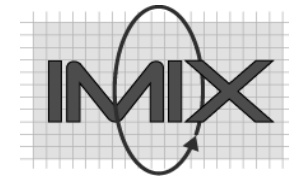


Off-line Answer Extraction for Dutch Question Answering



CLIN
December 17th 2004

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University of Groningen





Answer extraction for question answering

- Task of question answering (QA):
Find an answer in a large text collection to a question posed in natural language.
- Answer extraction:
Extract answers by looking at frequently occurring patterns.



Example of frequent answer structure

- What is the capital of [country]?
Wat is de hoofdstad van Bulgarije?
- [answer], the capital of [country]
Sofia, de hoofdstad van Bulgarije
- The [country-adj] capital [answer]
De Bulgaarse hoofdstad Sofia



Off-line answer extraction

- Extract answers from a text before the QA-process and store them
- Two ways to do that (Mur et al., 2004)
 - Regular Expressions
 - Syntactic Patterns



Overview

Off-line extraction

Overview

Our QA-system

Patterns

Table Creation

Table lookup

Evaluation & Results

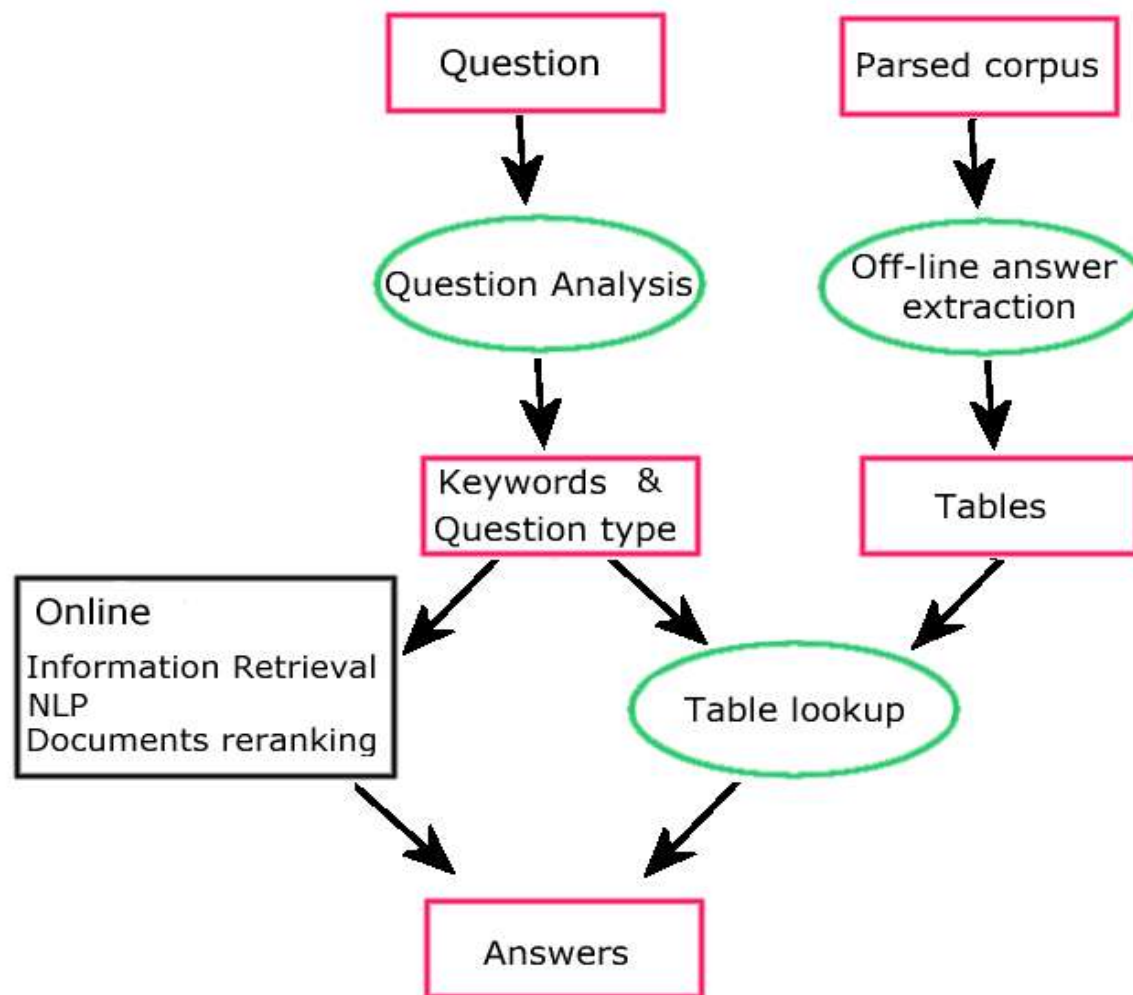
Conclusion

- Off-line answer extraction
- Our QA-system
- Patterns
- Table Creation
- Table lookup
- Evaluation and Results
- Conclusion and Future work



Our QA-system: Joost

- Off-line extraction
- Overview
- Our QA-system**
- Patterns
- Table Creation
- Table lookup
- Evaluation & Results
- Conclusion





Parsing with Alpino

Off-line extraction

Overview

Our QA-system

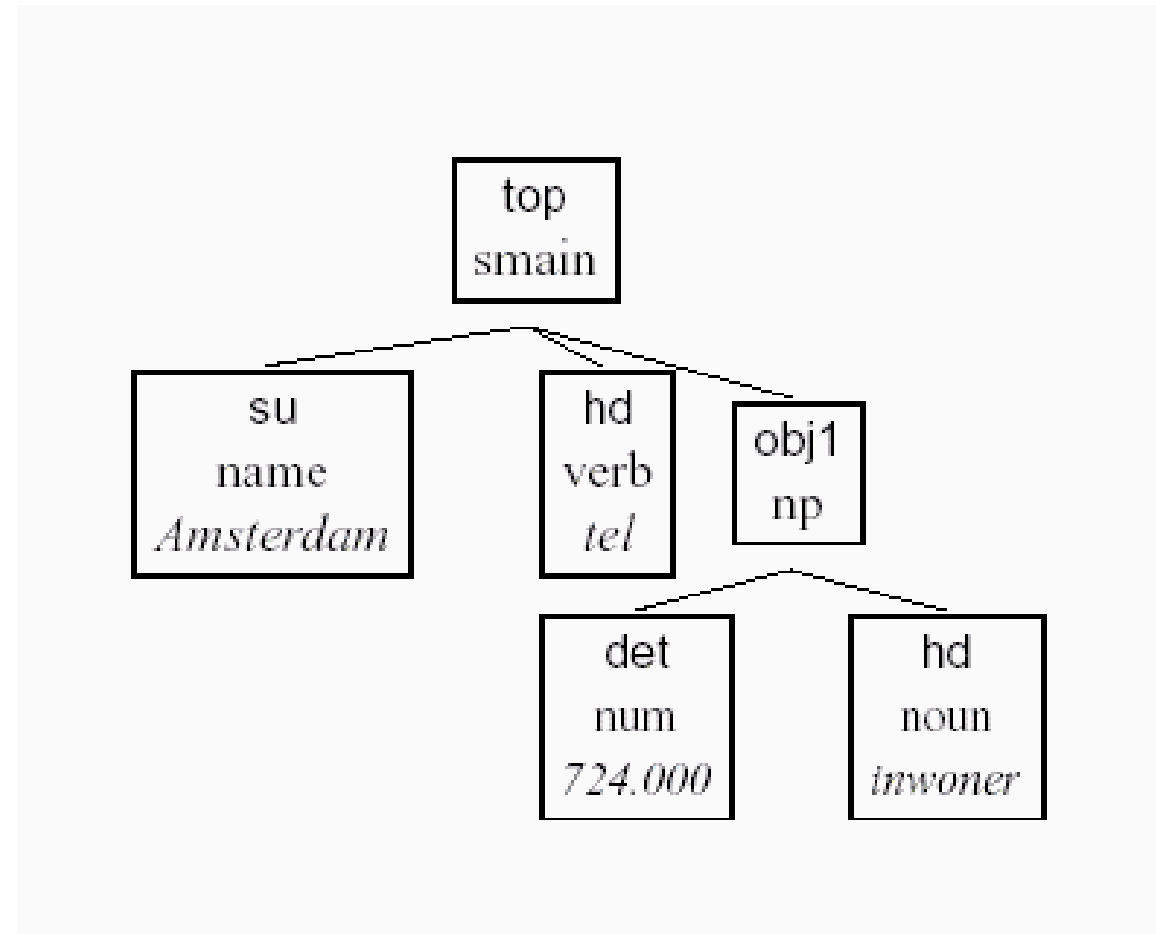
Patterns

Table Creation

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Conclusion





Categories

Off-line extraction

Overview

Our QA-system

Patterns

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Included:

Abbreviations, Capitals, Currency,
Functions, Inhabitants, Locations,
Manner of death

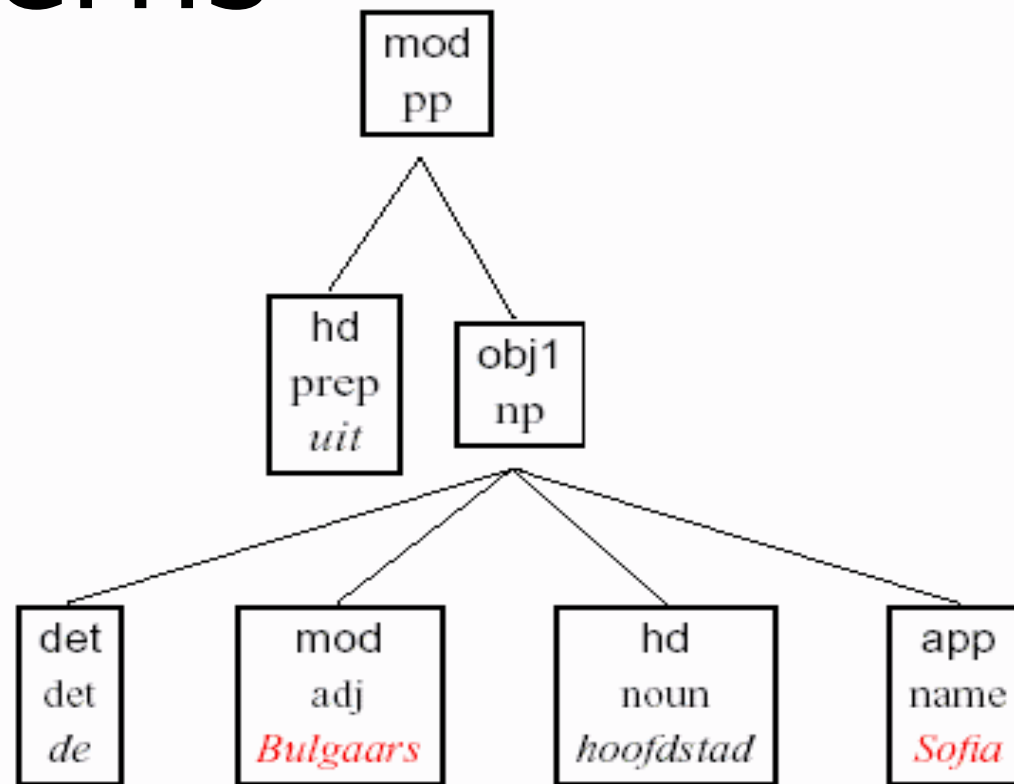
Excluded:

Definition, Date, Measure and 'Which'



Patterns

- Off-line extraction
- Overview
- Our QA-system
- Patterns**
- Table Creation
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- Evaluation & Results
- Conclusion



hoofdstad (noun) $\xrightarrow{\text{mod}}$ Country (adj)

hoofdstad (noun) $\xrightarrow{\text{app}}$ Capital (name)



Table Creation

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...
...
capital('Brazilië',5,'Brasilia','AD19950207-0050-277-1.xml').
capital('Brazilië',5,'Brasilia','NH19941222-0114-911-1.xml').
capital('Brazilië',5,'Brasilia','NH19950127-0035-244-8.xml').
capital('Brazilië',5,'Brasilia','NH19950217-0007-45-1.xml').
capital('Brazilië',5,'Brasilia','NH19950224-0043-306-4.xml').
capital('Bretagne',1,'Rennes','NH19940204-0076-551-1.xml').
capital('Bulgarije',5,'Sofia','AD19940422-0032-220-2.xml').
capital('Bulgarije',5,'Sofia','NH19940103-0037-264-2.xml').
capital('Bulgarije',5,'Sofia','NH19950421-0087-773-5.xml').
capital('Bulgarije',5,'Sofia','NH19951019-0133-1065-2.xml').
capital('Bulgarije',5,'Sofia','NH19951026-0144-993-2.xml').
capital('Burundi',1,'Bujumbara','NH19950413-0027-189-2.xml').
...
...



Table Lookup

Off-line extraction

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Q: *Wat is de hoofdstad van **Bulgarije**?*

Question analysis ->

question type:capital, keyword(s):**Bulgarije**

capital(**Bulgarije**, 5,**Sofia**,AD19940422-0032-220-2.xml).

A: **Sofia**



Evaluation

Off-line extraction

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- Data

- Training CLEF 2003

- AD and NRC 1994/1995

- 450 questions, 370 with answer

- Testing CLEF 2004

- AD and NRC 1994/1995

- 200 questions, 185 with answer

- MRR

- The score for a question is the reciprocal of the rank at which the first correct answer occurs or 0 if no correct answer is found. The score for the whole system is then the mean over the set of questions.



Results (1)

MRR for questions answered by Qatar

Off-line extraction

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Corpus	# Questions	MRR Qatar	MRR Online
CLEF 2003	65/370	0.73	0.40
CLEF 2004	24/185	0.71	0.46



Results (2)

CLEF 2003
370 questions

Off-line extraction

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Evaluation & Results

Conclusion

	Without tables	With tables
MRR	0.49	0.54
# correct on 1 st	145 (39%)	174 (47%)

- 65 (18%) questions answered by Qatar



Results (3)

CLEF 2004
185 questions

Off-line extraction

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Conclusion

	Without tables	With tables
MRR	0.51	0.52
# correct on 1 st	77 (42%)	81 (44%)

- 24 (13%) questions answered by Qatar



Conclusion

Off-line extraction

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Evaluation & Results

Conclusion

- Precision is high for Off-line module
- Performance increases
- Too few questions are answered
- Unexpected question types will never be answered



Future work

Off-line extraction

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Evaluation & Results

Conclusion

- Is it possible to answer more questions with Qatar?
 - Using ontology to classify 'which' questions
 - Discovery of patterns by machine learning techniques
 - Coreference resolution (maybe for Definition questions)

Off-line answer extraction for Dutch QA



Questions?

Off-line answer extraction for Dutch QA



RUG

University of Groningen



Evaluation & Results (4)

Table lookup per Category (CLEF 2004)

Off-line extraction

Overview

Our QA-system

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Categories	MRR	# questions
Capital	1.00	3 of 3
Inhabitants	1.00	1 of 1
Location	1.00	3 of 20
Abbreviation	1.00	1 of 4
Manner of death	0.667	3 of 5
Function	0.545	11 of 24
Currency	0.500	2 of 5