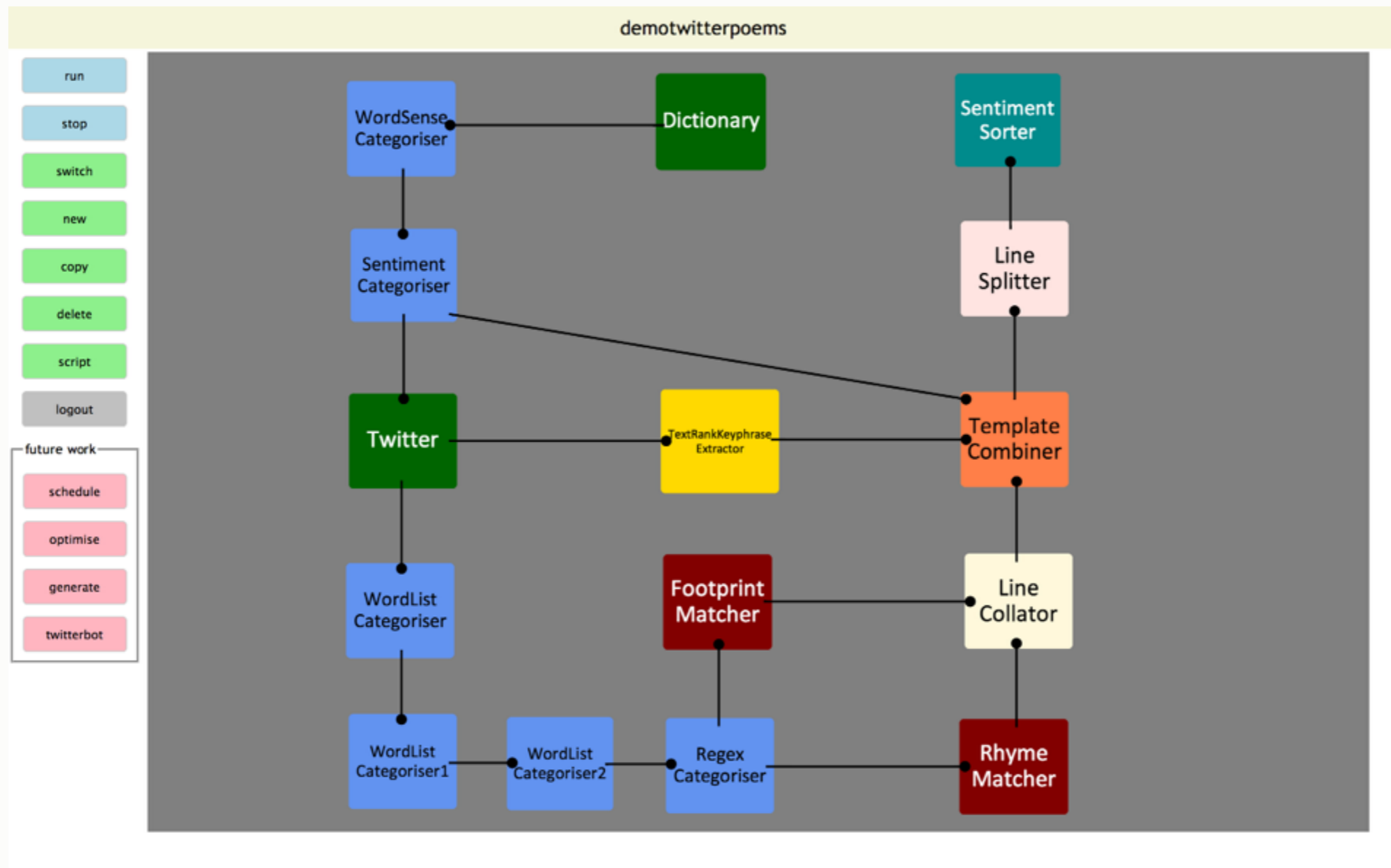


flora

person

mammal

Optimisation



Construction

{Twitter, Guardian, TextReader}

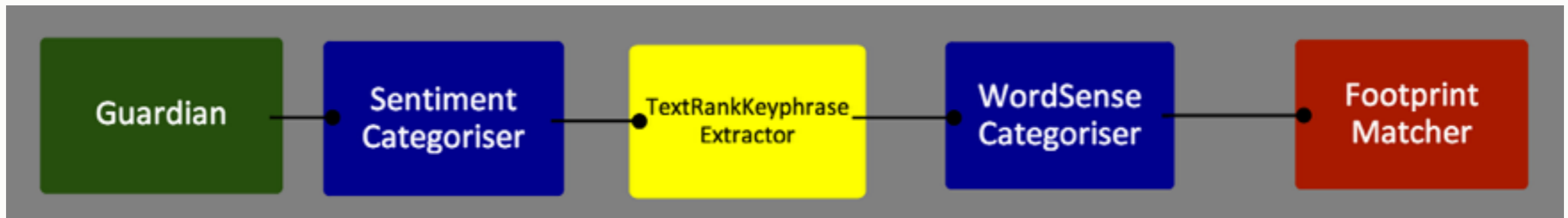
optional *{WordSenseCategoriser, Senti-mentCategoriser}*

{TextRankKeyphraseExtractor, RegexPhraseExtractor}

optional *{WordSenseCategoriser, SentimentCategoriser}*

{FootprintMatcher, RhymeMatcher}

- poetic couplet generation
- 108 node combos, 27k parameter options, 261m variables
- 200 runs generated 17 (8.5%) successfully running scripts
- output of 1-4m couplets

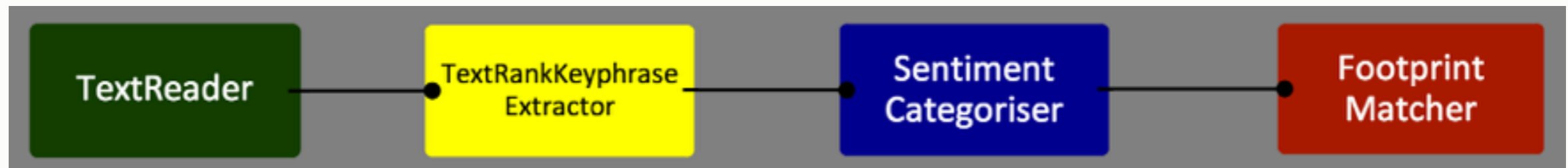


- 17 Guardian articles from first week of 2012
- one random neutral article
- extract key phrases
- select those starting with an adjective
- find same-syllable pairings

actual bodily harm
metropolitan police

chief inspector working
domestic violence

dangerous driving
potential recruits



```
text.retrievers.TextReader.TextReader_0  
textDirectory:churchill_speeches  
#TextReader_0_v1 = texts[r1]
```

```
text.extractors.TextRankKeyphraseExtractor.TextRankKeyphraseExtractor_0  
inputStringList:  
inputString:#TextReader_0_v1  
#TextRankKeyphraseExtractor_0_v2 = keyphrases[*].phrase
```

```
text.categorisers.SentimentCategoriser.SentimentCategoriser_0  
strings:#TextRankKeyphraseExtractor_0_v2  
wordPosition:0  
#SentimentCategoriser_0_v56 = extremes[*].text
```

```
text.matchers.FootprintMatcher.FootprintMatcher_0
```

52 couplets - [great air battle/despairing men] [greater efforts/greater ordeals]

Churchill's War

Good many people, great differences
good many people: outstanding increase.
Great organisations, greater security
greater security: terrible position

Great combatants, brilliant actions
Great preponderance, greater efforts

Great air battle, despairing men
Great air battle, brilliant actions

Great Britain, good account
Great Britain, good reason

Great flow: Great war
Great flow: Good men

Chess proceeds, good reason
Chess proceeds: victory

- curated by Russell Clarke
- Cox, T. (Presenter) Can a Computer Write Shakespeare? BBC Radio 4 documentary, first aired on 15th May 2014.

Summary

- Does everything we want it to so far
 - initial automation
 - promise for code sharing & collaboration
 - experimentation
- Currently being used - online whim machine
- Web version significantly improves on paper

Future

- Automation
 - alteration
 - optimisation
 - creation
 - evolutionary aspects to process generation (c.f. evolvable hardware)
 - assessment of success
 - genetic programming with our scripts

Future

- Open it up to everyone

- multi-user & security
- collaboration tools

- GUI improvements

- cross-browser
- bespoke inputs e.g. datepickers
- output types (images, sound, video)
- delivery (website, links, email, store)
- auto-layout

- Add-ons

- scheduled running & notifications
- create tweetbot
- deploy as standalone / website
- charts as compound nodes
- auto FACE-model detection

- Library

- web services (e.g. MetaphorMagnet)
- facilitating tools (auto web service)
- developer toolkit
- other language wrappers
- mash ups
- versioning
- more domains (mainly NLP now)
- we'll help anyone who's keen
- other Toolkits e.g. Pattern

- Other systems

- The Painting Fool, HR3, Nehovah ...
- feeds into library

- Looping & iteration

- TBD
- training nets
- evolutionary approaches

Future

- Automation
 - running all the time trying all combinations
 - on our server
 - tweeting results

Sales Pitch

ETA July

we'll help

we need your nodes

Sales Pitch

IT'S GOING TO BE FREE

Sales Pitch

FREE!

Sales Pitch

FREE!

Sales Pitch

FREE!

Sales Pitch

FREE!