

# Esfinge at CLEF 2007: First Steps in a Multiple Question and Multiple Answer Approach



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Esfinge on the Web: <http://www.linguateca.pt/Esfinge/>

## Esfinge Overview

- General domain question answering system, participation in QA@CLEF since 2004.
- The starting point was the redundancy-based architecture described in [Brill 2003].
- Exploiting the redundancy in the Web where Portuguese is one of the most used languages.
- For 2007: use of the M,N-O,P model for QA (multiple questions, multiple answers), anaphoric resolution, and Wikipedia.

## Answer Selection

- Merging different runs by analysing the result (3 to 6 runs)
  - Number of times an answer occurs in the results
  - The relevance of the support snippet regarding the question text

➤ Automatic Selection achieves 55% - 69% of the correct answers in the best possible selection

➤ Combination of several runs did not produce better results than some of the individual runs combined and therefore needs further attention

## Experiments

- Comparing runs with two different regular expression pattern generations
  - Esfinge regular expression patterns
  - PALAVRAS generated patterns

- Measuring the influence of the Web
  - Web + Newspapers + Wiki
  - Newspapers + Wiki

- Measuring the import of using Wikipedia
  - Web + Newspapers + Wiki
  - Web + Newspapers

➤ Using phrase patterns based on the syntactical analysis by PALAVRAS seems to slightly increase the performance

➤ Addition of Wikipedia brought 37.5% (9/24) increase in performance

➤ Use of the Web brought 32% (8/25) increase in performance

## Future Work

- Extend the question reformulation module
  - create expressions that include the answer expected position
  - use ontologies
  - use further syntactic analysis
- Create high precision filters for closed-class types of answers
- Improve choice among several answers
- Weigh redundancy by lexical counts in each document collection
- Use link structure of Wikipedia
- Do an empirical study for weighting alternative questions

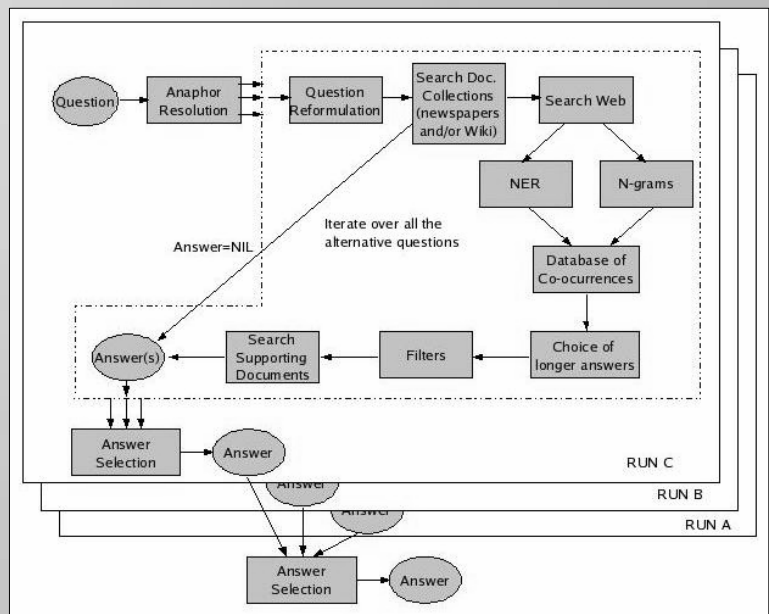
➤ Bick, Eckhard. The Parsing System "Palavras": *Automatic Grammatical Analysis of Portuguese in a Constraint Grammar Framework*. PhD thesis, Aarhus University, 2000

➤ Brill, Eric. 'Processing Natural Language without Natural Language Processing', in A. Gelbukh (ed.), *CICLing 2003*, LNCS 2588, Springer-Verlag Berlin Heidelberg, 2003, pp. 360-9.

## Anaphor Resolution

- Coping with five kinds of anaphoric expressions (see paper)
- Invoking PALAVRAS, a broad-coverage parser for Portuguese [Bick 2000]
- Dealing with sentence arguments (object, subject, etc.) as candidates
- Shallow reference resolution algorithm: 71% accuracy in general (over 122 questions)
- Producing several questions from the original one
- As a by-product, producing "syntactically-based patterns" as an alternative to regular expression reformulation of Esfinge
- Example (3 questions out of 1):
  - *Contra quem é que Steffi Graaf não jogou nas semi-finais de Roland Garros?*
  - *Contra quem é que o pai de Steffi Graaf não jogou nas semi-finais de Roland Garros?*
  - *Contra quem é que ela não jogou nas semi-finais de Roland Garros?*

This module had relatively good results (although it had little influence in the final performance given the few cases it had to resolve)



## Results

#	Description	Right Answers (all questions)			Unsupported Answers		Inexact Answers		Right Answers (1st questions in 150 tuples)			Total NIL
		o	so	no	-	+	o	so	no			
1	Esf071PTPT Official	15	0	8	2	4	0	12	0	4	143	
2	Esf072PTPT Official	11	0	10	3	2	0	6	0	5	181	
3	Web + News + Wiki	33	2	6	2	7	0	27	2	5	74	
4	News + Wiki	25	0	6	1	3	0	21	0	5	74	
5	Web + news	24	1	8	4	6	0	19	1	6	107	
6	Automatic selection 3-5	31	1	6	3	7	0	27	1	5	74	
7	Best Selection 3-5	46	2	--	4	8	0	38	2	--	--	
8	Web + News + Wiki	35	3	5	1	6	1	28	3	3	67	
9	News + Wiki	25	2	7	3	7	0	19	2	4	98	
10	Web + News	28	0	5	1	3	1	21	0	3	67	
11	Automatic Selection 8-10	34	2	5	2	6	1	27	2	3	68	
12	Best Selection 8-10	49	3	--	2	8	1	38	3	--	--	
13	Automatic Selection 3-5, 8-10	34	1	6	2	6	1	30	1	4	73	
14	Best Selection 3-5, 8-10	61	3	--	5	10	1	48	3	--	--	
15	Best Run in 2006	50	--	--	3	7	2	--	--	--	--	
16	CLEF2006A	57	--	--	6	10	2	--	--	--	--	
17	CLEF2006B	56	--	--	4	7	1	--	--	--	--	

i) Right answers (including NIL) ii) Partial right answers on lists iii) NIL right answers