

A computational grammar for Portuguese

bruno cuconato

2018-05-24

advisor: Alexandre Rademaker

Outline

introduction

thesis

plan

references

Topic

introduction

thesis

plan

references

grammars

- what are grammars?

grammars

- what are grammars?
- formal and natural languages

grammatical framework

- a DSL

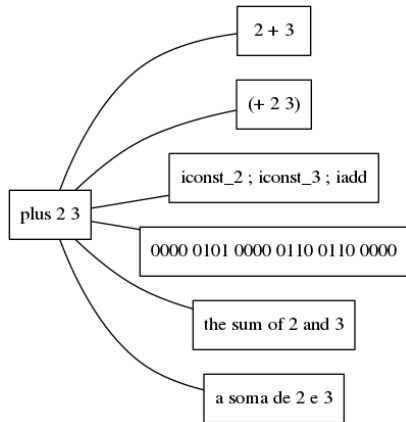
grammatical framework

- a DSL
 - for grammar writing

site

`grammaticalframework.org`

GF and compiler theory



the GF resource grammar library

- a common abstract syntax for 30+ natural languages
 - grammatical categories
 - constructor functions
 - test lexicon

the GF resource grammar library

- a common abstract syntax for 30+ natural languages
 - grammatical categories
 - constructor functions
 - test lexicon
- resource vs. application grammars
 - specialization

GF REPL examples

```
> import -retain present/TryPor.gfo
> cc -one mkS (mkCl (mkNP these_Det \
>   (mkN "bala"))) (mkA "gostoso"))
estas balas são gostosas
```

GF REPL examples

```
> import present/LangEng.gfo
> p -lang=Eng "these fish are rotten"
PhrUtt NoPConj (UttS (UseCl
  (TTAnt TPres ASimul) PPos
    (PredVP (DetCN (DetQuant this_Quant NumPl)
      (UseN fish_N))
      (UseComp (CompAP (PositA rotten_A))))))
NoVoc
```

GF REPL examples

```
> import FoodsEng.gf FoodsPor.gf  
> p -lang=Eng -tr "that pizza is delicious" \  
> | l -lang=Por  
Pred (That Pizza) Delicious  
essa pizza é deliciosa
```

Topic

introduction

thesis

plan

references

objectives

- develop a Portuguese resource grammar

objectives

- develop a Portuguese resource grammar
- one of
 - RTE experiment on the SICK corpus
 - translate glosses from OWN-PT
 - use GF to validate and translate glosses of the WN-ILI
 - KB to NL (DHBB, DO, etc.)
 - NL to KB

motivation

- no GF grammar for Portuguese
 - GF application grammars can now include Portuguese
- one of few free grammars of Portuguese
- each of...

the Portuguese Resource Grammar (PRG)

- already have a functioning version

matrix MRS testsuite

- the dog was chased by Browne
o cachorro era por Bobi perseguido
o cachorro era perseguido por Bobi
- it bothered Abrams that Browne barked
incomodava Atlas que Bobi ladrasse
- it bothered Browne that Abrams chased cats
incomodava Bobi que Atlas perseguisse gatos

the SICK corpus

- corpus of sentences pairs with entailment annotation

examples

- An Asian woman in a crowd is carrying a black bag
An Asian woman in in the midst of many people is carrying a black bag
- An Asian woman in a crowd is carrying a black bag
A cramped black train is on the bag of a girl

Topic

introduction

thesis

plan

references

theoretical references

Linguistics

- Chomsky [4]
- Montague [9, 7]

Logic

- Per Martin-Löf [8]

Grammar formalisms

- HPSG [5]
- LFG [3, 2]
- GF [6, 17, 13, 10, 16, 11, 1, 14, 15, 12]

schedule

Task	Allotted time
write MWE of Portuguese resource grammar	Jan-Apr/2018
test grammar against MRS testsuite	May/2018
revise Portuguese RG on a need basis	Mar/2018
write a grammar for the SICK corpus	Jun-Oct/2018
develop a reasoning system for the RTE experiment	Jul-Oct/2018
write-up	Oct-Dec/2018

Topic

introduction

thesis

plan

references



Krasimir Angelov.

Orthography engineering in grammatical framework.

2015.



Joan Bresnan, Ash Asudeh, Ida Toivonen, and Stephen Wechsler.

Lexical-functional syntax, volume 16.

John Wiley & Sons, 2015.



Miriam Butt, María-Eugenia Niño, and Frédérique Segond.

A Grammar Writer's Cookbook.

CSLI Publications, Stanford, CA, 1999.



Noam Chomsky.

On certain formal properties of grammars.

Information and control, 2(2):137–167, 1959.

-  Ann Copestake, Dan Flickinger, Carl Pollard, and Ivan A. Sag.

Minimal recursion semantics: An introduction.

Research on Language and Computation,
3(2):281–332, Jul 2005.

-  Grégoire Détrez and Aarne Ranta.

Smart paradigms and the predictability and complexity of inflectional morphology.

In Proceedings of the 13th Conference of the European Chapter of the Association for Computational Linguistics, EACL '12, pages 645–653, Stroudsburg, PA, USA, 2012. Association for Computational Linguistics.



Theo M. V. Janssen.

Montague semantics.

In Edward N. Zalta, editor, *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University, spring 2017 edition, 2017.



Per Martin-Löf and Giovanni Sambin.

Intuitionistic type theory, volume 9.

Bibliopolis Napoli, 1984.



Richard Montague.

Formal Philosophy: Selected Papers of Richard Montague. Ed. and with an Introd. by Richmond H. Thomason.

Yale University Press, 1974.



Aarne Ranta.

Computational semantics in type theory.

Mathématiques et sciences humaines. Mathematics and social sciences, (165), 2004.



Aarne Ranta.

Grammatical framework: a type-theoretical grammar formalism.

Journal of Functional Programming, 14(2):145–189, 2004.



Aarne Ranta.

***From Semantics to Computer Science. Essays in honour of Gilles Kahn*, chapter Grammars as software libraries.**

Cambridge University Press, 2009.



Aarne Ranta.

The gf resource grammar library.

Linguistic Issues in Language Technology, 2(2):1–63,
2009.



Aarne Ranta.

**Creating linguistic resources with the grammatical
framework.**

LREC Tutorial, Malta, 2010.



Aarne Ranta.

***Grammatical Framework: Programming with
Multilingual Grammars.***

CSLI Publications, Stanford, 2011.

ISBN-10: 1-57586-626-9 (Paper), 1-57586-627-7 (Cloth).



Aarne Ranta.

Translating between language and logic: What is easy and what is difficult.

In *CADE*, pages 5–25. Springer, 2011.



Aarne Ranta and Krasimir Angelov.

Implementing controlled languages in GF.

In *Workshop on Controlled Natural Language, CNL*, pages 8–10, 2009.